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# Audit of the Department's Performance Based Data Management Initiative

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## FINAL AUDIT REPORT



**ED-OIG/A11-E0003**

**September 2005**

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Our mission is to promote the efficiency, effectiveness, and integrity of the Department's programs and operations.



U.S. Department of Education  
Office of Inspector General  
Information Technology Audits Division  
Washington, DC

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Statements that managerial practices need improvements, as well as other conclusions, and recommendations in this report, represent the opinions of the Office of Inspector General. Determination of corrective action to be taken will be made by appropriate Department of Education officials.

In accordance with the Freedom of Information Act (U.S.C. Section 552), reports issued by the Office of Inspector General are available if requested; to members of the press and general public to the extent information contained therein is not subject to exemptions in the Act.



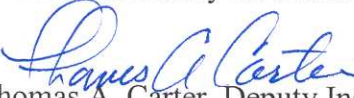
UNITED STATES DEPARTMENT OF EDUCATION

OFFICE OF THE INSPECTOR GENERAL

SEP 29 2005

**MEMORANDUM**

**TO:** Tom Luce  
Assistant Secretary for Planning, Evaluation and Policy Development

**FROM:**   
Thomas A. Carter, Deputy Inspector General  
Office of Inspector General

**SUBJECT:** FINAL AUDIT REPORT  
Audit of the Department's Performance Based Data Management Initiative  
Control No. ED-OIG/A11-E0003

Attached is the subject final audit report that covers the results of our review of the Department's Performance Based Data Management Initiative. An electronic copy has been provided to your Audit Liaison Officer. We included your formal response to our draft report in Appendix A of the final report.

Corrective actions proposed (resolution phase) and implemented (closure phase) by your office will be monitored and tracked through the Department's Audit Accountability and Resolution Tracking System (AARTS). ED policy requires that you develop a final corrective action plan (CAP) for our review in the automated system within 30 days of the issuance of this report. The CAP should set forth the specific action items, and targeted completion dates, necessary to implement final corrective actions on the findings and recommendations contained in this final audit report.

In accordance with the Inspector General Act of 1978, as amended, the Office of Inspector General is required to report to Congress twice a year on the audits that remain unresolved after 180 days from the date of issuance.

In accordance with the Freedom of Information Act (5 U.S.C. §552), reports issued by the Office of Inspector General are available to members of the press and general public to the extent information contained therein is not subject to exemptions in the Act.

We appreciate the cooperation given us during this review. If you have any questions, please call David Cole of my staff on 202-245-6917. Please refer to the control number in all correspondence related to the report.

Attachment

## Executive Summary

The Office of the Inspector General (OIG) audited the Performance Based Data Management Initiative (PBDMI) project and evaluated the Project Management Team's (PMT) Education Data Exchange Network (EDEN)<sup>1</sup> systems implementation to determine whether significant implementation and project management risks have been effectively mitigated to ensure that PBDMI will meet its investment goals of consolidating current data collection activities in a way that improves data quality and reduces the reporting burden for national education partners. Other audit objectives include determining whether system development methodologies are ensuring that system functionality requirements have been adequately defined and production systems meet end user performance requirements; project management and contract monitoring procedures have been implemented to ensure that project milestones are met and contract deliverables are performed; and the Department's EA has been consistently updated to support the technical requirements and business processes of PBDMI.

The Office of Management and Budget (OMB) has recognized that State and Local Education Agencies (SEA/LEA) engage in burdensome data reporting processes to comply with the Department's multiple education collection and reporting activities. Accordingly, OMB tasked the Department of Education (Department or ED) to develop an initiative that will create a web-based system for collecting timely student achievement data, and eliminate unnecessary and burdensome reporting of education data. In response, PBDMI was established and is considered critical to the success of several of the Department's programs, including the implementation of the Elementary and Secondary Education Act, as amended by the No Child Left Behind Act of 2001 (P.L. 107-110). Also, PBDMI supports the Department's goals of creating a culture of achievement and establishing management excellence.

Although the EDEN systems will not be fully developed and implemented until fiscal year 2006, the PMT indicates that the project has achieved success in a number of areas:

- The PBDMI Decision Support System (DSS) Pilot successfully collected large amounts of education data (i.e. over 2,200 files containing 63 different file types) from 50 SEAs via the Internet;
- The PMT met major investment goals by developing and implementing a production EDEN Submission System within original milestone dates;
- The EDEN Submission System has received education data submissions from 50 states; and
- The PMT has defined over 140 common data elements and definitions that will be used by the Program Managers and SEAs for collecting and reporting education information.

However, our audit determined that the PMT needs to improve certain system implementation and project management controls to ensure that PBDMI will meet intended project goals. Specifically, we noted: sufficient data input controls have not been implemented to ensure that data is complete, accurate, and valid; versions of the EDEN Submission System were

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<sup>1</sup> The Department is using PBDMI to develop and implement EDEN; a database repository system that will allow users to obtain organized and formatted information about the status and progress of education programs in the States, districts and schools.

implemented that did not meet user system functionality and performance requirements; standard data elements have not been fully defined to ensure that PBDMI data collection can replace the Department's numerous data collections efforts; inadequate user training and documentation has resulted in ongoing data submission errors; insufficient project management controls resulted in milestone dates that were not met and payments were made to certain SEAs without evidence that contract deliverables were performed.

We also identified deficiencies in the Department's Enterprise Architecture (EA) that will not facilitate the success of PBDMI. For example, a PBDMI Meta Data dictionary has not been adopted into the Department's EA to adequately define standard data elements, data definitions and the business rules associated with collecting those data elements. Additionally, we noted that the EA Technical Reference Model has not been fully developed to establish technical standards, products, and services that are required to build systems in support of the Department's required business functions and information security requirements. As a result, the PBDMI project is at risk of not meeting its goals of consolidating the collection of education information in a way that improves data quality and reduces the paperwork burden for national education partners.

We recommend that the Deputy Secretary devote additional resources to ensure the PBDMI PMT can adequately address the system development risks identified in this report. Additionally, we recommend that the Director, Strategy Accountability Service and the PMT:

- Provide guidance to SEA/LEAs in developing effective data input controls (i.e. edit checks, business processes) to verify the quality of education data at the source level and to ensure that data quality is maintained during the collection and data transmission process.
- Implement comprehensive requirements and configuration management controls to develop EDEN integrated systems that will meet system functionality and performance requirements, as well as encourage a proactive system development approach.
- Develop a comprehensive approach to enable the PMT to proactively define, collect, and standardize a complete listing of standard data elements and definitions.
- Develop comprehensive training programs and guidance to assist SEAs in reducing ongoing data submission errors with the EDEN Submission System.
- Develop comprehensive project management controls to effectively manage the timely completion of project milestones and oversee multiple contractors responsible for developing the EDEN integrated systems.
- Coordinate with the Department's Enterprise Chief Architect (ECA) to adopt a PBDMI Meta Data dictionary as part of the Department's EA to define standard data elements, data definitions and the business rules associated with collecting those data elements.

We recommend that the Department's Office of the Chief Information Officer (OCIO) ensure that the Department's ECA fully develops the EA Technical Reference Model to establish technical standards and information security requirements that are needed to build systems in support of the Department's critical operations. Additionally the Department's ECA needs to improve the Department's current EA and clearly define its Target Architecture and Transition Plan to ensure it is aligned with the OMB Federal EA.

During the audit and following the issuance of our Draft Audit Report, Department officials have taken steps to strengthen system development controls (e.g., data quality, enterprise

architecture, and configuration management controls) for PBDMI and devoted additional resources to the project. In their response to our draft report, the Assistant Secretary for Planning, Evaluation and Policy Development, on behalf of the Deputy Secretary, generally concurred with our findings and recommendations, and described specific actions taken and additional planned actions to address our concerns. The Department did not respond to recommendation 1.8 (Provide system development guidance that would address the risks associated with using the RAD methodology) in the report. We request that the OCIO develop a corrective action plan to address the outstanding recommendation. The Assistant Secretary for Planning, Evaluation and Policy Development response is included in its entirety in Appendix A of this report.

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### Acronyms Used in This Report

Department or ED	Department of Education
PBDMI	Performance Based Data Management Initiative
PMT	Project Management Team
OMB	Office of Management and Budget
EDEN	Education Data Exchange Network
EA	Enterprise Architecture
DARS	Decision Analysis and Reporting System
OCIO	Office of the Chief Information Officer
DSS	Decision Support System
RAD	Rapid Application Development
C4DQ	The Center for Data Quality, Inc.
XML	Extensible Markup Language
SEI-CMMI	Software Engineering Institute - Capability Maturity Model Integration
C&A	Certification and Accreditation
GAPS	Grants Administration and Payments System
ECA	Enterprise Chief Architect
SEA/LEA	State and Local Education Agencies

## Objectives, Scope, and Methodology

### Objectives

Our audit objectives were to evaluate whether significant system implementation and investment risks have been mitigated to ensure that PBDMI will meet its investment goals of consolidating current data collection activities in a way that improves data quality and reduces the reporting burden for national education partners. In addition, our audit objectives included determining whether:

- system development methodologies are ensuring that system functionality requirements have been adequately defined and production systems meet end user performance requirements;
- project management and contract monitoring procedures have been implemented to ensure that project milestones are met and contract deliverables are performed; and
- the Department's EA has been consistently updated to support the technical requirements and business processes of PBDMI.

### Scope

We conducted our work at applicable Department offices from January 2004 through March 2005. We discussed the results of our audit with PMT and representatives from the OCIO at an exit conference held on May 16, 2005. We conducted our audit in accordance with government auditing standards appropriate for the scope of this review.

### Methodology

In evaluating the PMT's system development methodologies, we reviewed data input quality controls, functionality and configuration management controls, standard data elements, and the adequacy of end user training and documentation.

- **Data Quality Controls** - To determine whether the PMT has effectively addressed the project goals regarding improving data quality, we reviewed data quality evaluation reports prepared by The Center for Data Quality, Inc. (C4DQ); interviewed representatives from the PMT, SEAs, and the C4DQ regarding data quality and data collection; reviewed OIG audit reports that evaluated the completeness, accuracy, validity, and reliability of data provided by SEAs and LEAs in connection with the Elementary and Secondary Education Act (Title I, Part A) education program and the Perkins Vocational and Technology Education Act of 1998 (Perkins III);<sup>2</sup> and held discussions with Department Program Managers and SEAs to obtain their perspective of PBDMI data quality issues or concerns.

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<sup>2</sup> OIG reports reviewed include: 1) A Joint Audit Report on The Status of State Student Assessment Systems and the Quality of Title I School Accountability Data, August 2002, S14-C0001; 2) Audit of Perkins III Performance Data at OVAE, May 2004, A03-D0013; 3) Kentucky Department of Technical Education's Management Controls Over Perkins III Performance Data Needs Strengthening, October 2003, A04-D0007; 4) Audit of Indiana's Management Controls Over Perkins III Performance Data, September 2003, A05-D0012; and 5) Audit of Florida's Management Controls Over Perkins III Performance Data, July 2003, A03-C0019.



- System Functionality and Configuration Management Controls - To determine whether the PMT has effectively addressed project goals of improving efficiency and effectiveness of data collections, we reviewed requirements management and configuration management weaknesses identified during testing of the DSS Pilot; reviewed Integrated Project Status Reports, customer support center help desk records, EDEN Submission System Release documents to identify instances where the EDEN Submission System was not meeting end user functionality and performance requirements; and interviewed representatives from the PMT to gain an understanding of systemic weaknesses that may prevent PBDMI from meeting investment goals.
- Standard Data Elements - To determine whether the PMT has proactively and fully defined standard data elements so the Department can ultimately discontinue its multiple data collection efforts, we interviewed representatives from the PMT, Program Offices, and SEAs and reviewed the standardized data elements and data dictionary developed in connection with PBDMI and approved by OMB.
- End User Training and Documentation - To determine whether the PMT has provided sufficient training and guidance to eliminate ongoing data transmission errors, we reviewed customer support center help desk logs and interviewed select SEAs to identify instances of system difficulties or data transmission errors with the EDEN Submission System.

To determine whether project management and contract monitoring procedures have been implemented to ensure that project milestones are met and contract expenditures are properly authorized, we interviewed representatives from the PMT and reviewed the PBDMI Exhibit 300 Business Case, Integrated Project Status Reports, and task order contracts in connection with PBDMI. In determining whether the Department's EA is developed in a manner that will facilitate the success of PBDMI, we reviewed the Department's EA documents to determine whether a mature architecture has been defined and interviewed representatives from the PMT and the OCIO to identify challenges associated with the Department's EA.

## Background

OMB recognizes that SEAs and LEAs have engaged in burdensome and paper-intensive reporting processes to comply with the Department's multiple, and sometimes redundant, education collection and reporting activities. In response, OMB allocated \$10 million to the Department in fiscal years 2003 and 2004 and tasked the Department to develop an initiative that will create a web-based system for collecting timely student achievement data and eliminate unnecessary and burdensome reporting that divert Federal, State, and local resources from activities that will improve student learning.

Consequently, the PBDMI project was conceptualized to fundamentally transform the way the Department conducts its current operations. Within the Department's fiscal year 2005 Budget Passback, OMB indicated that PBDMI remained a high priority and the Department's progress will be a factor in assessing ED's performance on the Budget and Performance Integration section of the President's Management Agenda Scorecard. In addition, PBDMI is deemed critical to the success of several of the Department's programs and operations, including:

- Implementation of the Elementary and Secondary Education Act, as amended by the No Child Left Behind Act of 2001 (P.L. 107-110): The Office of Elementary and Secondary Education is currently collecting information central to No Child Left Behind, including data on teacher qualification, state assessments, and schools in need of improvement.
- Program performance measurement: PBDMI is designed to support the management and analysis of education data, and thus is crucial to any departmental strategy for program performance measurement.
- Information collection: The PMT is working with States and program offices to establish common data elements and streamline information collections.
- Enterprise architecture: PBDMI represents an agency-wide Information Technology solution for managing program data and analysis.

Also, in the Department's FY 2005-2008 Information Resource Management Strategic Plan, the Department identified seven line-of-business areas. One of these areas, "Evaluation" will use common high quality data and analytics to reduce customer burden and improve evaluation quality. PBDMI is also tied to the Department goals of creating a culture of achievement and establishing management excellence.

The PBDMI project is a multi-year system development and implementation effort intended to consolidate the information collected from States, districts and schools in a way that improves data quality and reduces the paperwork burden for national education partners.

Specifically, PBDMI should streamline and centralize the data collection process thereby replacing multiple data collections.<sup>3</sup> Other PBDMI goals include:

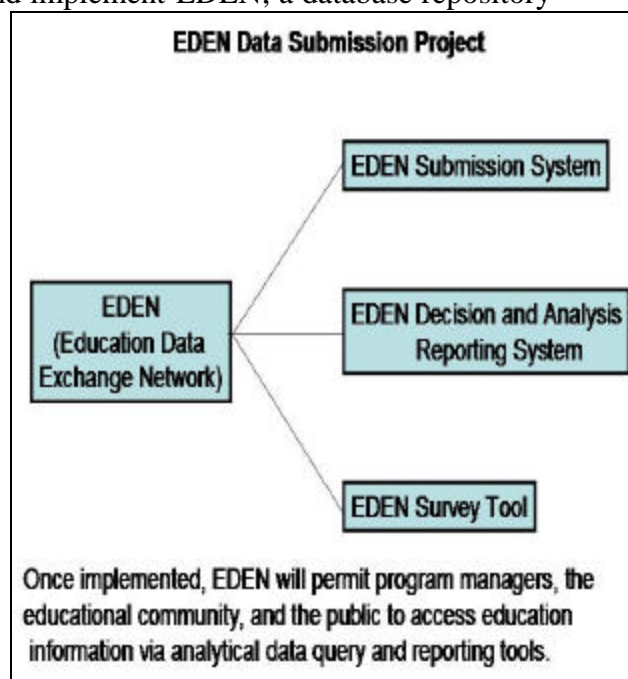
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<sup>3</sup> This includes State formula, as well as the grant programs administered by Office of Special Education Programs, the Office of English Language Acquisition, Office of Elementary and Secondary Education, and Office of Vocational and Adult Education; Common Core of Data collections administered by the National Center for Education Statistics; and the Elementary and Secondary Survey administered by the Office for Civil Rights.

- Improving internal efficiency and effectiveness by centralizing K-12 data collections and enabling this information to be shared more quickly and conveniently between Federal, State and local governments;
- Providing higher quality and more precise data to better align program funding to program results for increased accountability; and
- Improving the efficiency of the data collection and management process by leveraging Internet-based technologies.<sup>4</sup>

To streamline existing data collection efforts and information management processes, the Department is using PBDMI to develop and implement EDEN; a database repository

system that will allow users to obtain organized and formatted information about the status and progress of education programs in the States, districts and schools. EDEN is being developed through three integrated system development efforts: EDEN Submission System collects education data submitted by SEAs; EDEN Survey Tool collects Civil Rights Data from school districts; and EDEN Decision and Analysis Reporting System will allow Program Managers and States to query and analyze data submitted to EDEN. EDEN will ultimately allow SEAs and Federal agencies to transfer and analyze information about education programs.



PBDMI is intended to consolidate the collection of education information from States, districts and schools in a way that improves data quality and reduces the paperwork burden for national education partners. Through its data collections, PBDMI will collect and manage the following types of educational data: a) Achievement and performance statistics; b) School characteristics; c) Demographics; d) Program financial data; and e) Geospatial data (school longitude/latitude). To assist in the accurate collection of education data, the Department will rely on heavy participation from States and local education communities to obtain, use, share, and report educational information about program successes and education outcomes. To assist States with the additional reporting requirements associated with PBDMI, the Department provided each SEA \$50,000 in fiscal years 2003 and 2004 via task order contract, under the conditions that education data be provided to the Department; an Annual Work Plan be provided with detailed actions and schedules for providing educational data; and a statement of assurance signed by the Chief State School Officer that the State will provide as many education data elements as possible.

<sup>4</sup> For example, rather than requesting information (“collections”) from each State for each program, under PBDMI the Department would negotiate protocols with each State to establish routine data transfers from its information systems to a centralized data repository.

To meet project timelines, the PMT established aggressive project milestones dates and adopted a rapid application development approach in designing, developing, and implementing an integrated and centralized system (EDEN) that will collect and display education data. According to the PBDMI PMT staff, the EDEN Submission System was developed to mitigate risks under a three-step approach. Version 1.0 was a usable system for the submission of files from the SEAs. Version 1.1 addressed any issues that developed in the initial use by real users in the SEAs as opposed to test situations. Version 1.3 brought in the data framework functionality for use by the PMT. Consistent with this approach, the PMT conducted a PBDMI DSS Pilot, from November 2003 – March 2004, to determine the feasibility of electronically collecting large amounts of K-12 data from SEAs and to solicit feedback from the Program Offices about the use of the data collected.

The DSS Pilot was comprised of a voluntary collection of limited sets of data elements from 50 SEAs. Because States experienced different levels of success while submitting education data to the Department, the scope of the Pilot was expanded to include additional data submissions and a State-by-State analysis to identify common problems and develop corrective actions. The Department contracted CTG, Inc. to evaluate the DSS Pilot and identify positive repeatable results and corrective actions for problems before implementing the EDEN Submission System. The resulting report, “PBDMI Decision Support System Pilot Evaluation Report,” (July 2004) identified findings and provided recommendations to improve the success of education data submissions from the States; the PMT’s customer support to the States; and the PMT’s system development methodologies.

### System Implementation Methodologies

Several methodologies exist to assist organizations in developing and implementing information systems. All have benefits and risks that need to be considered when deciding which system development methodology to follow. The PBDMI PMT adopted a quick implementation methodology, known as the rapid application development (RAD) methodology for prototypes. Alternatively, traditional structured system development methodologies, such as the waterfall methodology, breaks projects into finite pieces and relies on thorough upfront planning to ensure success of the project.

When using a traditional system implementation methodology, the implementation team benefits from having a thorough planning and robust documentation process. According to the Carnegie Mellon Software Engineering Institute, “Capability Maturity Model Integration (CMMI) best practices associated with structured system development methodologies enable organizations to:

- more explicitly link management and engineering activities to business objectives;
- expand the scope of engineering activities to ensure that the resulting products or services meet customer expectations;
- incorporate lessons learned from additional areas of best practice (e.g., measurement, risk management, and supplier management);
- implement more robust high-maturity practices; and
- address additional organizational functions critical to its products and services.”

However, more traditional means of system implementation often requires more time, in comparison to less traditional methodologies, such as RAD. Characteristics of the RAD methodology include deployment of an early prototype which results in frequent end user feedback; frequent delivery of products within a short time period; and informal system development processes governing requirements management, configuration management, quality assurance, and project oversight key process controls. When correctly applied, RAD will result in active end user involvement, greater end user ownership of the system, software that is likely to meet end users' functionality requirements, and implementing production systems in a relatively short time period. If not effectively managed, this approach can result in developing multiple versions of systems that do not meet users' functionality and performance requirements, and ultimately missing critical project milestones dates. According to the PBDMI PMT, these risks were understood, anticipated, and planned throughout the development efforts.

## **Finding No. 1: PBDMI System Implementation Controls for the Development of the EDEN System Need Improvement**

We reviewed the PBDMI PMT system development implementation methodology to determine whether key processes were implemented to ensure that system functionality requirements have been adequately defined and production systems are meeting end user performance requirements. We determined that system implementation controls need improvement to ensure PBDMI will meet intended project goals. Specifically, we identified that significant project goals are at risk because:

- sufficient data input controls have not been implemented to ensure that data is complete, accurate, and valid;
- versions of the EDEN Submission System were implemented that did not meet user system functionality and performance requirements;
- application level change control processes have not been implemented to govern changes to common data elements, the Meta Data dictionary, and supporting business processes;
- standard data elements have not been fully defined to ensure that PBDMI data collection can replace the Department's numerous data collections efforts; and
- inadequate user training and insufficient documentation have resulted in ongoing data submission errors between the Department and SEAs.

### Data Input Quality Controls Need Improvement

Based on our procedures performed, we determined that improved data input controls are needed to ensure the education data provided by the SEAs is complete, accurate, and valid. For example, in July 2004, the PMT contracted with C4DQ to perform a data quality analysis of education information submitted in connection with the DSS Pilot.<sup>5</sup> C4DQ evaluated data tables residing in the EDEN Submission System and assessed six key data quality checks:

- Content Analysis – performed a frequency distribution analysis of data fields to identify whether duplicate attributes were present;
- Data Population – evaluated each column and row within the database to identify blank data fields;
- Primary Key Uniqueness – determined whether a unique primary key has been defined for each row within the EDEN database;
- Row Uniqueness – determined whether duplicate rows were present within the EDEN database;
- Referential Integrity – performed to identify “orphan” referential keys that do not link to other data tables with the database; and
- Data Dependency (business rules) – evaluated data fields for evidence that system edit checks are not functioning as intended.

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<sup>5</sup> The DSS Pilot was implemented to determine the feasibility of electronic collection of large amounts of K-12 data from SEAs and to solicit feedback from the Program Offices about the use of the data collected.

C4DQ analysis identified numerous data quality issues with data collected during the DSS Pilot, including duplicate data elements; empty data columns and data tables; duplicate data row attributes; errors within data tables; and invalid data values that indicate business rule violations.

C4DQ is evaluating the quality of the November 2004 PBDMI data submissions and will report to the PMT in Spring/Summer 2005. Based on our discussions with C4DQ, the PMT, and selected SEAs, the quality of the November 2004 data submission is not expected to significantly improve because the business processes for collecting education information have not changed much due to competing project priorities. Accordingly, we reviewed 69 help desk logs from the Partner Support Center from November 2004 to January 2005 and identified several calls from SEAs regarding the quality of education data submitted to the Department. Specific technical assistance issues included:

- Inaccurate data calculations – a SEA noticed an inaccurate data calculation of 465,000 when the accurate total should have been around 1,700. Other SEAs identified instances where grand totals of data submitted were incorrectly smaller than the sum of the respective sub-totals;
- Incomplete data – help desk calls from SEAs indicated that data submissions included missing data (i.e. phone numbers) for several school districts; and
- Inaccurate data values – callers identified incorrect ethnic counts such as reporting 661,178 American Indian or Alaskan Native students instead of 1,178.

The OIG has performed a number of audits of Title I Part A and Perkins III education programs and concluded that management controls must be strengthened to ensure that data submitted to the Department is complete, accurate, valid, and reliable. The reports state that State and local education agencies have provided inaccurate and incomplete education performance data to the Department.

Several Program Managers and SEAs raised a number of concerns about the data quality to us and whether the Department is committed to improving data quality. For example:

- Program Managers question the capacity of EDEN and whether some States can collect and provide quality data to the Department;
- Program Managers felt there was insufficient time to collect and provide all of the education data;
- Some SEAs felt the quality of the data provided to the Department is questionable because they had not received any formal data quality training; and
- SEAs stated that the Department has not provided sufficient funding for States to develop their own databases with the proper internal controls to promote quality data and information.

During our data quality discussions, the PMT stated they planned to meet with SEAs during summer 2005 to discuss methods for improving the quality of data submitted to the Department. The PMT also plans to develop data quality performance measures so the Department can track its progress towards meeting its investment goals. Our review indicates that competing project priorities have precluded the PMT from devoting adequate resources to address data quality concerns at the State and local levels.

For PBDMI to achieve its investment goal of improving data quality, sufficient data input controls (i.e. edit checks, business processes) must be implemented to verify the quality of data from the source and to ensure data quality is maintained when consolidating data at the State and local education level. Additionally, comprehensive training programs are needed for the SEAs and LEAs so they can verify the completeness, accuracy, and validity of education data before it is transmitted to the Department.

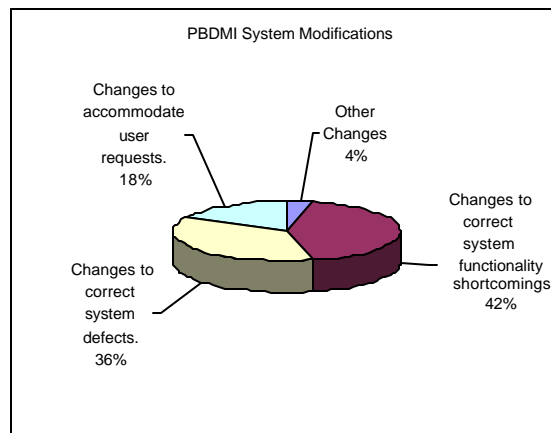
At the same time, the PMT will need to develop internal testing procedures and performance measures to verify the completeness, accuracy and reliability of education data before the EDEN Decision Analysis and Reporting System (DARS) becomes operational.<sup>6</sup> By improving data quality, the PMT will be able to demonstrate that PBDMI data collections can provide quality education data that will meet the business requirements of the Program Offices. Alternatively, Program Managers will continue to collect education data from multiple sources until the quality of data within EDEN is proven sufficient to replace the current data collection efforts.

Requirements and Configuration Management Processes Need Improvement

Based on our procedures performed, we determined that current requirements management and configuration management processes need improvement in order for the PMT to develop future versions of EDEN that will meet system functionality and performance requirements and will ensure that PBDMI will meet its original investment goals. The PMT’s RAD approach has been instrumental in developing and implementing the EDEN Submission System within project milestone dates. However, the PMT’s informal requirements management and configuration management processes have resulted in versions of EDEN that when implemented do not meet system functionality and performance requirements.

For instance, the PMT initially implemented the EDEN Submission System (Version 1.0) in November 2004 and subsequently the Department began receiving education data submissions from SEAs. However, because of shortcomings associated with EDEN Version 1.0, the PMT made significant software coding and system configuration modifications to correct system defects and address end user complaints to ensure that the EDEN Submission System meets functionality and performance requirements.<sup>7</sup>

Accordingly, the PMT released EDEN Submission System Version 1.1 in December 2004 (about 40 days later) and Version 1.2 in January 2005 (about 70 days from the initial Version 1.0 release). The accompanying chart illustrates the necessary system modifications since the EDEN Submission System was implemented.



<sup>6</sup> EDEN DARS will be available by Summer 2005 and will permit Program Managers to query data collected from the Fall 2004 education data submission.

<sup>7</sup> Significant system defects were classified from “High” (no work-around) to “Very High” (critical for proper system functionality) and were corrected in subsequent version releases of the EDEN Submission System.



Our review of EDEN Submission System Release documents (1.1 and 1.2) revealed numerous system functionality defects in earlier versions of EDEN and indicates that current requirement management and configuration management controls need improvement. Some significant system functionality defects that we noted include:

- System is rejecting a “Assessment for Promotion/Graduation Status” field when populated with a valid data value;
- System is rejecting a “Integrated Technology Status” field when populated with a valid data value;
- Duplicate school period records are present causing duplicate schools to appear within the ED database;
- LEA current status XML file incorrectly gives a format error response;<sup>8</sup>
- XML “School Status” (Current Year) schema needs to be changed to allow values less than 15 characters;

According to the PMT, frequent changing system functionality requirements, staffing constraints, and aggressive project milestones have contributed to delays in developing and implementing certain functional components of EDEN on schedule. Consistent with our findings, the DSS Pilot evaluation report identified that system functionality requirements for EDEN were not fully defined and the PMT needs to implement quality control reviews and configuration management techniques to reduce system defects and system down time

While the PMT’s RAD system development approach informally addresses key process controls (e.g., requirements management and configuration management), the PMT has not developed formal policies and procedures to ensure that positive system development efforts will be repeated and common system development problems will be identified and corrected. The Department has not designated an official system development methodology although a draft methodology policy document currently exists. Additionally, the draft policy does not preclude the use of RAD system development methodology nor address the system development risks associated with the RAD.

The PMT could benefit by adopting a formal structured configuration and requirements management processes such as the Carnegie Mellon’s CMMI. A structured development process would document policies and procedures that support key process controls and provide guidance to system developers to proactively address issues and correct potential problems before they occur. If the configuration and requirements management problems that we identified are not addressed, the PMT will not be successful in proactively developing integrated systems that meet the system functionality and performance requirements. Additionally, the PMT has not devoted sufficient resources to effectively mitigate the risks introduced under a RAD system implementation; thereby, putting the PBDMI project at risk of not meeting its project goals.

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<sup>8</sup> XML (Extensible Markup Language) is a widely used system for defining data formats.

## Insufficient Application Level Change Controls

Based on our procedures performed, we determined that the PMT needs to develop formal change control processes to govern changes to PBDMI application level common data elements and values, the related Meta Data dictionary, and supporting business processes necessary to ensure user requirements will be met.<sup>9</sup> During the development of the EDEN Submission System, the PMT followed the Department's change control and configuration management processes, while implementing hardware and software supporting EDEN. However, the PMT has not developed and documented change control processes to govern changes to application level data elements, the Meta Data dictionary, and supporting business processes. According to the PMT, one person is currently assigned to manage changes to EDEN common data elements and the Meta Data dictionary, because of staffing constraints. Consequently, changes to common data elements and Meta Data dictionary are not formally reviewed and approved by a change control review board.

A formal change control process is important because it instills a review process for all application level system changes and will help ensure that changes to the system and business processes do not adversely impact system performance and the Department's business operations. Informal change control processes will not ensure that a history of system changes are maintained to assist in identifying system performance issues. The PMT has indicated that they plan to develop a formal change control process that governs changes to the EDEN Meta data dictionary and the PBDMI data collection and reporting process, although these plans have not been formalized and prioritized.

## Standard Data Elements for Centralized Data Collections are not Fully Defined

We determined that the PMT has not fully defined all standard data elements in order for the Department to ultimately discontinue its multiple data collection efforts. While the PMT has defined over 140 standard data elements to be collected in connection with PBDMI,<sup>10</sup> many additional standard data elements must be identified to ensure that the centralized data collection process will meet the needs of all Program Managers. The PMT has used a reiterative approach to identify and define standard data elements and definitions to be used by the Program Managers and SEAs for collecting and reporting education information. However, this approach will ultimately prevent the PMT from proactively collecting a complete listing of common data elements because the process relies solely on the input from Program Managers and SEAs. The PMT needs to gain a thorough understanding of the Department's programs and reporting requirements in order to fully develop a complete listing of standard data elements. One Program Manager described the data element development process as providing many iterations of common data elements that the States can provide, but not identifying the data element collection requirements of the Program Office itself.

A representative from the PMT has stated that aggressive project milestones and staffing constraints have prevented the team from taking a more proactive approach in defining

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<sup>9</sup> Meta data dictionary identifies the data elements, definitions, collection activities, and reporting processes; it also helps ensure that future system changes are controlled and does not inhibit users from gathering their respective educational data.

<sup>10</sup> According to the PMT, this represents approximately 80% of the total data elements to be defined.

common data elements and definitions. During Spring/Summer 2005, the PMT plans to conduct Strategic Information Reviews and to meet with the Program Managers and SEAs/LEAs to define additional common data elements that must be collected to meet the Program Offices' reporting requirements. The Department will not be able to meet its project goals of improving efficiency and effectiveness if it does not proactively identify and standardize all education common data elements in support of PBDMI.

#### Inadequate User Training and Insufficient System Documentation

We determined that inadequate user training and insufficient system documentation have contributed to on-going data submission problems between SEAs and the Department; a shortcoming that could undermine the project goal of achieving efficiency and effectiveness. For example, our review of a sample of PBDMI help desk logs revealed that numerous data transmission errors occurred during the period November 2004 to January 2005. Based on discussions with SEAs, many of the data transmission errors could have been avoided if the SEAs had received sufficient technical training about the data submission process. Specific data transmission problems brought to our attention include:

- SEAs were unable to determine why the system is rejecting XML data when certain data fields are populated with a valid "NOTCOLLECT" data value;
- SEAs received invalid format error messages when submitting files that contained no errors;
- SEAs received invalid error messages stating that a table type abbreviation does not exist after the data value had passed edit checks; and
- SEAs received invalid transmission errors while attempting to upload school immigrant files to the Department (i.e. 0010/2460 – National Center for Education Statistics Country Codes).

Most SEAs expressed frustration as data transmission problems caused untimely delays in submitting educational data to the Department. Additionally, SEAs indicated that they devoted inordinate amounts of time to understand error messages and then needed to dedicate additional staff to correct the error messages. Furthermore, SEAs stated that additional technical training is necessary so that the States can efficiently respond to error messages and verify XML data against XML schema and file specifications. Although no formal training program has been developed, the PMT has indicated that better technical training is needed for SEAs to reduce the number of data submission errors.

Our review of the help desk logs revealed many help desk issues concerning data submission policy questions. Ideally, policy questions should be clarified through comprehensive system documentation including complete user requirements and standard data elements and definitions. Specific help desk questions pertaining to unclear data submission policies include:

- Many inquiries about whether to report students by age or by age group as specifications imply that the Department needs both;
- Many SEAs inquired whether they should report student achievement results for the 2003-2004 school year or report the results when making the Adequate Yearly Progress determinations; and

- Many inquiries related to how to handle the file specifications for students with disabilities beyond age 21 “Children with Disabilities-Individuals with Disabilities Education Act of 2004.”

Several SEAs representatives have complained that there is no clear guidance or fully developed data element specifications to assist the SEAs in the data submission process. Additionally, certain SEAs stated that the lack of clear guidance from the Department has increased the reporting burden for States and has resulted in duplication of work for those submitting education data to the Department. Due to competing project priorities, the PMT has not devoted the resources to develop clear guidance that will assist SEAs during the data submission process. The PMT needs to develop comprehensive data submission policies and guidance so that the SEAs know exactly the type of data to submit, submission procedures, and submission timelines.

### **Recommendations**

- 1.1 We recommend the Deputy Secretary devote additional resources to ensure the PBDMI PMT can adequately address the system development risks identified in this report.

#### *Department Response*

The corrective action for this recommendation is ongoing. The PBDMI PMT was augmented by two new FTEs in the last quarter of 2004. In addition, primary responsibility for program staff liaison on PBDMI data elements was assigned to three elementary and secondary education performance analysts in the Strategic Accountability Service, who assist the program offices in maintaining their program performance data. A new data acquisition team leader position has been competed and is pending a response to the offer. As part of the Secretary’s reorganization that created the Office of Planning, Evaluation and Policy Development, two new deputy assistant secretary positions have been created with primary responsibility for PBDMI policy coordination. Also, a senior OMB examiner is assigned to work part-time with the PBDMI policy team. The PMT is currently reviewing overall PBDMI staffing levels to ensure that the PMT can adequately address the system development risks identified in this report and other project requirements.

#### *OIG Response*

We reviewed the Department’s response and action taken. Based on the Department’s planned action, an acquisition team leader position is expected to be filled and two new deputy assistant secretary positions have been created with primary responsibility for PBDMI policy and coordination. A corrective action plan is required to ensure that audit follow-up processes have corrected the issues identified.

Additionally, we recommend that the Director, Strategy Accountability Service and the PMT:

- 1.2 Provide guidance to SEA/LEAs in developing effective data input controls (i.e. edit checks, business processes) to verify the quality of education data and to ensure that data quality is maintained during the collection and data transmission process.

### Department Response

The corrective action for this recommendation is ongoing. Data quality is a continuous improvement process inherent in the Education Data Exchange Network. The current quality of state education data provides much room for improvement. PBDMI has multiple strategies underway to encourage and assist states to improve their data systems and the quality of their data.

PBDMI is a systematic attempt to address those problems that exist in current State data reporting systems:

1. State data are transferred directly from State administrative record systems into EDEN rather than being transcribed by State program officials onto a Federal reporting form. This eliminates one potential source of error.
2. EDEN's first step in receiving State data is automated error checks. These are designed to assure appropriate formatting, consistency with previous submissions, and conformance with pre-defined parameters.
3. EDEN's Partner Support Center reviews issues such as those identified in 2, above, with States and to request resubmissions of accurate data, as documented by GAO.
4. PBDMI has contracted with the Center for Data Quality (C4DQ) to review the accuracy of State data submissions and to provide recommendations for improvement.
5. PBDMI also contracted with C4DQ to provide data quality reviews for individual States and to provide them recommendations and technical assistance. C4DQ has conducted reviews in 10 States to date.
6. PBDMI has provided and will continue to provide data quality training and technical assistance to State PBDMI Coordinators in collaboration with NCES and CCSSO.

As data are reviewed for quality, additional error checks will be identified. As errors are corrected in an individual State, the potential for similar errors will be identified to other States and added to the review list for the Partner Support Center.

### OIG Response

We reviewed the Department's response and action taken. The Department has recognized that the current quality of state education data provides much room for improvement. Although the response indicates that corrective action has been taken, a corrective action plan is required to ensure that audit follow-up processes have corrected the issues identified.

- 1.3 Develop internal testing procedures and performance measures to ascertain the completeness, accuracy and reliability of education data before the EDEN Decision Analysis and Reporting System becomes operational.

### Department Response

The corrective action for this recommendation is ongoing. We agree with this recommendation and are aware of the need to ensure that high quality data is used for policy decisions and program management. Many actions have been taken or are planned to ensure EDEN uses the best available data (see 1.2 for a summary). EDEN data edits are based on permitted values and prior years' CCD submissions. As EDEN accumulates multiple years of

data, it will be able to expand the database foundation for automated edits. In addition, program office staff and performance analysts are reviewing state data submissions against previous program office submissions as a basis for follow-up inquiries with States. These inquiries will help States identify specific areas on which to focus their data quality efforts. Importantly, the reporting system itself will enable additional analyses and reviews that will further support our data quality efforts. Because the reporting system will be operational before all data quality issues are finally resolved, users will be trained on the appropriate uses of the data.

As mentioned earlier, data quality is a continuous improvement process. In the interim, the data available for EDEN far exceeds the quality of what has been previously available to policy makers and program managers.

OIG Response

We reviewed the Department's response and action taken. A corrective action plan is required to ensure that audit follow-up processes have corrected the issues identified.

- 1.4 Implement comprehensive requirements and configuration management controls to develop EDEN integrated systems that will meet system functionality and performance requirement, as well as encourage a proactive system development approach.

Department Response

The corrective action was implemented in July 2005. ED selected Perot Systems, Inc. as contractor for PBDMI Operations, Maintenance and Enhancement. That contract includes enhanced configuration management controls negotiated with OCIO's new contractor, CSC. Comprehensive requirements were laid down in the contract and are being further specified in a series of action plans under development by Perot and review by ED.

OIG Response

We reviewed the Department's response and action taken. The selection of a single contractor to assist in configuration management should assist in strengthening the management of these controls. A corrective action plan is required to ensure that audit follow-up processes have corrected the issues identified.

- 1.5 Develop comprehensive procedures so the PMT can proactively define, collect, and standardize a complete listing of standard data elements and definitions in connection with PBDMI.

Department Response

Implemented September 2004 and under annual review. The PMT has completed in collaboration with OCIO/RIMS the second PBDMI collection submission to OMB. The proposed 2006-2008 collection builds on the 2004-2005 data elements and definitions with minor changes necessitated by the new IDEA reauthorization and similar programmatic changes. The identification of data elements is an iterative process. PBDMI began by asking program offices to define their information requirements (legislation, regulation, reporting, monitoring, program management, and risk avoidance.) It then reviewed these requirements against data currently gathered by ED programs and offices, identifying gaps, redundancies and inconsistent definitions. The resulting data set was reviewed with the states for

availability. Concurrently, a series of policy questions were developed with senior officers and data elements reviewed and modified to assure that those questions could be answered. We expect user requirements to evolve substantially as program officials and senior officers are able to access these data and further clarify their requirements.

The OPEPD planning team and new Executive level PBDMI Steering Committee will be undertaking a review of all elementary and secondary data elements to assure that programs rely on standard data elements and definitions that are aligned with PBDMI.

OIG Response

While the Department's response states that this recommendation was addressed in September 2004, it also states that the OPEPD planning team has not fully reviewed elementary and secondary data elements and identification of data elements is an iterative process. Consequently, the PMT has not fully developed comprehensive procedures for proactively defining and collecting a complete listing of standard data elements. Although the Department states that these actions were in place, we did not observe that these controls were effectively implemented during our review. Accordingly, we recommend that the PMT develop a corrective action plan to address the need to fully develop comprehensive procedures to proactively define, collect and standardize a complete listing of standard data elements and definitions in connection with PBDMI.

- 1.6 Develop a formal change control process that will govern changes to the EDEN Meta data dictionary and business processes associated with PBDMI data collection and reporting activities.

Department Response

The corrective action was implemented in July 2005. Perot Systems has proposed and has implemented a formal change control process under the oversight of the PMT and Steering Committee.

OIG Response

We reviewed the Department's response and action taken. Contractor assistance should assist the PMT in strengthening the change control process. A corrective action plan is required to ensure that audit follow-up processes have corrected the issues identified.

- 1.7 Develop comprehensive training programs and guidance to assist SEAs in reducing on-going data submission errors with the EDEN Submission System.

Department Response

The corrective action for this recommendation is ongoing. The PMT and Perot Systems are updating the EDEN guidance documents and training based on the proposed 2006-2008 data elements. Two and a half day training sessions have again been scheduled for State staff. Two regional trainings will be offered, one in Denver, CO, October 24-26, 2005, and one in Washington, DC, November 2-4. Both sessions will include introductory orientation for state Staff new to the EDEN system. We expect near 100% participation again this year.

OIG Response

We reviewed the Department's response and action taken. The Department's plans to update training and documentation should strengthen the program. A corrective action plan is required to ensure that audit follow-up processes have corrected the issues identified.

Additionally, we recommend that the CIO:

- 1.8 Provide system development guidance that would address the risks associated with using the RAD methodology.

Department Response

The OCIO did not provide a response to this recommendation.

OIG Response

Although no response was provided, the OCIO is required to develop a corrective action plan to address this outstanding recommendation.



## **Finding No. 2: PBDMI Project Management Controls Need Improvement**

We reviewed PBDMI project management controls to determine whether procedures have been implemented to ensure that project milestones are met and contract deliverables are performed. We have concluded that project management controls need to be strengthened. Specifically, we identified significant project milestone slippages and the Department made payments to certain States without evidence that contract deliverables were performed. This condition exists because the PMT established aggressive project deadlines and had insufficient staff to support the project. Unless these problems are addressed, project costs will increase and EDEN will not meet user expectations and performance requirements in a timely manner.

### Missed Project Milestones

Our review of the PBDMI Daily Status Reports from December 2004 to January 2005 has revealed that the PMT missed significant project milestones. Specifically, we noted slippages in the following milestones:

- Preparing and Delivering Guidance for SEAs slipped by approximately 150 days. This milestone is important for ensuring that SEAs have clear policy and guidance for collecting and submitting timely education data to EDEN. As discussed earlier in this report, some SEAs complained that they lacked clear guidance. This has resulted in duplication of work and reporting, and data transmission problems with the EDEN Submission System.
- Hardware and Software Requirements for DARS slipped by approximately 90 days. These milestones are important for ensuring that the PMT develops and implements versions of the DARS that will meet functionality and performance requirements of the Program Managers who will rely on those systems to gather and report education data. As stated earlier in this report, informal requirements and configuration management controls have contributed to the PMT implementing versions of the EDEN Submission System that was burdened with software coding defects and functionality deficiencies.
- Certification and Accreditation (C&A) of EDEN slipped by approximately 120 days. This milestone is important for ensuring that operational systems are adequately protected from internal and external security threats and vulnerabilities. Although the EDEN Submission System began receiving operational education data before becoming formally certified to process transactions, the PMT is working with the OCIO to comply with the Department's C&A requirements. The EDEN Submission System was formally certified to process data in March 2005.
- Organizational Transformation slipped by approximately 150 days. This milestone is important for defining who will be the system owner and responsible for system modifications as the EDEN solution enters into the operations and maintenance phase. It is not clear who is the ultimate system owner for the EDEN Submission System, Survey Tool, and DARS. For organization transformation of EDEN to be successful, the PMT needs to clearly define: the group responsible for coordinating transformation activities from development to maintenance phase; the appropriate training for all personnel involved in the transformation activities; and a complete inventory of all hardware and software that will be transitioned to the new system owner.

The PMT has stated that aggressive project deadlines and staffing constraints have predominantly contributed to the team missing project implementation dates. Additionally, frequent changes to system functionality requirements and inaccurate vendor completion dates have contributed to delays in system development and implementation. The PMT's informal RAD system development methodology has also contributed to frequent changes in system functionality requirements. The PMT also stated that the lack of qualified staff has adversely impacted the team's ability to manage multiple contractors in meeting project milestones and integrating systems on diverse platforms. To improve project management controls, the PMT plans to award a single contract that will be responsible for managing various sub-contractors who will maintain the EDEN data collection and reporting system.

### State Contract Support for PBDMI Project

To help reduce the reporting burden associated with providing data under PBDMI, OMB appropriated to the Department \$50,000 to give for each SEA. We noted that in some cases, the Department disbursed funds to the States without adequate documentation that the States fulfilled the terms of the contract. Specifically, we noted that certain States did not provide a detailed Annual Work Plan in accordance with the contract but still received the \$50,000 from the Department. We also noted that two SEA's received \$50,000 under the task order contract but did not submit any data in November 2004 as required. Without effective contract monitoring, the PMT cannot ensure that SEAs are efficiently and effectively using task order funding in support of PBDMI. A PMT representative has stated that a lack of adequate staffing has caused the PMT to focus their limited resources on the monitoring system development contractors as they constitute the most significant contracts supporting PBDMI.

### Recommendations

- 2.1 We recommend the Deputy Secretary devote additional resources to ensure the PBDMI Project Management Team can adequately address the project management risks identified in this report.

#### Department Response

The corrective action for this recommendation is ongoing. The Department referred to the same response as in recommendation 1.1 in response to 2.1.

Additionally, we recommend that the Director, Strategy Accountability Service and the PMT:

- 2.2 Develop comprehensive project management controls to effectively manage the timely completion of project milestones and oversee multiple contractors responsible for developing the EDEN integrated systems.

#### Department Response

A corrective action for this recommendation was implemented November 2004. PBDMI has a master project schedule, which the PMT has reviewed weekly with active contractors and OCIO for the past year and a half. The Operations, Maintenance and Enhancement contract awarded to Perot Systems, Inc., was designed to transition from the multiple contractors

required for development to a single contract to manage EDEN with the PMT. This transition will be complete at the end of this fiscal year.

OIG Response

The Department's response states that a corrective action to this recommendation was implemented as of November 2004. The weaknesses identified in this report were noted after November 2004. While we recognize that the PMT has taken steps to improve project management controls by recently awarding a single contract to manage multiple contractors supporting PBDMI, the Department has stated that this transition process will not be fully implemented until the end of the fiscal year. Until this transition process is completed, we recommend that the PMT continue to evaluate their project management controls to ensure that they adequately support the timely completion of project milestones and effectively oversee multiple contractors responsible for developing the EDEN integrated systems.

- 2.3 Develop comprehensive contract management controls to ensure that contract deliverables are performed and funds are disbursed in accordance with contract requirements. Furthermore, the PMT needs to develop procedures to ensure that all States provide education data in support of PBDMI.

Department Response

The corrective action for Part 1 was implemented in July 2005; Part 2 corrective action plan is ongoing. Comprehensive contract management controls have been put in place for the comprehensive Operations, Maintenance and Enhancement contract with Perot Systems, Inc., begun in July 2005. The PMT has developed a project management plan with Perot that is reviewed weekly. The COR has been designated the coordinator of the project management plan. A transition plan is also in place with Perot and the legacy contractors which is coordinated by the alternate COR for the Perot contract.

The new Office of Planning, Evaluation and Policy Development has developed a strategy to provide the incentives to states to ensure that all States provide education data in support of PBDMI. This strategy includes communication by senior officers, waiver of reporting requirements to those States that have transmitted the required data, and draft regulations requiring State submissions through EDEN.

OIG Response

We reviewed the Department's response and action taken. The Department's awarding of the Perot contract should assist in strengthening contract management controls as well as Perot's assistance in project management plan reviews. A corrective action plan is required to ensure that audit follow-up processes have corrected the issues identified.

### **Finding No. 3: Enterprise Architecture Shortfalls Need to be Addressed to Ensure PBDMI Success**

We reviewed the Department's EA to determine whether the EA has been consistently updated to support the technical requirements and business processes of PBDMI. We have concluded that the Department's EA is not fully developed to ensure PBDMI's success. Specifically, the PBDMI Meta Data dictionary has not been adopted into the Department's EA to further define standard data elements, data definitions and the business rules associated with collecting those data elements. Additionally, we noted that the EA Technical Reference Model has not been fully developed to establish technical standards, products, and services that are required to build systems in support of the Department's required business functions and information security requirements.

The Clinger-Cohen Act of 1996 (40 U.S.C., Section 1401 et. seq.) recognizes the importance of architectures by requiring agency Chief Information Officers to develop, maintain, and facilitate integrated systems architecture. A fully developed EA should fully describe business functions of the agency; define the information needs and flows of information among the business functions; and establish technical standards, products, and services that will be used to build systems that support the defined business functions.

#### Enterprise Architecture Lacks Meta Data Dictionary

We noted that the Department's EA does not include a Meta Data Dictionary supporting PBDMI data collections. The Meta Data Dictionary defines: the data elements and definitions collected in connection with PBDMI; acceptable data submission formats; permitted data values; and applicable business rules and warnings associated with the data elements. A PMT representative stated that adopting an Enterprise Meta Data Dictionary is important to PBDMI's success because it will clearly define standard data elements, data definitions, and the business processes for which the data will be collected and reported across the Department. Disagreements exist between the Program Managers and the PMT because standard data formats, permitted values, and business processes have not been defined. Unless these disagreements are resolved in a timely manner, the PMT faces the risk that Program Managers will not fully support the goals of PBDMI, which could jeopardize the success of the project. The Department's ECA has indicated that the EA will be updated to incorporate a standard Meta Data Dictionary in connection with the project.

#### EA Technical Reference Model Needs Development

We found that the EA Technical Reference Model has not been fully developed to establish technical standards, products, and services to build systems in support of the Department's required business functions and information security requirements. According to the Department's ECA, the current Technical Reference Model is a broad document that references to the Federal Enterprise Architecture but does not provide specific technical standards for implementing information systems. A PMT representative stated that the lack of a fully developed Technical Reference Model caused delays in implementing the EDEN

Submission System. This is because the Department's protocol standards, configuration, firewall, and anti-virus requirements for implementing production systems were not defined within the EA.

The ECA indicated that a Technology Roadmap, covering 16 technical subject areas, is being developed that will assist contractors in developing systems that will comply with the Department's protocol, configuration, and information security requirements. The OCIO is also performing a "gaps analysis"<sup>11</sup> of the various Department functions to identify essential business processes that need be identified in the Department's Target EA. The Target EA will ultimately contain descriptions of business processes, information flows, and a sequencing plan for achieving a vision for the Department's seven functional lines of business. The Department has devoted considerable resources towards developing its EA in the last year. Target EA activities should be completed during fiscal year 2006.

During fiscal years 2003 and 2004, OMB evaluated the Department's EA and the resulting scores (i.e., 2003 = 2, 2004 = 2.81 out of possible 5 points) indicate improvements are needed in the clarity and vision of overall EA.<sup>12</sup> OMB also noted a number of areas where the current EA must be improved: target architecture is defined only as a series of visions with no architectural modeling evident; transition plan is evident but tied only at a conceptual level to the Target Architecture; performance measures are not integrated across all levels of the EA; and the architecture does not provide an inventory of services with a specific view towards identifying redundant service components.

### **Recommendations**

- 3.1 To help ensure the success of PBDMI, we recommend that the Department's ECA coordinate with the PMT to adopt a PBDMI Meta Data dictionary into Department's EA to further define standard data elements, data definitions and the business rules associated with collecting those data elements.

#### *Department Response*

Corrective action was implemented in March 2005. The ED EA team has developed and implemented an ED EA Data Dictionary, which includes extensive metadata fields. It is maintained in the ED EA Repository and is currently available to Department users via ConnectED (<http://connected1.ed.gov/po/ea/>). The Department's ED EA Data Team established the Enterprise Data Dictionary August 2004. A corresponding Enterprise Data Dictionary User's Guide was developed at the same time. An overview of the Enterprise Data Dictionary was completed December 1, 2004 and is posted on ConnectED ([http://connected1.ed.gov/po/ea/docs/ecdm-edd\\_overview.doc](http://connected1.ed.gov/po/ea/docs/ecdm-edd_overview.doc)).

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<sup>11</sup> A process described by the Department's EA, in which the differences between believed and actual business processes are identified.

<sup>12</sup> Scores ranging from 0-3 within the EA Assessment Framework resulted from evaluating the content of the Department's EA program and making recommendations for improvement. Scores ranging from 4-5 result from evaluating the extent of EA programs and whether they have been successfully integrated into the Department's IT investment decision-making process.

Between August 2004 and March 2005, the Enterprise Data Dictionary added 1,494 data elements including those developed by PBDMI (EDEN). Incorporation of additional data elements and associated metadata has continued. As of July 2005 the ED EA Enterprise Data Dictionary contained data from 14 data models totaling 2,072 data elements. Incorporation of data elements into the ED EA Data Dictionary is continuing

The intent of establishing this *Department-Wide* ED EA Data Dictionary was to clearly define standard data formats and permitted values across the Department. These standard formats and values are directly related to the ED EA Enterprise Conceptual Data Model, and to Logical and Physical data models developed within various programs such as PBDMI (EDEN).

Ensuring full support of PBDMI (EDEN) from the program offices takes two paths. The first is the Information Collection approval process. Within the Department, that process includes a review of proposed collections to establish how much of the collection can be obtained through PBDMI (EDEN). Second, all new IT projects within the Department must conform to internal Life Cycle Management review and approval “gates.” Included are gates for review of the technical architecture (including data). At that time, the relationship between a proposed collection and the existence of relevant data in extant collections is established. These procedures had not governed program office systems or data collections prior to the launch of PBDMI. However, these mechanisms are now in place (Information Collection approval) or will be in place shortly (Life Cycle Management review), and will be used to curtail the use of redundant information collection and data storage activities.

#### OIG Response

The Department’s response states that a corrective action to this recommendation was implemented as of March 2005. While we recognize that the Department has taken actions in response to our preliminary audit findings and Draft Audit Report, the Department states that the incorporation of data elements into the EA Data Dictionary is a continuing process. Furthermore, during our May 2005 exit conference, PMT members concurred with our finding by stating that the Department lacked agency wide guidance for adopting Meta Data dictionary elements into the EA. Accordingly, we recommend that the Department's ECA continue to coordinate with the PMT to adopt all PBDMI Meta Data dictionary elements into Department's EA to fully define standard data elements, data definitions and the business rules associated with collecting those data elements.

Additionally, we recommend the Department’s ECA:

- 3.2 Fully develop the EA Technical Reference Model to establish technical standards and information security requirements that are needed to build systems in support of the Department’s critical operations.

#### Department Response

ED’s EA documentation library FY2005-Q3 release includes ED’s Technical Reference Model and Technology Standards Profile documents. These documents were developed together to establish technical standards, products, and services to build systems in support of ED’s business functions and information security requirements. These documents are also available on ConnectED ([http://connected1/test/po/ea/cdversion/2005-05-31\\_ED\\_EA\\_Start\\_Page.html](http://connected1/test/po/ea/cdversion/2005-05-31_ED_EA_Start_Page.html)).

ED's Technical reference Model (TRM) is consistent with oversight documents as follows:

- In accordance with OMB's EA Assessment Framework Version 1.5, ED's TRM documents present the taxonomy used to categorize ED's standard IT products and (non-proprietary) standards, and uses a custom TRM taxonomy that matches ED's EA vision and mission needs and also aligns with the FEA TRM.
- In accordance with OMB Circular A-130, ED's TRM identifies and describes the information services used throughout the agency.
- In accordance with the Practical Guide to Federal Enterprise Architecture, ED's TRM is a taxonomy that provides:
  - a consistent set of service areas, interface categories, and relationships used to address interoperability and open-system issues
  - conceptual entities that establish a common vocabulary to better describe, compare, and contrast systems and components
  - a basis for the identification, comparison, and selection of existing and emerging standards and their relationships

ED's Standards Profile is consistent with oversight documents as follows:

- In accordance with OMB's EA Assessment Framework Version 1.5, ED's Enterprise Standards Profile contains a list of non-proprietary interoperability standards currently used at ED, and maps these standards to BRM subfunctions, SRM service components, and TRM service categories.
- In accordance with OMB Circular A-130, ED's Standards Profile defines the set of IT standards that support the services articulated in ED's TRM, and includes a Security Standards Profile that is specific to the security services specified in the EA and, in conjunction with ED's Baseline Security Requirements document, covers such services as identification, authentication, and non-repudiation; audit trail creation and analysis; access controls; cryptography management; virus protection; fraud prevention; detection and mitigation; and intrusion prevention and detection.
- In accordance with the Practical Guide to Federal Enterprise Architecture, ED's Standards Profile is the set of rules that govern system implementation and operation, references the technical standards that apply to the architecture and how they need to be, or have been, implemented, and is time-phased to facilitate a structured, disciplined process of system development and evolution and to promote the consideration of emerging technologies and the likelihood of current technologies and standards becoming obsolete. ED's TRM organizes ED's Standards Profile. ED has presented the TRM and Standards Profile as separate documents instead of as a combined document. However, ED's Standards Profile includes all of the information contained in ED's TRM and is therefore a superset of ED's TRM.

OIG stated that "A PMT representative stated that the lack of a fully developed Technical Reference Model caused delays in implementing the EDEN Submission System. This is because the Department's protocol standards, configuration, firewall, and anti-virus requirements for implementing production systems were not defined within the EA."

ED's TRM and Standards Profile are new documents that organize the standards and guidelines, including protocol, configuration, firewall, and anti-virus standards, that are

published in source documents that were used by the EDNet Technical Review Board process at the time of PBDMI's TRB reviews. These source documents include the EDNet Product Support Plan, which is a list of products and product usages that are supported by EDNet Operations, and the EDNet Technology Standards Guide Version 4, which is a more comprehensive list of products and technical specifications supported on EDNet. EDNet's Technology Standards Guide Version 4 identifies EDNet's protocol standards, configuration, firewall, and anti-virus requirements.



OIG Response

We reviewed the Department's response and action taken. A corrective action plan is required to ensure that audit follow-up processes have corrected the issues identified.

3.3 Improve the Department's current EA and clearly define the EA Target Architecture and Transition Plan to ensure it's aligned with the OMB Federal EA.

Department Response

ED's EA Program is executing the ED EA Completion and Use Plan and has made progress in addressing each of the areas of improvement identified by OMB as evidenced by ED's EA Self Assessment Summary and EA Self-Assessment Details. Feedback provided in OMB's Response to ED's EA Completion and Use Plan indicated that ED's planned actions have achieved the next level of maturity. OMB currently rates ED's EA as "effective," as indicated on the June 30, 2005 President's Management Scorecard for E-Government:

President's Management Agenda DEPARTMENT OF EDUCATION				
<p><b>Initiative</b></p> <p><b>E-GOVERNMENT</b></p> <p><b>Agency Lead:</b></p> <p>William Leidinger, Assistant Secretary for Management and Chief Information Officer</p> <p><b>Lead RMO Examiner:</b></p> <p>David Rowe/Michael Cassidy</p> <p><b>Lead IT/E-Gov Analyst:</b></p> <p>Jeanette Thornton</p>	 <p><b>Yellow</b></p> <p>Next ↑ est. by TBD</p>	<p>✓ Has effective EA (Y) Q3FY05</p> <p>Acceptable business cases for major systems            ___ for more than 50%            ✓ for all on Q3 FY05.</p> <p>Cost/schedule/performance adherence for major IT            ✓ overruns/shortfalls &lt; 30% Q1FY04            ___ EVMS shows overruns/ shortfalls &lt;10% planned on Q4 FY05</p> <p>Security of all IT systems            ✓ 80% secured or IG verifies effectiveness (Y) FY03Q4            ✓ 90% secured (G) planned Q2FY05            ✓ submits quarterly reports (G) Q2FY05            ✓ IG verifies effective (G) Q1FY05</p> <p>E-Gov implementation            ___ has process &amp; plan Q4 FY05            ___ has implemented TBD</p> <p><b>MAINTAINING GREEN</b></p> <p>___ all IT systems secure TBD</p> <p>___ IT systems installed in accordance with security configurations TBD</p> <p>___ consolidated/optimized all infrastructure for COOP</p>	<p style="text-align: center;"></p> <p><b>Green</b></p> <p><u>Actions taken this quarter:</u></p> <ul style="list-style-type: none"> <li>Issued task order for E-Travel vendor; submitted MOU to GSA.</li> <li>Removed CSB, FBI, and Enterprise Venture Capital from the management watch list.</li> <li>Enterprise architecture was rated "effective"</li> <li>Provided quarterly EVM variance report.</li> <li>Provided quarterly FISMA POAM.</li> <li>Provided a Grants.gov status report and final results of the SF 424 analysis.</li> <li>Migrated 13 grants to Grants.gov APPLY per ED's Grants.gov ramp up plan.</li> </ul> <p><u>Planned actions for next quarter:</u></p> <ul style="list-style-type: none"> <li>By July 22, submit draft Exhibit 53.</li> <li>By September 30, migrate 6 grants to grants.gov APPLY.</li> <li>By September 15, provide quarterly EVM variance report using template and ED's agency policy on the use of EVM.</li> <li>By September 15, submit a plan to incorporate EVM language into DME contracts and begin incorporation.</li> <li>By September 15th, provide quarterly FISMA POAM Report.</li> <li>Submit PBDMI information collection.</li> <li>Finalize E-Travel implementation schedule.</li> </ul>	<p><b>Status remains yellow. Progress score is contingent satisfactory completion of all Q3 actions.</b></p> <p>Status rating could improve when cost/schedule/ performance adherence is within 10% using an ANS/EIA EVMS for all development, modernization and enhancement investments, and the quality of ED's C&amp;As are rated "satisfactory."</p> <p>By September 1, 2005, ED must have an OMB-approved E-Gov Implementation plan and complete all Q3 and Q4 milestones including passback items. Failure to do so will result in a downgrade in STATUS in Q4 2005.</p> <p>In PTB3, all maintaining green criteria apply as soon as ED achieves a green status rating. ED must achieve all maintaining green criteria per their plan no later than June 30, 2006, or be downgraded in STATUS. Progress in achieving all standards will be measure against PTB3 plans and reflected quarterly on the scorecard.</p> <p>After ED submits their draft Exhibit 53, OMB and ED should discuss FY07 IT portfolio, including: (1) planned major investments; and (2) OMB's expectations for ED's financial system business cases.</p> <p>ED's FY06/FY07 funding for Business Gateway is an outstanding issue, requiring resolution between OMB, SBA, and ED.</p>

INSTRUCTIONS FOR COMPLETING THE SCORECARD FORMAT

June 30, 2005



President's Management Agenda  
DEPARTMENT OF EDUCATION

ACCOUNTABILITY/CONTACT INFORMATION

List the following for the initiative:

- name and title of the agency's lead
- name of the OMB Resource Management Office (RMO) examiner
- name of the initiative owner's staff lead

CURRENT STATUS COLUMN

Indicate the status rating (green, yellow, or red) for the quarter. To earn a yellow or green status rating, an agency must have achieved all the yellow or green Standards for Success. (See <http://www.results.gov/agenda/standards.pdf> )

If the status rating changed from the previous quarter, the rating should be followed by an up or down arrow, as appropriate. If the rating improved from red to green or deteriorated from green to red, use two arrows. Indicate the projected date (quarter and year) of the next status improvement. If the agency has already achieved green status for the initiative, the note can be deleted.

Example: Next ↑  
est. by  
FY 2005  
Q4

The current status column has been standardized to present a check list for the Standards for Success. All standards are preceded by an underscored space (    ) where you should indicate (with a check or X) if the standard has been achieved. The presentation of the standards varies somewhat by initiative. Usually yellow and green standards are grouped under a topic area with the yellow standard listed first. When necessary a (Y), (G), or (G+) follows the standard to indicate whether it is a yellow, green, or maintaining green standard.

An agency must meet all the specifications of the standards to receive a check mark. (See <http://www.results.gov/agenda/standards.pdf> for the full description of the standard.) Due to space constraints, short hand descriptions have been used to identify the standards in the quarterly scorecards.

Space is provided to indicate the date that the standard was originally achieved or is expected to be achieved.

- Enter a date in each space indicated.
- Present the date as the month or quarter and the year.
- If the standard has been achieved, enter the date when it was first achieved. For instance, if any agency received its first clean audit opinion for its FY 2000 financial statements (and has received clean opinions each year since then) the date would be 3/2001, not the date corresponding to the most recent audit.
- It is understood that future dates are approximate and that estimates may change each quarter.
- In cases where a standard was achieved long ago, either an estimate or a less than symbol (<) with the word date should be entered in the space.

June 30, 2005

DEPARTMENT OF EDUCATION

- If an estimate cannot be provided due to significant uncertainty, enter TBD in the space provided for the date.

Use bold to highlight any standard that was achieved in the past quarter

PROGRESS COLUMN

Indicate the progress rating (green, yellow, or red) for the quarter based on the definitions listed below:

Definitions of Progress Evaluation

GREEN: Implementation is proceeding according to plans agreed upon with the agencies.

YELLOW: Slippage in implementation schedule, quality of deliverables, or other issues requiring adjustments by agency in order to achieve initiative on a timely basis.

RED: Initiative in serious jeopardy. Unlikely to realize objectives without significant management intervention

If the progress rating changed from the previous quarter, the rating should be followed by an up or down arrow, as appropriate. If the rating improved from red to green or deteriorated from green to red, two arrows should be used.

List key actions completed in the past quarter and key actions planned for the following quarter. Significant actions, either completed or planned, should be highlighted using bold typeface.

COMMENTS COLUMN

Provide additional information as necessary to enhance the presentation.

OVERALL

The quarterly scorecards should not exceed one page per initiative.

Do not delete or modify any of the standards listed in the status column.

June 30, 2005

## Technical Corrections

(1) The audit report incorrectly refers to the records of technical assistance provided to SEAs by the Partner Support Center:

- Page 5 “customer support center help desk compliant logs” should be “customer support center help desk logs” or “customer support center help desk records.”

OIG Response: The language in our final audit report was changed to the PBDMI terminology: “customer support center help desk records.”

- Page 11 “Specific SEA complaints included:” should be “Specific technical assistance issues included:”

OIG Response: The language in our final audit report was changed to the PBDMI terminology: “Specific technical assistance issues included.”

(2) The technical assistance issues are not accurately described on page 11.

- The first bullet implies that the submission system calculates totals and records totals. The files provided by the SEAs often include subtotals and grand totals. When a file includes subtotals and grand totals, the submission system checks to determine if the subtotals are less the grand total. If the subtotals are more than the grand total, an error is generated. The log that was reviewed was simply an SEA working through resolving an error in their file. It was not an “inaccurate data calculation” by the Submission System.

OIG Response: We do not believe the report makes an inaccurate implication as claimed by the Department. However, the report was rephrased in an attempt to address management’s concern and to clarify that the submission system did not incorrectly calculates totals and records totals. Accordingly, the wording in the final audit report was changed to read: “Inaccurate data calculations – a SEA noticed an inaccurate data calculation of 465,000 when the accurate total should have been around 1700. Other SEAs identified instances where grand totals of data submitted were incorrectly smaller than the sum of the respective sub-totals”

- The second bullet implies the EDEN is responsible for missing data. The technical assistance that is the basis for this bullet was from an SEA informing ED that the SEA does not require that schools provide the SEA with a phone number and therefore the SEA does not have all the phone numbers of the schools in the state. The data is incomplete because it doesn’t exist at the SEA not because of anything to do with EDEN.

OIG Response: The Department’s response stating the report is making an implication to EDEN is inaccurate. In our report, we provide several examples regarding the

quality of data submitted to the Department and did not specifically state that EDEN was responsible for the missing data. Therefore we stand by our report findings and have not changed the wording in the Final Audit Report to address management's concerns.

- The third bullet implies either that the Submission System is changing data values provided by SEAs or creating its own data values. The Submission System wasn't incorrectly reporting a data value. The Submission System was showing an incorrect value because an incorrect value had been inputted into the System.

OIG Response: The Department's claim that the report implies that the Submission System is changing the data values or is creating its own values is incorrect. In our report, we provide several examples regarding the quality of data submitted to the Department and did not specifically state that EDEN was responsible for the missing data. Therefore, we stand by our report findings and have not changed the wording in the Final Audit Report to address management's concerns.

- (3) The concern listed on page 11 "program managers question the capacity of EDEN" may not meet the test of evidence because program managers have only partial knowledge about the system on which to base an opinion.

OIG Response: We do not agree with the Department's comment that program managers' statements about the capacity of EDEN does not meet the "test of evidence" standards. To gain an understanding of challenges facing PBDMI, we interviewed program managers, who interact directly with the system, to determine whether significant implementation risks have been effectively mitigated to ensure that PBDMI will meet its investment goals of consolidating current data collection activities in a way that improves data quality and reduces the reporting burden for national education partners. From these discussions, program managers expressed concerns because the PMT has not demonstrated to them that the quality of data collected will be sufficient to meet their operational needs. In order for PBDMI to consolidate the Department's multiple data collection efforts and meet its investment goals, the PMT must demonstrate to program managers (to obtain their buy-in) that the adequacy and quality of data collected will be sufficient to replace the program offices current data collection efforts. As management has previously indicated, data quality continues to be a significant risk that impacts the success of PBDMI, and the PMT has not effectively mitigated significant implementation risks related to this investment. Therefore, we stand by our report findings and have not changed the wording in the Final Audit Report to address management's concerns.

- (4) The description of the implementation of the EDEN Submission System is misleading. It implies that the PMT was not prepared for these issues. To mitigate risks, the EDEN Submission System was brought up in a planned, three-step approach. Version 1.0 was a usable system for the submission of files from SEAs. Version 1.1 addressed any issues that developed in the initial use by real users in the SEAs as opposed to test situations. Version 1.3 brought in the data framework functionality for use by the PMT.

OIG Response: Within the "Background" section of the Final Audit Report, we provided additional explanation about the PMT's system development program. Specifically, we

added: “According to the PBDMI PMT staff, the EDEN Submission System was developed to mitigate risks under a three-step approach. Version 1.0 was a usable system for the submission of files from SEAs. Version 1.1 addressed any issues that developed in the initial use by real users in the SEAs as apposed to test situations. Version 1.3 brought in the data framework functionality for use by the PMT.”

The issues listed on page 13 as “significant system functionality defects” are mostly minor coding issues of specific data fields. For example, the first bullet regarding the field for “assessment for promotion/graduation status.” This data field is for an optional data group.

OIG Response: Based on our review of EDEN Submission System Release documents (1.1 and 1.2), we noted numerous system functionality defects in early versions of EDEN that required coding modifications to ensure proper functionality of the system. We considered the following classifications to be greater than “minor coding issues,” and significant because of their nature and because a coding correction was required for subsequent releases of the EDEN Submission System: 1) “High” – correction is required because “no work-around” can be identified; and 2) “Very High” – correction is required and “critical for proper system functionality.” As the system functionality defects that we identified were classified as “High” and “Very High” within the EDEN Submission System Release documents, we do not consider these defects to be minor coding issues. Therefore, we stand by our report findings and have not changed the wording in the Final Audit Report to address the Department’s concerns.

## Other Matters and Statement on Internal Controls

### Other Matters

During the testing of the DSS Pilot, SEAs expressed concerns about whether education data was adequately protected. Although the Department does not collect data at the individual level, certain SEAs stated that education information about individuals could be derived because sufficient access controls had not been implemented. In response, the PMT implemented role-based security controls to eliminate privacy violations associated with “small cell” data inquiries.

### Statement on Internal Controls

As part of our audit, we reviewed internal controls related to the PMT’s ongoing system development efforts for the EDEN Submission System, Survey Tools, and DARS. We performed our review, in part, to determine the nature, timing, and extent of our substantive tests to accomplish our audit objectives. Because of inherent limitations, a study and evaluation made for the limited purpose described above would not necessarily disclose all material weaknesses in the internal controls. Our assessment did disclose internal control weaknesses that have impacted the system development efforts of EDEN.

In brief, we have determined that the PMT needs to improve certain project management and system implementation controls to ensure that the EDEN solution will ultimately consolidate the collection of education information in a way that improves data quality and reduces the paperwork burden for national education partners. In addition, the Department needs to fully develop its EA so that Meta Data Dictionary is defined to identify the data elements collected, submission formats, permitted values, applicable business rules and warnings, and the need for information. Furthermore, the EA Technical Reference Model needs to be fully developed to define technical standards, products, and services that must be adopted when implementing information systems. These weaknesses and their effects are fully discussed in the “Findings” section throughout this report.

## Appendix A: Department's Response to Draft Audit Report



UNITED STATES DEPARTMENT OF EDUCATION  
OFFICE OF PLANNING, EVALUATION AND POLICY DEVELOPMENT  
SEP 12 2005

### MEMORANDUM

TO: John Higgins  
Inspector General

CC: David Cole  
Director, Information Technology Audits

FROM: Tom Luce *Tom Luce*  
Assistant Secretary

SUBJECT: Response to Draft Audit Report: Audit of the Department's Performance Based Data Management Initiative Control No. ED-OIG/A11-E0003

Thank you for the opportunity to review the draft audit report on the Performance Based Data Management Initiative (PBDMI). In my first two months as Assistant Secretary for Planning, Evaluation and Policy Development, I have embraced PBDMI as my top priority. The Secretary, who also lists PBDMI among her top priorities, and I agree that achieving the promise of No Child Left Behind depends on access to the kinds of data and analytic tools being generated by PBDMI. We value your recommendations on how we can strengthen PBDMI and have already implemented most of them.

We agree with the finding that system implementation controls for the development of the EDEN system could be improved and have taken steps to do that under a single operations, maintenance and enhancement contract for all PBDMI systems. Data quality is an ongoing challenge with state and local education data that PBDMI is designed to address immediately and over the long term. The data quality issues identified in your report were those revealed by PBDMI processes and have been acted on with our state partners. Regarding the improvements of requirements and configuration management processes, the rapid development methodology chosen by PBDMI by its nature results in initial versions of the system that are refined in subsequent versions. As PBDMI matures, we will transition from the rapid development methodology to a more traditional systems development and maintenance methodology. PBDMI has worked closely with OCIO to develop an Enterprise Architecture vision. PBDMI data definitions and structures became the basis for the Department's Data Architecture.

**1.1 We recommend the Deputy Secretary devote additional resources to ensure the PBDMI PMT can adequately address the system development risks identified in this report.**

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*Our mission is to ensure equal access to education and to promote educational excellence throughout the nation.*

**Status:** Ongoing.

**Response:** The PBDMI PMT was augmented by two new FTEs in the last quarter of 2004. In addition, primary responsibility for program staff liaison on PBDMI data elements was assigned to the three elementary and secondary education performance analysts in the Strategic Accountability Service, who assist program offices in maintaining their program performance data. A new data acquisition team leader position has been competed and is pending a response to the offer. As part of the Secretary's reorganization that created the Office of Planning, Evaluation and Policy Development, two new deputy assistant secretary positions have been created with primary responsibility for PBDMI policy coordination. Also, a senior OMB examiner is assigned to work part-time with the PBDMI policy team. The PMT is currently reviewing overall PBDMI staffing levels to ensure that the PMT can adequately address the system development risks identified in this report and other project requirements.

**1.2 Provide guidance to SEA/LEAs in developing effective data input controls (i.e. edit checks, business processes) to verify the quality of education data and to ensure that data quality is maintained during the collection and data transmission process.**

**Status:** Ongoing

**Response:** Data quality is a continuous improvement process inherent in the Education Data Exchange Network. The current quality of state education data provides much room for improvement. PBDMI has multiple strategies underway to encourage and assist states to improve their data systems and the quality of their data.

PBDMI is a systematic attempt to address those problems that exist in current State data reporting systems:

1. State data are transferred directly from State administrative record systems into EDEN rather than being transcribed by State program officials onto a Federal reporting form. This eliminates one potential source of error.
2. EDEN's first step in receiving State data is automated error checks. These are designed to assure appropriate formatting, consistency with previous submissions, and conformance with pre-defined parameters.
3. EDEN's Partner Support Center reviews issues such as those identified in 2, above, with States and to request resubmissions of accurate data, as documented by GAO.
4. PBDMI has contracted with the Center for Data Quality (C4DQ) to review the accuracy of State data submissions and to provide recommendations for improvement.
5. PBDMI also contracted with C4DQ to provide data quality reviews for individual States and to provide them recommendations and technical assistance. C4DQ has conducted reviews in 10 States to date.

6. PBDMI has provided and will continue to provide data quality training and technical assistance to State PBDMI Coordinators in collaboration with NCES and CCSSO.

As data are reviewed for quality, additional error checks will be identified. As errors are corrected in an individual State, the potential for similar errors will be identified to other States and added to the review list for the Partner Support Center.

**1.3 Develop internal testing procedures and performance measures to ascertain the completeness, accuracy and reliability of education data before the EDEN Decision and Analysis Reporting System becomes operational.**

**Status:** Ongoing

**Response:** We agree with this recommendation and are aware of the need to ensure that high quality data is used for policy decisions and program management. Many actions have been taken or are planned to ensure EDEN uses the best available data (see 1.2 for a summary). EDEN data edits are based on permitted values and prior years' CCD submissions. As EDEN accumulates multiple years of data, it will be able to expand the database foundation for automated edits. In addition, program office staff and performance analysts are reviewing state data submissions against previous program office submissions as a basis for follow-up inquiries with states. These inquiries will help States identify specific areas on which to focus their data quality efforts. Importantly, the reporting system itself will enable additional analyses and reviews that will further support our data quality efforts. Because the reporting system will be operational before all data quality issues are finally resolved, users will be trained on the appropriate uses of the data.

As mentioned earlier, data quality is a continuous improvement process. In the interim, the data available for EDEN far exceeds the quality of what has been previously available to policy makers and program managers.

**1.4 Implement comprehensive requirements and configuration management controls to develop EDEN integrated systems that will meet system functionality and performance requirement, as well as encourage a proactive system development approach.**

**Status:** Implemented July 2005

**Response:** ED selected Perot Systems, Inc. as contractor for PBDMI Operations, Maintenance and Enhancement. That contract includes enhanced configuration management controls negotiated with OCIO's new contractor, CSC. Comprehensive requirements were laid down in the contract and are being further specified in a series of action plans under development by Perot and review by ED.



**1.5 Develop comprehensive procedures so the PMT can proactively define, collect and standardize a complete listing of standard data elements and definitions in connection with PBDMI.**

**Status:** Implemented September 2004 and under annual review

The PMT has completed in collaboration with OCIO/RIMS the second PBDMI collection submission to OMB. The proposed 2006-2008 collection builds on the 2004-2005 data elements and definitions with minor changes necessitated by the new IDEA reauthorization and similar programmatic changes. The identification of data elements is an iterative process. PBDMI began by asking program offices to define their information requirements (legislation, regulation, reporting, monitoring, program management, and risk avoidance). It then reviewed these requirements against data currently gathered by ED programs and offices, identifying gaps, redundancies and inconsistent definitions. The resulting data set was reviewed with the states for availability. Concurrently, a series of policy questions were developed with senior officers and data elements reviewed and modified to assure that those questions could be answered. We expect user requirements to evolve substantially as program officials and senior officers are able to access these data and further clarify their requirements.

The OPEPD planning team and new Executive level PBDMI Steering Committee will be undertaking a review of all elementary and secondary data elements to assure that programs rely on standard data elements and definitions that are aligned with PBDMI.

**1.6 Develop a formal change control process that will govern changes to the EDEN Meta data dictionary and business processes associated with PBDMI data collection and reporting activities.**

**Status:** Implemented July 2005

**Response:** Perot Systems has proposed and has implemented a formal change control process under the oversight of the PMT and Steering Committee.

**1.7 Develop comprehensive training programs and guidance to assist SEAs in reducing on-going data submission errors with the EDEN Submission System.**

**Status:** Ongoing

The PMT and Perot Systems are updating the EDEN guidance documents and training based on the proposed 2006-2008 data elements. Two and a half day training sessions have again been scheduled for state staff. Two regional trainings will be offered, one in Denver, CO, October 24-26, 2005, and one in Washington, DC, November 2-4. Both sessions will include introductory orientation for state staff new to the EDEN system. We expect near 100% participation again this year.

**2.1 We recommend the Deputy Secretary devote additional resources to ensure the PBDMI PMT can adequately address the system development risks identified in this report.**

**Status:** Ongoing.

**Response:** See response to 1.1

**2.2 Develop comprehensive project management controls to effectively manage the timely completion of project milestones and oversee multiple contractors responsible for developing the EDEN integrated systems.**

**Status:** Implemented November 2004

**Response:** PBDMI has a master project schedule which the PMT has reviewed weekly with active contractors and OCIO for the past year and a half. The Operations, Maintenance and Enhancement contract awarded to Perot Systems, Inc., was designed to transition from the multiple contractors required for development to a single contract to manage EDEN with the PMT. This transition will be complete at the end of this fiscal year.

**2.3 Develop comprehensive contract management controls to ensure that contract deliverables are performed and funds disbursed in accordance with contract requirements. Furthermore, the PMT needs to develop procedures to ensure that all States provide education data in support of PBDMI.**

**Status:** Part 1 implemented July 2005; Part 2 ongoing

**Response:** Comprehensive contract management controls have been put in place for the comprehensive Operations, Maintenance and Enhancement contract with Perot Systems, Inc., begun in July 2005. The PMT has developed a project management plan with Perot that is reviewed weekly. The COR has been designated the coordinator of the project management plan. A transition plan is also in place with Perot and the legacy contractors which is coordinated by the alternate COR for the Perot contract.

The new Office of Planning, Evaluation and Policy Development has developed a strategy to provide the incentives to states to ensure that all States provide education data in support of PBDMI. This strategy includes communication by senior officers, waiver of reporting requirements to those States that have transmitted the required data, and draft regulations requiring State submissions through EDEN.

**3.1 To help ensure the success of PBDMI, we recommend that the Department's ECA coordinate with the PMT to adopt a PBDMI Meta Data dictionary into Department's EA to further define standard data elements, data definitions and the business rules associated with collecting those data elements.**

**Status:** Implemented March 2005

**Response:** The ED EA team has developed and implemented an ED EA Data Dictionary, which includes extensive metadata fields. It is maintained in the ED EA Repository and is currently available to Department users via ConnectED (<http://connected1.ed.gov/po/ea/>). The Department's ED EA Data Team established the Enterprise Data Dictionary August 2004. A corresponding Enterprise Data Dictionary User's Guide was developed at the same time. An overview of the Enterprise Data Dictionary was completed December 1, 2004 and is posted on ConnectED ([http://connected1.ed.gov/po/ea/docs/ecdm-edd\\_overview.doc](http://connected1.ed.gov/po/ea/docs/ecdm-edd_overview.doc)).

Between August 2004 and March 2005, the Enterprise Data Dictionary added 1,494 data elements including those developed by PBDMI (EDEN). Incorporation of additional data elements and associated metadata has continued. As of July 2005 the ED EA Enterprise Data Dictionary contained data from fourteen data models totaling 2,072 data elements. Incorporation of data elements into the ED EA Data Dictionary is continuing

The intent of establishing this *Department-Wide* ED EA Data Dictionary was to clearly define standard data formats and permitted values across the Department. These standard formats and values are directly related to the ED EA Enterprise Conceptual Data Model, and to Logical and Physical data models developed within various programs such as PBDMI (EDEN).

Ensuring full support of PBDMI (EDEN) from the program offices takes two paths. The first is the Information Collection approval process. Within the Department, that process includes a review of proposed collections to establish how much of the collection can be obtained through PBDMI (EDEN). Second, all new IT projects within the Department must conform to internal Life Cycle Management review and approval "gates." Included are gates for review of the technical architecture (including data). At that time, the relationship between a proposed collection and the existence of relevant data in extant collections is established. These procedures had not governed program office systems or data collections prior to the launch of PBDMI. However, these mechanisms are now in place (Information Collection approval) or will be in place shortly (Life Cycle Management review), and will be used to curtail the use of redundant information collection and data storage activities.

**3.2 Fully develop the EA Technical Reference Model to establish technical standards and information security requirements that are needed to build systems in support of the Department's critical operations.**

**Status:** Implemented May 2005

**Response:** ED's EA documentation library FY2005-Q3 release includes ED's Technical Reference Model and Technology Standards Profile documents. These documents were developed together to establish technical standards, products, and services to build systems in support of ED's business functions and information security requirements.

These documents are also available on ConnectED  
([http://connected1/test/po/ea/cdversion/2005-05-31\\_ED\\_EA\\_Start\\_Page.html](http://connected1/test/po/ea/cdversion/2005-05-31_ED_EA_Start_Page.html)).

ED's Technical reference Model (TRM) is consistent with oversight documents as follows:

- In accordance with OMB's EA Assessment Framework Version 1.5, ED's TRM documents present the taxonomy used to categorize ED's standard IT products and (non-proprietary) standards, and uses a custom TRM taxonomy that matches ED's EA vision and mission needs and also aligns with the FEA TRM.
- In accordance with OMB Circular A-130, ED's TRM identifies and describes the information services used throughout the agency.
- In accordance with the Practical Guide to Federal Enterprise Architecture, ED's TRM is a taxonomy that provides:
  - a consistent set of service areas, interface categories, and relationships used to address interoperability and open-system issues
  - conceptual entities that establish a common vocabulary to better describe, compare, and contrast systems and components
  - a basis for the identification, comparison, and selection of existing and emerging standards and their relationships

ED's Standards Profile is consistent with oversight documents as follows:

- In accordance with OMB's EA Assessment Framework Version 1.5, ED's Enterprise Standards Profile contains a list of non-proprietary interoperability standards currently used at ED, and maps these standards to BRM subfunctions, SRM service components, and TRM service categories.
- In accordance with OMB Circular A-130, ED's Standards Profile defines the set of IT standards that support the services articulated in ED's TRM, and includes a Security Standards Profile that is specific to the security services specified in the EA and, in conjunction with ED's Baseline Security Requirements document, covers such services as identification, authentication, and non-repudiation; audit trail creation and analysis; access controls; cryptography management; virus protection; fraud prevention; detection and mitigation; and intrusion prevention and detection.
- In accordance with the Practical Guide to Federal Enterprise Architecture, ED's Standards Profile is the set of rules that govern system implementation and operation, references the technical standards that apply to the architecture and how they need to be, or have been, implemented, and is time-phased to facilitate a structured, disciplined process of system development and evolution and to promote the consideration of emerging technologies and the likelihood of current technologies and standards becoming obsolete. ED's TRM organizes ED's Standards Profile. ED has presented the TRM and Standards Profile as separate documents instead of as a combined document. However, ED's Standards Profile includes all of the information contained in ED's TRM and is therefore a superset of ED's TRM.

7

OIG stated that "A PMT representative stated that the lack of a fully developed Technical Reference Model caused delays in implementing the EDEN Submission System. This is because the Department's protocol standards, configuration, firewall, and anti-virus requirements for implementing production systems were not defined within the EA."

ED's TRM and Standards Profile are new documents that organize the standards and guidelines, including protocol, configuration, firewall, and anti-virus standards, that are published in source documents that were used by the EDNet Technical Review Board process at the time of PBDMI's TRB reviews. These source documents include the EDNet Product Support Plan, which is a list of products and product usages that are supported by EDNet Operations, and the EDNet Technology Standards Guide Version 4, which is a more comprehensive list of products and technical specifications supported on EDNet. EDNet's Technology Standards Guide Version 4 identifies EDNet's protocol standards, configuration, firewall, and anti-virus requirements.

### **3.3 Improve the Department's current EA and clearly define the EA Target Architecture and Transition Plan to ensure it's aligned with the OMB Federal EA.**

**Status:** Implemented June 2005

**Response:** ED's EA Program is executing the ED EA Completion and Use Plan and has made progress in addressing each of the areas of improvement identified by OMB as evidenced by ED's EA Self Assessment Summary and EA Self-Assessment Details. Feedback provided in OMB's Response to ED's EA Completion and Use Plan indicated that ED's planned actions have achieved the next level of maturity. OMB currently rates ED's EA as "effective," as indicated on the enclosed June 30, 2005 President's Management Scorecard for E-Government (hard copy attached).



ED FINAL Scorecard  
2005Q3.doc

#### Technical Corrections



- (1) The audit report incorrectly refers to the records of technical assistance provided to SEAs by the Partner Support Center:
  - Page 5 "customer support center help desk compliant logs" should be "customer support center help desk logs" or "customer support center help desk records."
  - Page 11 "Specific SEA complaints included:" should be "Specific technical assistance issues included:"
- (2) The technical assistance issues are not accurately described on page 11.

- The first bullet implies that the submission system calculates totals and records totals. The files provided by the SEAs often include subtotals and grand totals. When a file includes subtotals and grand totals, the submission system checks to determine if the subtotals are less the grand total. If the subtotals are more than the grand total, an error is generated. The log that was reviewed was simply an SEA working through resolving an error in their file. It was not an “inaccurate data calculation” by the Submission System.
  - The second bullet implies the EDEN is responsible for missing data. The technical assistance that is the basis for this bullet was from an SEA informing ED that the SEA does not require that schools provide the SEA with a phone number and therefore the SEA does not have all the phone numbers of the schools in the state. The data is incomplete because it doesn’t exist at the SEA not because of anything to do with EDEN.
  - The third bullet implies either that the Submission System is changing data values provided by SEAs or creating its own data values. The Submission System wasn’t incorrectly reporting a data value. The Submission System was showing an incorrect value because an incorrect value had been inputted into the System.
- (3) The concern listed on page 11 “program managers question the capacity of EDEN” may not meet the test of evidence because program managers have only partial knowledge about the system on which to base an opinion.
- (4) The description of the implementation of the EDEN Submission System is misleading. It implies that the PMT was not prepared for these issues. To mitigate risks, the EDEN Submission System was brought up in a planned, three-step approach. Version 1.0 was a usable system for the submission of files from SEAs. Version 1.1 addressed any issues that developed in the initial use by real users in the SEAs as apposed to test situations. Version 1.3 brought in the data framework functionality for use by the PMT.

The issues listed on page 13 as “significant system functionality defects” are mostly minor coding issues of specific data fields. For example, the first bullet regarding the field for “assessment for promotion/graduation status.” This data field is for an optional data group.

Attachment

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<p><b>Initiative</b></p> <p><b>E-GOVERNMENT</b></p> <p><b>Agency Lead:</b></p> <p>William Leidinger, Assistant Secretary for Management and Chief Information Officer</p> <p><b>Lead RMO Examiner:</b></p> <p>David Rowe/Michael Cassidy</p> <p><b>Lead IT/E-Gov Analyst:</b></p> <p>Jeanette Thornton</p>	<p align="center"></p> <p align="center"><b>Yellow</b></p> <p align="center">Next ↑ est. by TBD</p>	<p>✓ Has effective EA (Y) Q3FY05</p> <p>Acceptable business cases for major systems          ___ for more than 50%          ✓ for all on Q3 FY05.</p> <p>Cost/schedule/performance adherence for major IT          ✓ overruns/shortfalls &lt; 30% Q1FY04          ___ EVMS shows overruns/ shortfalls &lt;10% planned on Q4 FY05</p> <p>Security of all IT systems          ✓ 80% secured or IG verifies effectiveness (Y) FY03Q4          ✓ 90% secured (G) planned Q2FY05          ✓ submits quarterly reports (G) Q2FY05          ✓ IG verifies effective (G) Q1FY05</p> <p>E-Gov implementation          ___ has process &amp; plan Q4 FY05          ___ has implemented TBD</p> <p><b>MAINTAINING GREEN</b></p> <p>___ all IT systems secure TBD</p> <p>___ IT systems installed in accordance with security configurations TBD</p> <p>___ consolidated/optimized all infrastructure for COOP</p>	<p align="center"></p> <p align="center"><b>Green</b></p>	<p><u>Actions taken this quarter:</u></p> <ul style="list-style-type: none"> <li>• Issued task order for E-Travel vendor; submitted MOU to GSA.</li> <li>• Removed CSB, FEBl, and Enterprise Venture Capital from the management watch list.</li> <li>• Enterprise architecture was rated "effective"</li> <li>• Provided quarterly EVM variance report.</li> <li>• Provided quarterly FISMA POAM.</li> <li>• Provided a Grants.gov status report and final results of the SF 424 analysis.</li> <li>• Migrated 13 grants to Grants.gov APPLY per ED's Grants.gov ramp up plan.</li> </ul> <p><u>Planned actions for next quarter:</u></p> <ul style="list-style-type: none"> <li>• By July 22, submit draft Exhibit 53.</li> <li>• By September 30, migrate 6 grants to grants.gov APPLY.</li> <li>• By September 15, provide quarterly EVM variance report using template and ED's agency policy on the use of EVM.</li> <li>• By September 15, submit a plan to incorporate EVM language into DME contracts and begin incorporation.</li> <li>• By September 15th, provide quarterly FISMA POAM Report.</li> <li>• Submit PBDMI information collection.</li> <li>• Finalize E-Travel implementation schedule.</li> </ul>	<p><b>Status remains yellow. Progress score is contingent satisfactory completion of all Q3 actions.</b></p> <p><b>Status rating could improve when cost/schedule/ performance adherence is within 10% using an ANSI/EIA EVMS for all development, modernization and enhancement investments, and the quality of ED's C&amp;As are rated "satisfactory."</b></p> <p>By September 1, 2005, ED must have an OMB-approved E-Gov implementation plan and complete all Q3 and Q4 milestones including passback items. Failure to do so will result in a downgrade in STATUS in Q4 2005.</p> <p>In PTB3, all maintaining green criteria apply as soon as ED achieves a green status rating. ED must achieve all maintaining green criteria per their plan no later than June 30, 2006, or be downgraded in STATUS. Progress in achieving all standards will be measure against PTB3 plans and reflected quarterly on the scorecard.</p> <p>After ED submits their draft Exhibit 53, OMB and ED should discuss FY07 IT portfolio, including: (1) planned major investments; and (2) OMB's expectations for ED's financial system business cases.</p> <p>ED's FY06/FY07 funding for Business Gateway is an outstanding issue, requiring resolution between OMB, SBA, and ED.</p>
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**INSTRUCTIONS FOR COMPLETING THE SCORECARD FORMAT**

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ACCOUNTABILITY/CONTACT INFORMATION

List the following for the initiative:

- name and title of the agency's lead
- name of the OMB Resource Management Office (RMO) examiner
- name of the initiative owner's staff lead

CURRENT STATUS COLUMN

Indicate the status rating (green, yellow, or red) for the quarter. To earn a yellow or green status rating, an agency must have achieved all the yellow or green Standards for Success. (See <http://www.results.gov/agenda/standards.pdf> )

If the status rating changed from the previous quarter, the rating should be followed by an up or down arrow, as appropriate. If the rating improved from red to green or deteriorated from green to red, use two arrows. Indicate the projected date (quarter and year) of the next status improvement. If the agency has already achieved green status for the initiative, the note can be deleted.

Example:      Next ↑  
                  est. by  
                  FY 2005  
                  Q4

The current status column has been standardized to present a check list for the Standards for Success. All standards are preceded by an underscored space (    ) where you should indicate (with a check or X) if the standard has been achieved. The presentation of the standards varies somewhat by initiative. Usually yellow and green standards are grouped under a topic area with the yellow standard listed first. When necessary a (Y), (G), or (G+) follows the standard to indicate whether it is a yellow, green, or maintaining green standard.

An agency must meet all the specifications of the standards to receive a check mark. (See <http://www.results.gov/agenda/standards.pdf> for the full description of the standard.) Due to space constraints, short hand descriptions have been used to identify the standards in the quarterly scorecards.

Space is provided to indicate the date that the standard was originally achieved or is expected to be achieved.

- Enter a date in each space indicated.
- Present the date as the month or quarter and the year.
- If the standard has been achieved, enter the date when it was first achieved. For instance, if any agency received its first clean audit opinion for its FY 2000 financial statements (and has received clean opinions each year since then) the date would be 3/2001, not the date corresponding to the most recent audit.
- It is understood that future dates are approximate and that estimates may change each quarter.
- In cases where a standard was achieved long ago, either an estimate or a less than symbol (<) with the word date should be entered in the space.

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- If an estimate cannot be provided due to significant uncertainty, enter TBD in the space provided for the date.

Use bold to highlight any standard that was achieved in the past quarter

### PROGRESS COLUMN

Indicate the progress rating (green, yellow, or red) for the quarter based on the definitions listed below:

#### Definitions of Progress Evaluation

**GREEN:** Implementation is proceeding according to plans agreed upon with the agencies.

**YELLOW:** Slippage in implementation schedule, quality of deliverables, or other issues requiring adjustments by agency in order to achieve initiative on a timely basis.

**RED:** Initiative in serious jeopardy. Unlikely to realize objectives without significant management intervention

If the progress rating changed from the previous quarter, the rating should be followed by an up or down arrow, as appropriate. If the rating improved from red to green or deteriorated from green to red, two arrows should be used.

List key actions completed in the past quarter and key actions planned for the following quarter. Significant actions, either completed or planned, should be highlighted using bold typeface.

### COMMENTS COLUMN

Provide additional information as necessary to enhance the presentation.

### OVERALL

The quarterly scorecards should not exceed one page per initiative.

Do not delete or modify any of the standards listed in the status column.

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