Montgomery County, Maryland
Office of the County Executive
Office of Internal Audit

Post-Implementation Audit of Montgomery County's Enterprise Resource Planning (ERP) System
June 20, 2013

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MCIA-13-5

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Post-Implementation Audit of ERP

Highlights

Why MCIA Did this Audit?

We conducted the audit as the County's Enterprise Resource Planning System (ERP) implementation project was identified as a high-risk area during our County-wide risk assessment. The ERP is an integrated system heavily relied upon by all County departments for their financial and operational processes. It is budgeted to cost over $65 million.

The objectives of the audit were to review the effectiveness of the implementation effort, assess the adequacy of the key controls implemented for a select number of financial modules, and identify remaining challenges or problems in the implementation and potential solutions. We also reviewed the adequacy of controls to ensure payments to ERP contractors were correct.

The audit focused on the design of controls and included limited sampling for testing. The audit sought to verify and confirm if appropriate internal controls are implemented within the system to identify, detect, and prevent errors and/or fraud.

What MCIA Recommends

This report contains 14 recommendations including, defining adequate roles and responsibilities for business units, core departments, and the ERP Enterprise Service Center team; conducting business process reengineering of its operations including considering centralizing certain financial functions; hiring more skilled and technical full time resources; making reports available through ERP; developing strong user access administration process and conducting thorough segregation of duties analysis; and applying required configurations within the system.

The County Enterprise Resource Planning (ERP) Executive Steering Committee fully concurred with 12 of the recommendations and partially with two.

What is the County's ERP System?

An Enterprise Resource Planning (ERP) is a complex system of business management software that integrates information and activities from all departments and functions across an organization. The purpose of the ERP system is to facilitate the flow of information between all business functions inside the boundaries of the County. The County is implementing an ERP system to replace its legacy systems and to integrate most of its business processes to produce and access current information easily.

What MCIA Found?

During the course of the audit, we identified many areas and activities that the ERP project team and the County did well and followed best practices such as: using independent (GFOA) partnership in requirements gathering and procurement; dedicating knowledgeable staff from core business departments to assist in implementation and backfilling at core business department level; leveraging a 50/50 staff to consultant ratio to reduce costs and reliance on contractors; co-locating functional and technical staff; and using an integrator (CIBER, Inc.) to lead the implementation effort and provide expertise in making business decisions. Some of the key positive accomplishments were: the ERP Project team is very responsive, and technically knowledgeable; modules were implemented on time and within budget; the team works diligently to resolve and troubleshoot issues; the team is constantly learning and keen on improving its implementation procedures. The issue management process to document and track CAFR related issues is an example of the team's focus on continuous improvement and issues with criticality and priority.

However, the audit identified 14 areas of system or internal control weaknesses including: (1) governance issues regarding clearly defined roles and system responsibilities; (2) need for more experienced functional and technical resources; (3) incomplete business process re-engineering prior to system or module implementation; (4) inadequate security and user access administration process including segregation of duties; (5) poor controls around master data; (6) inadequate configuration management process; (7) inadequate retention of project-related documentation; (8) insufficient reporting capabilities needed by the department units to efficiently conduct their daily activities; (9) need for a more robust issue management and escalation process; (10) inadequate training; (11) inconsistent review and approval of data conversion by business units; (12) inadequate testing; (13) insufficient defining or consideration of County requirements for the ERP project; and (14) inadequate implementation of long term or permanent solutions to remediate CAFR related issues.

It is important to note that our audit did not disclose any instances of fraud or material errors resulting from the weaknesses we found during our audit. However, if not corrected each weakness increases the County's vulnerability to waste, fraud or abuse.

ERP Post-Implementation Audit

Introduction

This document summarizes the work performed by Watkins Meegan on behalf of the Montgomery County Office of Internal Audit (MCIA) in reviewing the implementation of the County's Enterprise Resources Planning (ERP) system – Oracle E-Business Suite (EBS) and PeopleSoft Retiree Payroll module. The overall objective of the audit was to determine whether the ERP system has been implemented adequately and meets the County's requirements. This document describes the background, scope, objectives of the audits, and approach and methodology used to assess the implementation, and the results of our audit including our overall recommendations.

Background

In 2007, the County embarked on a Technology Modernization (Tech Mod) capital project under which implementation of systems such as ERP and other projects were undertaken. The ERP implementation project was undertaken to replace core legacy business systems[1] with the initial focus being on financial and procurement modules. The entire County-wide implementation was expected to be a 3-5 year project completed using a phased approach, with the first set of modules (financials/procurement) to be completed within 24 months of the initiation of the project. The County selected the Oracle EBS suite of applications as the ERP software and contracted with CIBER to assist with the implementation of the software.

The initiation and ongoing implementation of the project under the Tech Mod project is overseen by an Executive Steering Committee that is headed by the Chief Administrative Officer (CAO). Its members include the Directors of the Departments of Finance, Office of Human Resources, Technology Services, General Services, Health and Human Services, Liquor Control, Employee Retirement Plans, and the Office of Management and Budget; an Assistant CAO, and the ERP Project Director. Often times the ERP project team [2] participates in the Executive Steering Committee meeting to provide specifics on implementation.

As the ERP systems and the different modules are implemented and maturing, there is an immediate need for a sustaining organization to support the ERP system. The County has a support team, and is working towards establishing an Enterprise Service Center (ESC), which will be comprised of full time County employees and contractors. The County is continuously looking to enhance the skill sets of the ERP staff in the current team and future ESC to support the system. According to County officials, the Enterprise Service Center charter will include enhancements, upgrading and maintenance of the ERP system, and provide continuing support to ensure ongoing viability of key County operations and processes.

The Oracle EBS system was implemented to support the operations of the County and designed to fully integrate all the significant processes and procedures of the County and make them more effective and efficient. Given the integrated nature of Oracle EBS, certain risks and challenges may be encountered by the County, or any organization that implements an ERP, as it relates to:

[1] Legacy systems that the County used which are replaced by Oracle ERP are Financial Administration and Management Information Systems (FAMIS), Advanced Purchasing and Inventory Control System (ADPICS), Human Resources Management System (HRMS), and BPREP (also EOS, HCM)

[2] The ERP working group or the project team is responsible for implementing the system for the County. The team is comprised of County full time employees, CIBER consultants, and contractors.

- Technology and business environment
- User or management behavior
- Business processes and procedures
- System functionality
- Application security
- Underlying infrastructure
- Data conversion and integrity
- Ongoing maintenance/business continuity

The risks associated with the implementation and ongoing use of County's Oracle EBS ERP system cannot be determined or controlled by review of application or technical risks in isolation, but must be considered in conjunction with the County's business processes and its relevant objectives. Some of the major concerns regarding implementation and management of ERP systems in general are:

- Failure to meet user requirements
- Failure to integrate
- Incompatibility with technical infrastructure
- Vendor support problems
- Expensive and complex installations

The ERP project is currently budgeted (through June 2013) to be upwards of $65 million dollars with the actual costs as of January 31, 2013, being approximately $59 million dollars. The following table outlines the implementation schedules of the 23 initial ERP modules that were implemented in July 2010 through February 2011.

ERP Modules		**Implementation Schedule**
Financials	General Ledger Accounts Payable Accounts Receivable Assets Payments Web Application Desktop Integrator Advanced Collections Cash Management Bill Presentment Architecture Purchasing Procurement Contracts, Services Procurement, Sourcing for Oracle Purchasing, Project and Grants Fixed Assets	July 2010
Human Resources	Core Human Resource Compensation Work Bench Labor Distribution Oracle Advanced Benefits	Jan/Feb 2011

	Payroll iRecruitment Employee Self Service Manager Self Service	

Additional modules have been implemented into the production environment since February 2011:

Additional RP Modules		Implementation Schedule
Financials	iExpense iReceivable Work Orders Inventory	January 2012 and After
PeopleSoft Pension Administration	Retiree Payroll	March 2012

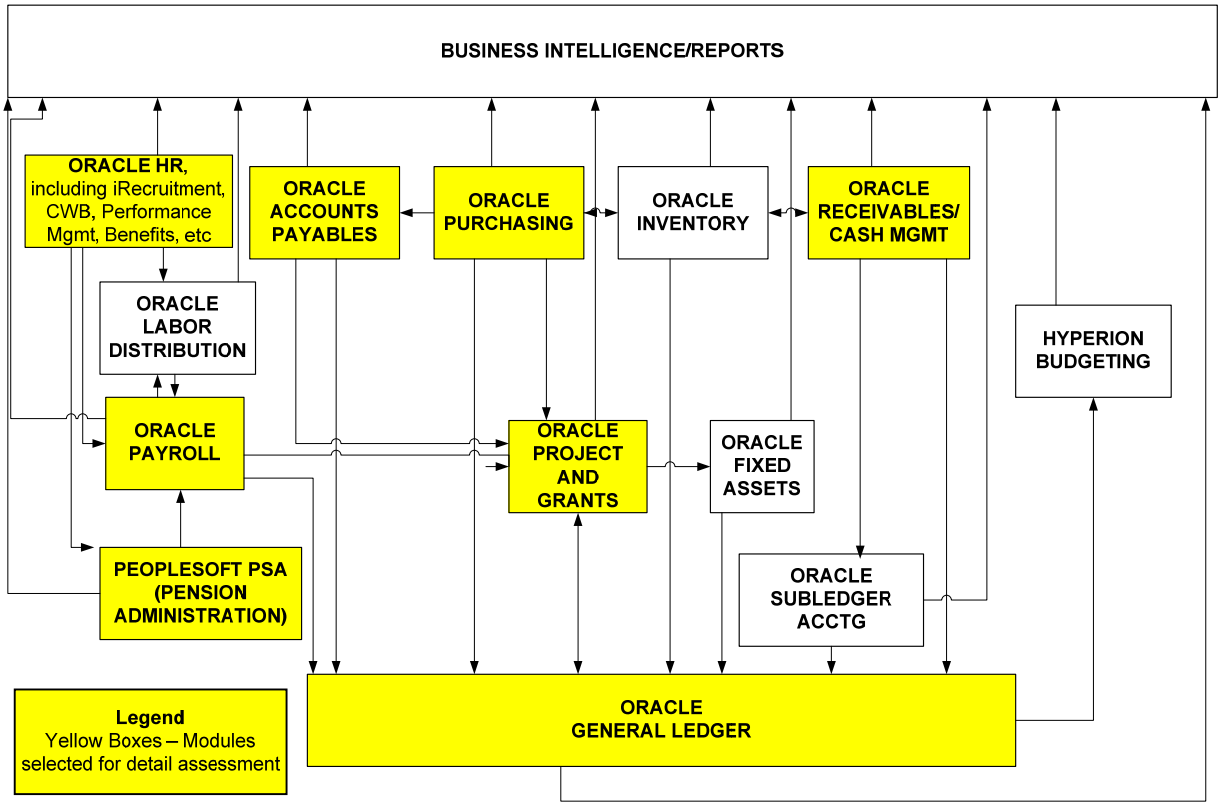

Figure 1 High Level Oracle EBS Diagram

The Office of Internal audit (MCIA) initiated an audit of the ERP system because it was identified as a high-risk area in the County-wide Risk Assessment. The ERP is the authoritative system from which the data that support the County's Comprehensive Annual Financial Report (CAFR) is generated, it is highly visible with significant project costs, and impacts all departments and many County employees. Considering that the system was live in production environment for approximately 18 months and the critical modules had been implemented and operating as planned for some time, MCIA initiated the audit in April 2012. The audit was planned in two phases.

Objectives, Scope and Methodology

The overall objectives of the post-implementation audit of the ERP system were to:

- Determine if the system is operating as intended and if the system is effectively serving the County's needs.
- Identify any remaining challenges the County may face to complete the implementation.
- Evaluate processes and controls to ensure payments to contractors for ERP implementation are for services received and pursuant to the contract.

As mentioned above, the audit was split into two phases. Using the information gathered in Phase I, the Watkins Meegan audit team developed a detailed audit plan that was executed in the second phase.

During the second phase (Phase II) of the audit we executed the detail audit plan developed in Phase I for the selected modules and sought to determine whether key functional and technical controls have been implemented within the ERP system to mitigate risks and assist in identifying, detecting, and preventing errors and fraud. The specific objectives covered in Phase II of the audit for six selected modules were to:

- Assess if the system implementation procedures adequately addressed testing of processes, data conversions from the legacy system, and integrity of incoming and outgoing interfaces for the six modules;

- Assess the adequacy of procedures, training materials, issues management process, and reports to meet the end user requirements, effectively manage operations and detect errors, exceptions, and potential fraud;

- Review the adequacy and implementation of key controls to ensure the integrity of master and transaction data and application configuration such as approval hierarchies and application security for the six modules;

- Review and evaluate the processes and controls to ensure payments to contractors for ERP implementation are for services received and pursuant to the contract;

- Identify any remaining challenges to complete the ERP implementation.

The County ERP team implemented more than 20 modules in the first two waves of implementation of the ERP system. The modules crossed 13 County functions and operations. MCIA did not include all the modules in scope of the audit in order to limit audit cost as well as the disruption of the existing implementation efforts and to be cognizant of the County end users, business process owners, and ERP team members' time and schedules. We limited the scope of the audit to 8 modules; five core modules impacting financial reporting and HR, Payroll, and Retiree Payroll. The team developed criteria to select high-risk areas/modules to do a detail assessment. Eight-high risk areas/modules (highlighted in yellow in Figure 1 High Level Oracle EBS Diagram) were selected for the detail assessment as shown below:

Module	Objective
General Ledger	Oracle General Ledger module is a central repository for accounting data transferred from all sub-ledgers or modules like accounts payable, accounts receivable, cash management, fixed assets, purchasing, and projects. Oracle General ledger is the backbone of the ERP system which holds financial and non-financial data for the County.
Accounts Payable	Oracle Accounts Payable module is the module where entries related to the County's transactions around payments owed by the County to suppliers and other creditors are processed and stored.
Projects and Grants	Oracle Projects and Grants is the module to track costs incurred against projects and awards/grants and includes features to support project managers and others to oversee projects and grants.
Payroll	Oracle Payroll is the module used to calculate employee salaries, bonuses, and deductions correctly, make timely payments, and provide data for accounting.
Human Resources	Oracle Human Resources is the module to support effective workforce management. Oracle HR can be configured to align with the County's processes and be automated to complete a variety of tasks, including organization and position control, recruitment, career development, compensation management and benefits.
Cash Management	Oracle Cash Management is the module to streamline the bank reconciliation process and manage liquidity.
Purchasing	Oracle Purchasing is the module to manage procurement activities and ensure compliance with County's regulation on procurement.
Retiree Payroll (PeopleSoft)	Retiree Payroll (PeopleSoft Pension Administration) is the system used by the County to mange retiree payroll data and payments. This system interfaces with Oracle HR module for employee and retiree data and to Oracle payroll module for processing payments.

The main criteria the team used, along with some other considerations to identify the high-risk areas and selecting the modules, are:

Impact to CAFR	**Reputational Risk and Exposure**
Dollar amount of transactions flowing through the modules	Volume of transactions
Complexity of the modules	Issues encountered during go-live
Suggestions offered to us in discussion with end users, core department users, and ERP working group/project team	

Additional information on the objectives, risks, scope, and methodology can be found in Appendix I – Scope Approach and Methodology.

Results

During the course of the audit we identified areas and activities that the ERP project team and the County performed very well, particularly considering the size and complexity of the project. Some of the key positive accomplishments were:

- The County initiated a number of best practices with the implementation of ERP:
  - Established an Executive Steering Committee (ESC) led by the Chief Administrative Officer
  - Partnered with Government Finance Officers Association (GFOA) in defining and gathering requirements
  - Dedicated experienced staff from the business operations (Finance, Human Resource, Purchasing, Budget, Technology Services)
  - Backfilled positions in the business operations
  - Established separate office space and co-located functional and technical staff
  - ESC charged the ERP project team to make decisions, utilize best practices embedded in the system, and avoided customization
- The ERP Project team is helpful, responsive, and technically knowledgeable.
- The majority of the modules were implemented on time and within budget.
- Communication about the project and with various business units and departments at a high level was good.
- ERP Project team has worked diligently to resolve and troubleshoot issues as soon as it could with the resources available.
- The County has started using new modules and functionality that were non-existent prior to ERP implementation such as Project and Grants, Receiving, and Accounts Receivables. These new modules and functionality have the capability and can assist the County to enhance the existing processes and improve efficiency.
- The issue management process to document and track Comprehensive Annual Financial Reporting (CAFR)-related issues is strong and allows for documentation and tracking of issues with criticality and priority.
- The invoices, we tested, for the services rendered to the County by the contractors

assisting the County with the implementation were paid in accordance with the agreed upon terms and conditions and were paid correctly.

A project of this nature is complex, critical, time and resource consuming, and of high visibility. There are always going to be areas and activities that can be done better and enhanced, and some areas that require deeper analysis and a better approach. Our audit disclosed areas that need strengthening, enhancing, or the need for new processes or controls to mitigate risks. We have listed below our observations that apply across all of the eight modules assessed.

It is important to note that our audit did not disclose any instances of fraud or material errors resulting from the weaknesses we found during our audit. However, if not corrected each increases the County's vulnerability to waste fraud or abuse.

1. **Governance: Lack of Adequate Roles and Responsibilities Defined for the System** – Currently, it is unclear that roles and responsibilities of the operating departments, core business departments, and the ERP team are defined and communicated as they relate to who owns and is accountable for what aspect of the ERP system. By de facto, it appears that the ERP team is making decisions and not the business units or the County core departments on how, what, when, and why the modules or any functionality of the module should be implemented.

   We noted, through inquiry with approximately fifty (50) County personnel (end users and business unit/core department owners), that the operating departments or the core business departments do not believe that they have sufficient control over how the system is being implemented, and how the system should be functioning in order to support County operations. Industry leading practices suggest that the County operating units and core business departments (units that have the end users who use the system on a daily basis to do their jobs and support County operations) should have final authority over the functional and operational use of the ERP system, which includes but not is limited to, approving any functional changes, user access testing, functional issue prioritization and remediation efforts, and authority to reject a change/module/system from being implemented into production.

   We understand that subject matter experts (SME's) from each core business departments were appointed by their respective core business departments to represent the core business departments, and be part of the implementation team. However, wearing multiple hats (one for implementing the modules timely and in budget and the other to ensure that all the requirements have been implemented for their respective core business departments) can lead to confusion and conflicts in roles and responsibilities of the SME's. This can create a perception that since the SME's are representing the core business departments that they have the authority on-behalf of the core business departments to take critical decisions on requirements, and go-live and could have lead to lack of communication back to the core business departments in terms of their involvement in the decision making process. Because the roles, responsibilities, and accountability are not clearly defined and communicated, the end users and core business department users do not seem fully vested in the system. Inadequate definition of roles and responsibilities could have also contributed to a perception that operating departments and core business departments "do not have a say," leading to end user dissatisfaction and a feeling that their

day-to-day requirements are not being adequately or fully met utilizing the ERP system. This may also be the reason there appears to be resistance to adapting the ERP system by staff in certain departments.

Additionally, the ERP personnel including the SME's implementing the modules are wearing multiple hats – continually adding new functionality and implementing more modules; and doing post implementation maintenance and support. This also seems to be creating a challenge of understanding distinctly the roles and responsibilities.

2. **Resources: Lack of Functional and Technical Full-Time Resources to Use and Support ERP System** – Our audit noted that the County lacks sufficient numbers of functional and technical full-time County employees with in-depth understanding and expertise of Oracle EBS and PeopleSoft in the core departments and within the ERP team. This often times is a common issue for organizations who are implementing a major ERP system for the first time. Currently, there are a limited number of full-time County employees, who have prior experience with the new systems that are part of the core business departments and operating departments. The ERP team relies upon ERP full time contractors and hourly-paid contractors for the ongoing support and administration of the Oracle EBS and PeopleSoft system. Lack of adequate resources has led to the County facing issues on many fronts. A noticeable issue was the delayed issuance of the CAFR in FY 2011, which was issued on March 2012 instead of the planned date of December 2011. The lack of functional and technical resources was a contributing reason for the delay. According to County officials, not having appropriate skilled and trained functional personnel led to transactions getting mis-categorized and miscoded and contributing to delays in preparing financial statements. We noted that more recently the County has incorporated requirements around potential candidates having Oracle EBS experience and skills in filling future full-time positions where day-to-day usage of ERP system is part of the job function.

   Additionally, the County ERP team has not been able to provide sustainable support for all the modules or long-term solutions to Oracle EBS issues due to turnover in consultant and contractor professionals and lack of in-house full-time expertise. The ERP team is losing institutional knowledge every time a consultant and/or a contractor leaves the project. The County also loses valuable time getting a replacement and getting them up to speed with the project. We noted that there is currently no dedicated PeopleSoft resource at the County to support Retiree Payroll process. The PeopleSoft system that is used for running retiree payment process is complex and has interfaces with the Oracle HR and Payroll modules. The County is currently relying on a consultant for support, but the consultant is also working at an off-site location supporting a different project unrelated to the County. There is a risk the consultant may not give priority to fulfilling the County's needs and there could be considerable delay in obtaining support. While turnover in any department cannot be predicted, a full-time employee base is generally preferred to a contingent/contract employee/or a consultant to support longer term needs of complex systems like Oracle EBS and PeopleSoft.

3. **Business Process Re-Engineering (BPR)** – Business Process Re-engineering is strategy leveraged by business to focus on analysis and design of workflows and processes within an organization. BPR is done to increase efficiencies; help organizations rethink how they conduct their operations, cut operational costs, and better align the operations to take

advantage of new strategies, systems, or projects. BPR is a very important aspect in any ERP implementation. By conducting BPR, a business process owner knows the current stage of their business operations and also identifies areas where the processes need to be improved. Majority of the times the process improvements are either achieved by the implementation of the ERP system or the process improvements are made so that the full functionality of the ERP system can be used to support the business. This in turn helps in increasing efficiencies, cutting costs, and improving operations.

Our audit noted that BPR was not consistently performed for all County operations impacted by the ERP system(s). In some areas, processes, even if refined or enhanced, were not fully implemented and communicated. The County did undergo an exercise at the inception of the ERP project where "as-is" and "to-be" processes were flowcharted with the input from the different business units and departments within the County. A third party was engaged to assist the County with the flowcharting process and identify areas where the processes need to be changed, or enhanced to ensure that the County could take advantage of the functionality that Oracle EBS and PeopleSoft provide. However, pursuant to our inspection of the various County documents, inquiry of various County personnel and contractors, and inspection of configuration settings, we noted that the recommendations or changes identified during the BPR exercise have not been fully implemented.

According to ERP officials, the County deferred implementing some important recommendations identified during the BPR exercise because the County felt it needed to restrict the amount of change it could absorb during that time period. We agree that in some instances deferring a BPR or not forcing an organization to go through too much change may be deemed as a good approach. However that kind of decision making should be well studied and documented. We did not find such documentation. Impacts of not doing the BPR or not implementing the recommendations from the BPR exercise on the implementation should be carefully considered. Our experience shows that the impacts may be detrimental to the overall success and operations of the newly implemented system and outweigh the stress put on an organization due to BPR changes. Additionally the decision to not conduct a BPR, or not implement resulting recommendations, should be done by an independent organization (organization not involved in the implementation process) who can objectively look at all the factors and independently opine on the BPR deferral.

Lack of BPR or implementation of the recommendations from the BPR exercise, may have led to weaknesses in the areas of configuration settings not properly implemented within the ERP system(s) and business units having to introduce manual workarounds, such as spreadsheets, that may have resulted in inefficiencies and County not being able to take advantage of ERP system(s). Additionally an observation of note made by the audit team was that the current County financial functions are decentralized (Accounts Payables, HR, etc) but the system as implemented is intended for a centralized function with formal consistent processes and application of those processes. Currently various County departments conduct different module specific transactions in different manners, for example, imaging of supporting documents done by County agencies is different as compared to how Accounts Payable images supporting documents in Finance department.

Additionally, while the County has developed desktop and closing procedures to facilitate consistent closing process, it does not appear that management reviewed these procedures as there were instances of procedures having references to the legacy system. There should be a process in place to review the procedures and enhance them periodically to reflect the existing process and systems used. Procedures are a key preventive control to reduce errors and omissions to ensure accuracy and completeness of accounting entries and resulting financial statements.

4. **User Access Administration Process** – Our audit disclosed inadequate application security and related processes supporting the Oracle and PeopleSoft systems. We found that the process of managing user access requests (creating, modifying, and revoking) was not adequately designed. This could be due to lack of resources in the security administration function. Currently, the Application/System Administrator verifies if the user requesting access has received training for the module, and verifies that the request for access is made by the Department Director or pre-authorized designee. The Application/System Administrator then grants access to the responsibility [3] on confirmation of both appropriately authorized request and receipt of training. While it appears that access is granted based on request made by a Department Director or their designee, it doesn't appear that the access is actually approved by a person who owns the modules or set of functionalities within the ERP system. Industry leading practices require access approvals to financial modules within an ERP system be obtained from personnel who have knowledge about the various security roles and responsibilities that are currently used within the modules and which roles and responsibilities gives what kind of access within the modules.

   The County's process has no central repository where user requests are documented, tracked, stored and can be retrieved when required. Currently, the Service Request Form or the request for user access email is transferred from the system administrator's inbox to a hard drive which is a County asset provided to the administrator by the County Department of Technology Services (DTS). Because the hard drive is an external drive, it is not backed up. Additionally, we noted that for a sample of 10 users that we selected for access approval verification, we could not obtain the approved service request forms indicating the access that was requested and authorized for the 10 users.

   a. *User Access Review:* The current user access review process does not involve evaluation of the responsibilities and the access privileges an Oracle responsibility grants to a user. The current process only evaluates whether a user still needs access to the system and to the responsibility he or she is assigned. Additionally, we noted that access of contractors and users with elevated or privileged access is not reviewed during the process. We also noted that the County had not completed access review for PeopleSoft system used for retiree payroll process. Knowingly or inadvertently, excessive and conflicting access may be granted to a user through the Oracle responsibilities. Inadequate user access administration process can lead to inappropriate access granted to critical information, which may result in malicious or accidental deletion, modification, or manipulation of system files.

[3] Responsibility in Oracle refers to the privileges and access that is granted to do day to day functions within the system.

We also found that there is no process in place to identify orphan and idle accounts that are either not associated with a user, individual, or are not an application or service account. There are several orphan accounts (not assigned to a user or an individual, and are not application or service accounts) identified currently being active and having privileged access to the ERP system. The orphan accounts can be used to compromise the system. With no preventive and/or detective controls (review of the accounts), this access control weakness can expose critical information to internal and external intrusion, to potential unauthorized access, modification, or disclosure of sensitive information. In addition, it can increase the risk of introducing errors or irregularities into data processing operations and allow individuals to bypass critical controls.

b. *Security Administration Function*: Currently, the majority of the user access administration activities are managed and conducted by one individual, the Application/System Administrator of ERP system. The administrator has multiple super user and system administration responsibilities with functional and application development responsibility as well. We understand that the County has identified an additional individual to assist with the security administration activities and to back up the Application/System administrator; however, in our experience and based on industry leading practices, a security/system administration function supporting 10,000 County users and County operations needs a group of three (3) to four (4) full-time, dedicated resources.

c. *Logging and Monitoring of activities:* Our review noted that the administrator's activities are not logged and reviewed. Additionally, we noted nineteen (19) users having super user or administrative access to the Oracle system and their activities are neither logged nor reviewed on a periodic basis. Lack of process to identify, log, and monitor day-to-day activities of super user, power user, privileged users, and administrative users within the Oracle system can lead to security activities not being performed in a timely manner. This can result in potential security issues not being addressed including unauthorized access to critical systems and potential for collusion and fraud. Industry leading practices suggest that all super user and administrative activities are logged and reviewed on a periodic basis by an independent team (for example information security team)

d. *Segregation of Duties (Conflicting access)/Excessive Access: T*here is no process in place to identify Segregation of Duties (SOD) conflicts while creating responsibilities and granting or managing user access to the Oracle system. The only criteria used by the administrator to prevent SOD, is to not grant a user Approver and Clerk or DPO Buyer responsibilities. For example, we noted that there are 10 user accounts that have Application Development responsibility on the production system. Another example noted was that members of the ERP team have the PnG system administration responsibility that allows them complete access to the PnG module, including managing configuration and transactions. These users also have super user access to payroll for active and non-active employees; to GL, which allows for journal entry and posting; AP super user; Receivables super user; and HR generalist responsibility. This control weakness is compounded as there is no oversight or monitoring of the activities performed by these users. Having the ability to conduct critical transactions across all modules without oversight and monitoring increases the risk of compromises to the integrity of County's financial statements and books

of account either intentionally or unintentionally, and execution of unauthorized transactions or changes.

We also noted that the current process does not verify for excessive access. For example, our review of the users with access to the Oracle purchasing module identified at least six (6) users with unlimited purchasing authority. These users can execute purchase orders, task orders, change orders, contracts, and other documents. While the County's policies and guidelines may allow for a few users to have unlimited authority, for internal control purposes, we believe users who get that privilege should only be part of the procurement office and should be formally authorized by the County CAO. Of the six users identified with the privilege of unlimited authority, only two (2) users work for the Office of Procurement, the other 4 users are part of the ERP Enterprise Service Center.

Additionally, our review also noted fifty eight (58) users at the County had unlimited DPO authority in Oracle. These users can execute department purchase orders without requiring approvals. While the unlimited approval authority is intended for the purchase of exempt commodities and services, there is no system control or monitoring process implemented to detect intentional or unintentional abuse of authority for purchase of nonexempt items or services. Another example of excessive access was noted in the Oracle HR module, where in addition to the seven users within the Core HR department who can approve and update critical HR data, there are approximately 16 Office of Human Resources (OHR) employees who can update critical HR data. Excessive access to users can result in unauthorized changes and can compromise the integrity of critical HR data.

Our review also noted there are an excessive number of users with access to the PeopleSoft retiree payroll system. Although there are only a small number of users (approximately six) involved with the retiree payroll process, our review found over 400 user IDs with access to the PeopleSoft system. Users with access to default responsibilities in PeopleSoft have not been removed. While we understand that this could have been due to migration of legacy user ID's into the new system and County has initiated a post-implementation clean up of these ID's, the ID's were not scrubbed or cleaned at the time of the audit. This can lead to risk of compromise to the integrity of retiree payroll calculations.

5. **Master Data** – Our audit showed that controls relating to master data[4] are not adequate, as changes to master data are not formally approved or monitored. Also, there is no detective control to verify if changes to the master data made were appropriate and that there were no unauthorized changes. Master data, if compromised, can seriously impact the integrity of financial transactions including payroll, purchasing, or the integrity of financial reports. This can have serious consequences with the possibility of lawsuits, fines, and penalties**.**

[4] Master data is information that is key to the operation of a business. For example, for Human Resource, an employee record is considered as master data. For Accounts Payable (AP) and Purchasing vendor or supplier information is considered as master data. For General Ledger (GL) chart of accounts including all elements that go into the account structure such as funds, cost center and accounts, etc is considered master data. For Cash Management, master data is the bank information, for Projects and Grants, master data is the templates for projects and awards.

Controls relating to review, deletion, and correction of active employee master data that is interfaced from Oracle HR to PeopleSoft are not adequate. Our review noted there were issues due to creation of duplicate records in Oracle HR for terminated employees who are rehired. Duplicate IDs impact the accuracy of the retirement calculations. When a person retires, PeopleSoft will extract data for only one record and calculate the benefits and the other record of the retiree will not be included in the calculation. As a result, the participant may not receive the correct credited service amount, which impacts the retirement benefit amount.

There is no systematic analysis, processes and procedures, and dedicated staff to analyze reports to manage data and transaction integrity. We noted that controls relating to supplier master data are not adequate. Our review indicated there are no tasks or activities performed to review the accuracy, completeness, and integrity of supplier master records. There are over 2,000 suppliers in the Oracle database without a tax ID and an undetermined number of duplicate suppliers in the database. There is no process established to identify and correct errors. Considering the total number of records in the Oracle database and the criticality of the records, a data cleansing and scrubbing exercise, while time-consuming, should be done. If resource constraints are an issue, County should consider hiring temporary resources to cleanse the data.

6. **Configuration Management (CM):** Our audit noted that there is no formal process or program to update configuration[5] information for the Oracle modules used in production. Prior to go-live, the contractor prepared a deliverable to document application configuration information for each module. However, after creation of the initial deliverable, application configuration documents have not been updated. While the County does have a process to manage changes to the system, it does not have a configuration management process or a formal configuration management program._

   A formal CM program ensures that documentation (requirement, design, test, and acceptance documentation) for configurations is accurate and consistent with the intended purpose. This will allow for all the configurations that are implemented within the ERP system to be documented and managed. If the configurations need to be changed, they should follow the ERP change control process. The configurations should not be changed without proper in-depth analysis of the impact of the change on end-to-end transactions. Because the ERP system is a tightly integrated system, a change in the configuration in one module can have a significant impact on the transactions in various modules. The configuration management process should also indicate which configurations are part of which modules within ERP and the configurations should be categorized as functional and technical and should also have criticality assigned. The criticality definitions should dictate the number of approvals required by the business owners, if and when the configurations are changed. The initial configurations should be sourced from the RTM if available. If the RTM is not available, the configurations should have been collected and documented directly from the production instance of the ERP system.

[5] Configurations are defined as initial settings and/or parameters that allow a system to operate and function in a way that meets the intended use.

For example, our audit noted that controls to ensure Accounts Payable (AP) transactions are valid and unique (not duplicated) are not adequate. The current process to detect duplicate payments, non-compliance to invoice numbering guidelines, detection of invoices without a purchase order or receiving report, wrong invoice cancellations, excess accruals, use of incorrect accounts, and other errors for the AP function is ad hoc and not through adequate configuration settings.

Our audit noted that there are manual overrides being done in the PeopleSoft system for all retirement calculations. Manual overrides are done to calculate the average final earnings to add the imputed earnings as part of the fiscal year 2010 general wage adjustment. This occurs because PeopleSoft has not been customized/configured to calculate the final average earnings of a retiree from imputed earnings and other adjustments. Manual overrides pose a risk of over/under payment to retirees instead of relying on numbers being generated by the system using functional logic that resides within the system.

Some other examples of configurations not being implemented adequately are around audit trails being overwritten and not maintained for historical purposes. For example, our procedures noted that the audit trail history of approximately 9,500 County employee records was overwritten due to mass updates done to the records by the ERP team in October 2011 utilizing a script. Also, the person who made the change appears as "anonymous" instead of the name of the script, program, or actual user who made the change. Additionally, we noted that when Core HR approves personnel transactions with salary changes initiated by department HR liaisons, the salary window in Oracle HR displays the approver as the ERP application/system administrator and not the person from the department who approved the change. This could be attributed to a configuration error or mis-configuration of approver type in Oracle HR module.

Additionally, when Core HR approves a personnel transaction initiated by the HR liaisons or updates an employee's record, the system replaces the previous approver's name and date approved with a new name and current date. While there is nothing wrong with the audit trail being updated to reflect the current and most recent update, the audit trail history is not retained. Among other things this causes Core HR personnel to lose their ability to view the full history of changes they have approved. Audit trails provide the ability to trace the history of a transaction from start to finish. They allow program managers and external reviewers to monitor what is happening and verify if the transactions were properly recorded and authorized. Without audit trails, unauthorized or fraudulent transactions may go undetected, errors may not be corrected, and it would difficult or impossible to recreate events for an investigation if there is compromise to the integrity of data. This could be due to lack of configurations set to retain audit trail history.

7. **Issue Management** – The issue management process utilized to document and track ERP implementation issues is weak and needs to be enhanced. The process does not allow the ability to centrally document and track all issues that users encounter while using Oracle and PeopleSoft system to do their day to day activities. The process does not allow for issues to be tracked based on criticality consistently across all departments and the resolution of the issues may not be based on priority, criticality, and impact analysis. As a result, critical and priority issues cannot be resolved in a timely manner, leading to multiple exposures to the County.

We understand that the County, since our initial observation and briefing to ERP officials regarding this issue, has undertaken an initiative to develop a central issue management repository. The repository is SharePoint-based and is currently used by the ERP team. The County has enhanced its issue management process and seeks to mirror the CAFR issue management process, which we believe is good, mature, and can be sustained. The ERP team hopes to share the SharePoint-based issue management process with the core business departments in the near future with the goal to open it up to all County departments that use ERP.

8. **Reporting** – Reports are not available to departmental and business unit users to perform reconciliations, monitor day-to-day operations, produce required information for reporting to other agencies, and detect errors and duplicates. Reports are a key component of any operations and were included in the requirements. For financials, we noted that two years after the modules were implemented, users still do not have the reports they need to manage their operations. The audit team noted through inquiry that County made a conscious decision to not implement reports during the initial phases. According to officials, the decision was based on cost/benefit and risk/impact analysis done by the County at the time of making the decision.

   The County determined that most reporting needs could be met from on-line inquiries and standard reports and any additional user required reports would be developed using lower cost report development contractors after go-live. We believe the County seriously underestimated the impact of not making reports available to County departments. Without reports, departments lack the ability to detect errors and complete reconciliations timely and efficiently. There is increasing reliance on workarounds and parallel systems. Also, there is an overall dissatisfaction of many users from core business and operational departments in the lack of reporting. Departmental staff relayed this sentiment to us consistently throughout our audit. Additionally, unauthorized and fraudulent transactions may go undetected without adequate reporting capability. This is a particularly critical issue that impacts many system users.

9. **Testing** – Our audit noted that test cases (unit, system, and user acceptance) were created, executed, and approved without consistent and appropriate involvement and feedback from the operating departments and core business departments. Additionally, sign-offs on test results were not obtained from core business department owners or operational departments. While we understand CIBER developed the test plans and SME's approved them as a representing member of the core business departments the test plans should have been vetted by others in the core business departments. SME's while perceived to be representing the core business departments on the ERP implementation team, also had the responsibility to complete the implementation of the modules in a timely manner and on budget. This could have led to SME's having conflicting priorities and hence not objectively and thoroughly looking at all the test plans to ensure the plans met requirements. Failure to fully involve core business department owners in development and execution of test plans, especially user acceptance testing, will often result in end-user dissatisfaction and the implementation team may be at risk of not meeting user requirements.

Our audit procedures included sampling 5 test cases to verify if the testing for the HR module was conducted before the module was implemented into the production environment. Of the five sampled test cases for User Acceptance Testing, two samples did not have documented evidence that testing was conducted. Additionally, we took a sample of 5 User Acceptance Test cases for AP module and found that documentation could not be located to indicate that such testing was conducted.

Another example of lack of testing noted was when the audit team selected 5 samples of integration test cases while assessing the GL module and noted that none of the tests were performed prior to the GL module being implemented and ready for use in production environment. Pursuant to further inquiry about the lack of testing done, it was noted that there was no evidence of business justification or approval obtained for not conducting the tests. Additionally, there was no evidence that the testing was performed at a later date. This could be a result of turnover in the ERP team and the ERP team undergoing centralization of their testing efforts. Pursuant to industry leading guidance, untested or improperly tested components may cause system problems creating issues with effectiveness and efficiency of operations and can introduce critical errors.

10. **Data Conversion** – Through inquiry and inspection of the data conversion plans, we noted that the plans were not consistently reviewed and approved by the core business departments and operating departments. For example, we noted that legacy data, when transferred from the old system, was not cleansed before being uploaded into Oracle. We noted duplicates and suppliers with missing tax ID's transferred from the old legacy system. According to County officials, this was the result of lack of resources and priorities being more focused on cleansing data related to financial transactions.

    Core business and operating departments could have identified the duplicates and lack of missing information, had they reviewed and approved the data conversion plans. Additionally, the County was unable to provide us evidence of data conversion testing and a final summary report indicating that the data from legacy systems when moved to the staging and production tables was complete and accurate. Validation of complete and accurate data conversion from the legacy system to the new system is a critical step in any system implementation project, especially in a project of this complexity and critical nature. Additionally, this was a requirement that was outlined in the data conversion strategy document created by CIBER for the ERP project team. Inadequate validation of complete and accurate data conversion, could result in data inconsistencies in the converted data, and could lead to errors in the data.

11. **Documentation** – Our audit noted that the County does not have a central repository where all the documentation related to the ERP project from the inception to the current state is consistently retained. Pursuant to inquiry with personnel from the ERP team, it was noted that many documents were stored on the local hard drives of the users. Additionally, we could not locate a policy, defined or enforced, which requires the ERP project team to retain ERP project-related documentation. Inadequate retention of project-related documentation can cause the County to lose historical reference points and important decision-making factors that may be needed in future. Certain project-related decisions may have been made that had a critical impact on the project and those decisions should be documented and

retained so that, in the event the decisions need to be revisited in the future, the County can do so.

12. **Requirements** – Our audit noted that a Requirements Traceability Matrix (RTM) was not developed that lists all County requirements related to the ERP system. Officials told us that the County was following the process outlined by the CIBER, the County's contracted implementer. CIBER in its implementation and integration process did not use the RTM tool.

    We understand that the County relied on its consultants to provide expert guidance and advice. However it is widely recognized that the RTM is a best-practice tool. It allows an entity, such as the county, to track its requirements of the ERP system(s). The RTM should be updated on a regular basis throughout the project indicating which requirements are met and what testing was done to ensure that the requirement is met or will be met. Additionally, the RTM should also list the testers, approvers, and personnel involved in each of the requirements, which module(s) will satisfy the requirement, and the date the requirements were implemented in the production environment, along with status on whether or not the requirement is met. Without an RTM for the ERP project the County cannot have reasonable assurance that all of its pre-stated requirements were met.

    This is particularly important for the County since its Statement of Work (SOW) for the ERP contract contained upward of 5,000 requirements. Of those 5,000+ requirements, approximately 3,300 requirements were for the modules the audit team selected to assess in detail with the exception of the PeopleSoft Pension Administration System (Retiree Payroll module). We could not find evidence that requirements were defined for the Retiree Payroll module.

    Because the number of requirements was voluminous, we selected a sample of requirements from each module for validation. We selected samples based on the experience, criticality, understanding of the business processes, information gathered in Phase I of our audit, knowledge of the modules, and risk to County operations. Because there was no RTM developed, it was not possible to validate if all the requirements were met. Where possible and feasible, we through walkthroughs and inspections, validated whether the sample requirements were implemented or not. In many cases, we noted that there were design gaps in internal controls which would be a result of multiple requirements either not considered or implemented(for example, approval hierarchies, cross-validation rules, automatic bank reconciliations, reports, etc.). Because many requirements were not considered or implemented for the modules assessed, many business units and process owners have developed manual workarounds and have parallel systems (Excel spreadsheets, etc.) that may introduce inefficiencies and potential errors in County operations and financials.

    Some of the requirements that were not met as identified by the audit team were:

    a. Different reports were required to be developed and made available when the ERP system was implemented. That requirement was not met and is yet to be met as of the date this audit was conducted.
    b. Preventing Duplicate payments: Invoice numbering guidelines while turned on to prevent duplicate payments is not consistently followed by all departments. Also,

since the County has a decentralized payments processing environment, not all invoices centrally reviewed by A/P are inputted exactly as listed to ensure that invoice numbering guidelines are followed and invoices number.

c. County required that the ERP system must be configured to mask certain user-defined data fields for security reasons (e.g., social security number, addresses, and secondary job). We noted that the social security number of an employee is masked on certain screen but not on the US statement of earnings screen and HR element entries in the HR module and HR employees and liaisons can see social security numbers of all County personnel.
d. Additionally, we noted that there is no alert or notification to the departments when an employee's professional license, certification, or employment eligibility verification form (I-9) is expiring within the next thirty or sixty days. This was one of the requirements included in the Statement of Work during procurement.

Not implementing one of the requirements identified during the Statement of Work may lead to end user dissatisfaction and increased frustration, even though the requirement may not be considered critical by the implementation team.

Additionally the audit team noted that the Oracle Cash Management (CM) module has only been partially implemented and configured. There are significant operational issues with entering receipts in Oracle in a timely manner. Currently, only the County's primary bank of approximately a dozen banks it uses was interfaced with Oracle CM module. The other banks were not interfaced and connected with the module during the time of the audit; however, there are plans to consolidate the different banks the County utilizes and does business with and interface them with the ERP system. Further, business processes for receipts at the departments have not been streamlined to ensure entries are made in the CM module accurately and in a timely manner to match with entries on bank statements.

We also observed that bank accounts have not been configured to facilitate automated bank reconciliations for matching receipts and certain number of payment transactions. This has resulted in the County having to manually reconcile the receipts and payments and Finance having to hire several contractors to do manual bank reconciliations. Manual bank reconciliations are time-consuming and the process involves significant effort with the possibility of errors. There is an increased risk of financial losses and potential for other exposures as receipts may not be deposited and reconciled in a timely manner.

Our audit procedures also noted that the Oracle workflow and approval hierarchy based on employee/supervisor relationships, authorization limits, and sources are not used for approving journal entries to GL. Officials told us that County had made a conscious decision to not use Oracle Journal Entry workflow. They indicated that the Journal Entry workflow follows HR hierarchy and because there was inadequate backup approver functionality defined at the time of implementation, there was no immediate way to prevent journal entries from being fully posted within an operating department and never being submitted to finance for review and approval. Instead, the County implemented risk controls for the GL module that involved preparers not approving their own journal entries.

Based on our experience, this is inadequate to prevent unauthorized, incorrect, or incomplete accounting transactions from being entered and posted to the general ledger.

There is no authorization limit defined that indicates the maximum amount of a journal entry transaction that can be approved by a user. Currently the Journal Entry approver authority is restricted to users in Department of Finance, ERP team, and Office of Management and Budget, but some users have access to this authority through super user responsibility and shared ID's, which can be mis-used. Oracle provides the functionality to define sources of journal entries where approvals can be required before these are reviewed and posted, but this feature has not been implemented. Lack of such critical approval controls can lead to increased risk of compromise to the integrity of the County's financial statements and books of account, either intentionally or unintentionally.

The County may have not been able to implement the functionality due to the decentralized nature of its operations and the ERP system is more suited for centralized operations and functions. This is a recurrent issue that needs to be addressed.

13. **Training** – We found that the initial training provided to the end user and department core users were mostly generic and not tailored to County operations or processes. During the course of our interviews and focus group sessions, we noted that there was frustration in the end user community as the training was not sufficient or fully effective. Not having adequate and strong training, especially involving complex and complicated systems like Oracle and PeopleSoft, will lead to the end user losing interest and showing resistance in adapting to the new system. The ERP team, upon receipt of the feedback from end user and department heads, revamped the training program and UPK's to provide informative and illustrate examples that are specific to County operations and processes.

14. **Remediation of Issues Related to CAFR** – Our audit noted that there were over 100 CAFR-related issues identified by the Department of Finance and the ERP team that led to delays in the County releasing the CAFR for FY2011. In discussing this issue with County officials after we completed our audit work they stated that the actual number of discrete issues is less than 100 because a number of items are presented on the list as requiring both short-term workarounds and longer term permanent solutions. While Finance, the ERP team, and other stakeholders are working diligently to resolve the issues, we noted that the resolutions in most cases do appear to be short-term and not long-term, permanent solutions.

    For example, one of the CAFR issues identified was bank reconciliations not done timely and being delayed for months. To remediate that issue the County for 2012 CAFR did manual bank reconciliations utilizing contractors. Manual bank reconciliations are long, laborious, tedious, and error prone and considered a short term solution and not a permanent fix. Permanent solution would be to implement auto bank reconciliation feature in the Cash Management module within the ERP system. We understand that while the approach to remediate the issue with short-term fixes may have been adequate to prepare the CAFR for FY2012, there should be a concerted effort on developing long term permanent solutions for the issues identified. Developing long-term and permanent solutions will free the County from facing the identified issues again in the near future with the resulting drain on resources.

Recommendations

To improve the County's ongoing ERP implementation efforts we recommend that the County implement the recommendations listed below. We want to point out that many, if not all, of the recommendations, may have applicability to other large scale or complex systems that the County is currently implementing or may plan in the future. Therefore, we urge the County to consider the recommendations as it implements or plans other major systems.

1. Establish clear roles and responsibilities of the operating departments, core business departments, and the ERP Enterprise Service Center (ESC) for the ERP implementation project.
    a. The definitions should be clear and should outline key responsibilities and the corresponding departments, offices or officials that have the final authority on how major ERP decisions are made and implemented.
    b. The ERP Enterprise Service Center (ESC) should have the responsibility to provide County-wide support to sustain the ERP system. Some of the tasks and activities included in the ESC should be maintenance, troubleshooting, help desk, deep technical support of technical issues, patching and upgrading, facilitating, and making changes to the system, etc.
    c. The operating departments, core business departments, and ERP ESC should work jointly on how to progressively mature the system and County operations, with each entity playing its role and evaluating the functional and technical impact on the County and its operations. (See finding no. 1 in Results section)

2. Recruit and hire full-time employees in the core business departments and operating departments who have an understanding of the Oracle EBS and PeopleSoft systems, and have previously used and are well-versed in the system. While not all the employees need to be experts or experienced with Oracle or PeopleSoft, it will benefit the County if the day-to-day managers, who are leading the various core departments, are well-versed and experienced (or at a minimum well trained) in the respective systems. The County should consider reducing reliance on contractors and consultants to support the ERP system. (See finding no. 2 in Results section).

3. Initiate a new Business Process Re-engineering (BPR) initiative, or complete the original effort, wherein core business department and operating departments should be responsible for analyzing their existing business process and operations and identifying improvements that can increase efficiencies, allow for stronger internal controls, and take advantage of the functionality available via County enterprise systems like ERP. This may require core business departments and operating departments to invest in tools and training for effectively mapping business processes. The County should:
    a. To take advantage of the centralized nature of the ERP system, consider the costs and benefits of centralizing financial functions (shared services model) from County departments such as Accounts Payable, Accounts Receivables, Purchasing, Procurement, Project and Grants into one central core Finance Department, and the HR functions under the Office of Human Resources. While each agency/business unit or department can have onsite personnel for each of the identified areas, personnel should be reporting to one County central

function and should be following policies, procedures, and standards as outlined by the central authority.

b. Prepare for BPR by building cross functional teams; identify the objectives, and develop a strategic purpose.
c. Map and analyze the "as-is" process and design the "to-be" processes. The County can take advantage of the already existing "as-is" process and "to-be" process flowcharts that were developed as part of the ERP implementation and identify the gaps, if any, in the "to-be" processes as the flow charts are dated back couple of years.
d. Plan to implement the re-engineered processes ("to-be") by developing an implementation and transition plans, prototyping and simulating the transition plans, developing training programs for the new processes, and implementing the transition plans.
e. Monitor the newly implemented process and continuously measure the performance of the processes against a target. The County should allow for continuous process improvements in the newly designed and implemented business processes. County can monitor the performance of the processes leveraging industry wide accepted practices or approach like Balanced Scorecard or Total Measurement Development Method (TMDM) (See finding no. 3 in Results section).

4. Define and develop a strong user access administration process to manage user access to the ERP systems.
    a. The user access administration process should include processes to create, modify, and delete access to Oracle and ERP. The process should be centralized and a central repository should be used to document, receive, track, and fulfill access requests.
    b. The process to request new/modify access should be based on the principle of "need-to-know" or "least privileged". Requests should be approved by the module or business process owners. For example, the request to get new or modify existing access to the Accounts Payable module should require the user request to be approved by the identified Accounts Payable module owners or delegates of the owners. Only with proper approval should the new access be granted or existing access be modified. While granting new access or modifying existing access, the ERP security team, in conjunction with the business units or owners, should determine if the new access or modification of access is going to create conflict of duties or grant excessive access. The team should do a segregation of duties analysis at the roles and responsibilities level and at the individual employee level before access is granted. The process to disable/delete access should require the ERP security team to disable access within Oracle and PeopleSoft within a pre-defined timeframe upon receipt of notification.
    c. The process should require business process and module owners to do a periodic user access review of all the users who have access to their respective modules along with their associated responsibilities and privileges. The review should encompass assessing whether the user needs access and if the access he or she has through the assigned responsibility is appropriate and needed for future. Any identified changes through the access review process should be

made in a timely manner, and documented and tracked in the central repository.

d. Annually, the ERP ESC team and the various module owners, business units, and core departments should review all the responsibilities and the access that the responsibilities grant and ensure that the access is appropriate and there is no segregation of duties weaknesses. The roles, responsibilities, and access privileges should be documented in detail indicating the access each role grants and the functionalities that they can execute.

e. Set up a small ERP security administration team (possibly 3-4 County personnel) to support the security administration functions such as user access, security configurations, SOD analysis, user access reviews, and maintaining roles and responsibilities within ERP. The team, in conjunction with the ESC personnel and SMEs, can facilitate how security roles and responsibilities are defined and maintained in the system. The team can also assist with change control, and other administration functions like logging and monitoring, etc. (See finding no. 4 in Results section)

5. Establish processes and internal controls around master data within the ERP system. The County should implement preventive and detective internal controls to project integrity of master data relevant to each module within ERP. Master data may be different for each module and, hence, controls would have to be implemented specifically for each module. For example, preventive controls (access controls, ability to make changes, etc.) and detective controls (regular monitoring of activities, privileged and business user) should be implemented for employee data (Name, SSN, Salary, Benefits, etc.) within the HR module. Changes to supplier master data (vendor name, vendor tax ID, etc.) in the purchasing module should be prevented by using adequate access controls or be fully disclosed by using reports that show what data was changed and by whom. The reports should be reviewed on a regular basis by the authorized and appropriate personnel in the Office of Procurement. (See finding no. 5 in Results section)

6. Establish a Configuration Management (CM) process which will allow the County to maintain consistency of ERP's performance, functional, and technical attributes along with its requirements, design, and operational information throughout the ERP lifecycle. The CM process will provide the County visibility and control of how the ERP is performing and allows for orderly management of ERP information and changes. The CM process will be beneficial if the County needs to change configurations to revise capability; improve performance, reliability, or maintainability; extend ERP lifecycle; reduce cost, risk and liability; or correct defects.

    a. Establish ownership to maintain application configuration documents to help the Enterprise Service Center team and other users with troubleshooting, accountability for configuration changes, and with obtaining a better understanding of the current state of configuration for each module.

    b. Implement monitoring controls as part of the CM process to detect changes made to the configurations so that any unauthorized changes or errors can be identified or detected. (See finding no. 6 in Results section)

7. Continue to enhance the new issue management process where ERP-related issues can be documented, tracked, and managed through the newly created central issues repository

(SharePoint). Once established and matured, the County should consider extending the issue management process and the system to be leveraged by and for other County projects. (See finding no. 7 in Results section)

8. Expedite the availability of reports to assist the core departments, business units, and other County agencies with their day-to-day tasks and activities. The ERP team should outline a firm plan with milestones indicating when the reports will be available either directly from Oracle or through the use of the Business Intelligence (BI) tool. Monitoring of the plan's implementation should be performed. (See finding no. 8 in Results section)

9. Establish an improved testing process.
    a. Ensure that all applicable tests (unit, regression, system, user acceptance testing, etc.) are conducted successfully, documented with expected and actual results, approvals obtained from all relevant entities, including the business process owners and core departments as applicable, and retained.
    b. The testing process should be managed and monitored by a County project team to ensure that all required tests are conducted and any failures during the testing phase are recorded, investigated, resolved, and the failed tests are repeated before the modules or functionality goes live.
    c. In the event there are defects or failures that require detail analysis and collaboration with the vendor, an assessment should be made whether the identified failures or defects could have a material negative impact if not corrected. The assessment and recommendations should be presented to the stakeholders, business units, and core department owners. Resulting decisions (i.e. to go live or defer) should be fully documented and based on detailed analysis of the information presented. (See finding no. 9 in Results section)

10. Establish an improved data validation/migration/conversion process wherein data from legacy systems, when converted, are verified for completeness, accuracy, and integrity.
    a. The data conversion process should require documentation and execution of a strategy that includes conducting detailed data conversion tests. It should also require validation for data completeness, integrity, and accuracy.
    b. The data validation/conversion/migration testing process should be similar, if not the same, as the one recommended in recommendation no. 9 above. The results of all the tests should be approved by the business users and business unit owners and the approvals, along with the test cases and results, should be retained in a central repository for future reference. (See finding no. 10 in Results section)

11. Develop a central repository for document retention dedicated to the ERP project. The repository should be owned and managed by the County, not contractors, and all project-related documentation should be stored and retained in accordance with the County's document retention policy and procedures. (See finding no. 11 in Results section)

12. Develop a Requirements Traceability Matrix (RTM) for future ERP modules and track all County requirements that were included in the Statement of Work (SoW).
    a. Ensure that all requirements are documented and tracked in RTM.

b. The RTM should be used for tracking any changes that have been made to the requirements or if the initially stated requirements cannot be met.
c. The RTM should be a living document and be updated as the modules are implemented.
d. The RTM can also be used as the source document for the configurations that were set in the system when the system was first implemented. (See finding no. 12 in Results section)

13. Training for the ERP and its modules provided by the County ERP project team and/or contractors should be developed or updated, as applicable, in collaboration with the business and core department owners as much as possible. (See finding no. 13 in Results section)

14. Develop long term solutions and fixes to remediate and resolve CAFR related issues.
    a. The solutions should be preventive or detective in nature and where possible through the use of functionality within ERP. If ERP does not allow or support the long term solution then a process outside of the system should be developed to mitigate the issue.
    b. The solutions should consider leveraging the existing resources of the County to the extent possible.
    c. Where needed and deemed necessary enhancements or re-engineering of County processes should be considered. (See finding no. 14 in Results section)

Comments and MCIA Evaluation

We provided the County ERP Enterprise Steering Committee with a draft of this report for review and comment on May 9, 2013 and we received their comments on June 14. Of the 14 recommendations above, the Steering Committee concurred completely with 12 and concurred partially with the remaining two—recommendations 3 and 6. The Steering Committee's full response appears in Appendix II of this report.

With respect to our recommendation no. 3 regarding County initiating a new Business Process Re-engineering (BPR) initiative, or completing the original effort, we support the Steering Committee's response where in the County is performing BPR efforts, including business process mapping in conjunction with implementation of new ERP modules. Additionally we suggest that the County approve the implementation of the business process re-engineering opportunities identified in the already implemented modules and functionalities as highlighted in the response by the Steering Committee.

Regarding our recommendation no.6 on the need to establish a configuration management (CM) process, the Steering Committee said that they have a change management process that is utilized for managing changes to configurations. While we understand that County is managing changes to the configurations through the change management process and County may be considering CM as a subset of a change management process, we strongly recommend that the County incorporate the missing elements for the CM process including (1) inventorying of all configurations and (2) monitoring of those configurations and any changes.

Appendix I – Scope Approach and Methodology

In reviewing the selected eight (8) modules we designed audit steps which sought to address the following objectives and associated risks:

AUDIT OBJECTIVES AND RELATED RISKS	
1	**Review the adequacy of controls to ensure that master data is valid, accurate, complete, timely, and authorized.**
	Risks: • Master data in Oracle EBS is not complete, accurate, and timely, resulting in risk of errors in compiling the Comprehensive Annual Financial Report (CAFR), additional cost and effort to restate CAFR and other financial statements, and embarrassment to the County.
2	**Review the adequacy of procedures to ensure transactions are valid, accurate, complete, timely, and authorized.**
	Risks: • Procedures performed by end users/core department users may not be consistent and do not reflect the controls relating to the Oracle EBS implementation. • Unauthorized or inaccurate journal entries and potential for errors in CAFR and other financial reports.
3	**Review issues related to the implementation and operation of the modules and verify that issues are clearly documented, communicated, prioritized, assigned, and that there is a plan for remediation.**
	Risks: • Implementation and operational issues due to Oracle EBS implementation have not been communicated or prioritized and there is no action plan to resolve issues. • Manual workarounds are used with potential for errors.
4	**Review if application configuration settings are appropriately implemented to reflect the County's requirements and policy, are approved, and are being monitored for changes.**
	Risks: • Approval hierarchy as configured is not in line with the County's policy for approvals. • Vendor invoices that do meet the criteria for payment are approved for payment. • Tolerance limits defined in various modules are not in conformity with the County's policy.
5	**Review if access to Oracle EBS for master and transactional data is restricted to authorized users and there is adequate segregation of duty to ensure users cannot circumvent controls.**
	Risks: • Access to Oracle EBS is excessive and not directly related to user's job function. • Segregation of duties for Oracle EBS modules is not adequate and a user can prepare, approve, and review changes to master or journal entries. • Only authorized users have access to financial statement generator (FSG). Access to FSG allows a user to define and execute financial reports. • User access reviews are not performed on a periodic basis to ensure access is restricted to authorized users.
6	**Review if data conversion requirements were defined for initial setup of Oracle EBS, technical design documents were prepared, validation procedures were performed prior to data loading/conversion, and business owners of the data have reviewed and approved and signed**

	off on the conversion plan.
	Risks: • Data converted from the legacy system to Oracle EBS for master and transactional data is not complete and accurate. Also, legacy data has not been cleaned or scrubbed, resulting in financial reporting errors. • Core Department/End Users/Business owners have not reviewed or approved the data conversion plan.
7	**Review if the testing strategy adequately addresses all testing objectives; appropriate test plans have been documented, reviewed and approved; test cases have been appropriately designed and documented; and business owners have reviewed, approved, and signed off on the test process. Also, test results, both expected and actual, are clearly documented and issues noted are prioritized and remediated.**
	Risks: • Testing strategy, test plans, and test cases for Oracle EBS modules are not adequate or have not been reviewed, approved, and clearly documented. • Test results, including expected and actual test results, have not been clearly documented to show Oracle EBS modules testing results. • Issues noted from testing have not been clearly documented, prioritized, and remediated. • End-user involvement in testing is not adequate and business owners did not review and approve the test results. • Sufficient time was not allocated for executing and completing the testing tasks.
8	**Review if interface controls ensure that data transferred to and from Oracle EBS are complete, accurate, and done in a timely and secure manner.**
	Risks: • Interfaces to and from Oracle EBS modules do not have adequate controls to ensure data transmissions are secure, timely, accurate, and complete. There are no notifications when interfaces do not work as expected or if there is an error. Log files are not retained for troubleshooting and investigation.

In addition to the above objectives, the audit team also evaluated the following objectives:

- Controls ensure that payment to the ERP consultants is in accordance with the contract terms, including any amendments to the contract and have been approved.
- Critical data, transactions, and programs are backed up and retained in accordance with laws, regulations, and County policy to enable retrieval when needed.

The report was prepared in accordance with consulting standards established by the American Institute of Certified Public Accountants. We used the Committee of Sponsoring Organizations (COSO) internal control framework in conjunction with the Control Objectives for Information Technology (COBIT) and Federal Information Systems Control Audit Manual (FISCAM) to assess the adequacy. We worked with MCIA and agreed upon the framework and the standards to be used to perform the high-level assessment to evaluate the effectiveness of the implementation and whether it fulfills the objectives that were set forth as business drivers at the beginning of the project.

As part of the audit, the audit team interviewed key ERP team members supporting the 8 modules assessed in detail, various end user(s) who are involved in using the 8 modules on a daily basis, including core department users, ERP technical personnel, County DTS personnel, and ERP Project Architect. The audit team reviewed the ERP project related documentation, inspected configuration settings for each of the modules where applicable, and inspected and reviewed a limited number of County policies and procedures where needed. Additionally, the audit team inspected and reviewed selected invoices submitted by the contractors (primarily CIBER) in support of the ERP implementation project.

We conducted walkthroughs (understanding of the end-to-end process by "walking through" the process with responsible process owners) and limited testing to validate implementation of key functional and technical controls for 7 financial modules and 1 human resources module. We met with the personnel during the course of both the phases of the ERP audit from the following departments and business units:

No. of Users	Department	Areas Covered
12	Department of Finance	All in-scope modules
3	Department of General Services	Purchasing
10	Department of Transportation	HR, Projects and Grants, AP, GL, Purchasing, Cash Management
15	Department of Health and Human Services	Projects and Grants, AP, General Ledger, Purchasing, HR
4	Board of Investment Trustees	Retiree Payroll
15	ERP Enterprise Service Center	Application Security, System Administration, all in-scope modules, project management, governance
1	County Executive Office	Project Management and Governance
3	Office of Human Resources	Human Resources
1	Fire and Rescue Services	Human Resources
2	Department of Correctional Rehabilitation	Human Resources
4	Department of Technology Services	Interfaces – All modules, IT Operations
1	Police	HR
1	Public Libraries	AP and GL

Where possible and applicable, the audit team also leveraged the knowledge and information gained from attending the ERP Executive Steering Committee meetings (ERP ESC) over the last two years during this engagement in both the phases. The knowledge assisted us in identifying the high-risk modules within the ERP system and also allowed us to focus on the key risk areas of the projects. The audit team used the monthly ERP ESC status reports and the information gathered through the ESC meetings.

Appendix II – Responses to Review – ERP Enterprise Steering Committee

DEPARTMENT OF FINANCE

Isiah Leggett
County Executive

Joseph F. Beach
Director

MEMORANDUM

June 14, 2013

TO: Larry Dyckman, Internal Auditor

FROM: Karen Plucinski, Acting ERP Program Director
On Behalf of the Executive Steering Committee

SUBJECT: Response to Recommendations from Post-Implementation Audit of Montgomery County's Enterprise Resource Planning (ERP) System dated May 9, 2013

Enclosed please find the ERP Steering Committee's formal response to the Post-Implementation Audit Report referenced above.

We look forward to discussing the recommendations, and the County's progress in implementing improvements. If you, or the audit firm working with you, have any questions relating to the attached, please contact me at 240-773-3386.

Attachment

cc: Timothy L. Firestine, Chief Administrative Officer
Joseph Beach, Director, Department of Finance
Joseph Adler, Director, Office of Human Resources
David Dise, Director, Department of General Services
Linda Herman, Executive Director, Montgomery County Employee Retirement Plans
Jennifer Hughes, Director, Office of Management and Budget
George Griffin, Director, Department of Liquor Control
Sonny Segal, Chief Information Officer, Department of Technology Services
Uma Ahluwalia, Director, Department of Health and Human Services

Response to Recommendations from Post-Implementation Audit of Montgomery County's ERP System Dated May 9, 2013

Steering Committee General Comment:

As noted in the audit report, Montgomery County implemented a significant number of best practices and achieved key accomplishments in its implementation of the ERP Oracle ebusiness system. We understand and acknowledge that the audit disclosed "areas that need strengthening, enhancing, or the need for new processes or controls to mitigate risks." (see Results section, page 10) We also understand, as noted in the Audit Report Recommendations below, that many recommendations may have applicability to future system or module implementations. In the responses provided below, we have addressed applicability to, and improvements implemented, planned related to, implementations of new modules. It should also be noted that in some cases, the audit report refers to findings or issues in the Results section of the report, that are not repeated in the Recommendations section. Where deemed appropriate, the Steering Committee Response to Recommendations may also refer to and address those additional issues.

Audit Report Recommendations and Steering Committee Responses:

To improve the County's ongoing ERP implementation efforts we recommend that the County implement the recommendations listed below. We want to point out that many, if not all, of the recommendations, may have applicability to other large scale or complex systems that the County is currently implementing or may plan in the future. Therefore, we urge the County to consider the recommendations as it implements or plans other major systems.

1. Establish clear roles and responsibilities of the operating departments, core business departments, and the ERP Enterprise Service Center (ESC) for the ERP implementation project.
    a. The definitions should be clear and should outline key responsibilities and the corresponding departments, offices or officials that have the final authority on how major ERP decisions are made and implemented.
    b. The ERP Enterprise Service Center (ESC) should have the responsibility to provide County-wide support to sustain the ERP system. Some of the tasks and activities included in the ESC should be maintenance, troubleshooting, help desk, deep technical support of technical issues, patching and upgrading, facilitating, and making changes to the system, etc.

c. The operating departments, core business departments, and ERP ESC should work jointly on how to progressively mature the system and County operations, with each entity playing its role and evaluating the functional and technical impact on the County and its operations. (See finding no. 1 in Results section)

Steering Committee Response:

We concur with the recommendation.

However, it is important to point out that, during the ERP implementation Subject Matter Experts (SMEs) from the core business departments were appointed by their respective departments to represent the business owners and were charged to make business decisions and to avoid customization. Project team responsibilities were documented as part of the project charter. Because of the complexity of the systems and the lack of experienced staff in core business departments, the SMEs played multiple roles during implementation and after. With continuing implementation of new modules, and because post implementation stabilization took longer than anticipated, a primary focus of ERP SME staff on stabilization and maintenance had to be deferred.

The County is now in a better place to define and establish the ERP Enterprise Service Center (ESC), to include more formally defining roles and responsibilities between the ESC and core business departments. This will include addressing the delineation in roles as it relates to areas mentioned in the report – functional and operational use of the system, including but not limited to approving functional changes, user access testing, functional issue prioritization and remediation efforts, and authority to reject a change/module from being implemented into production. Additional information on the ERP ESC is provided in response to Recommendation 2.

It should also be noted that the ERP team and core business departments have been working jointly together during post-implementation to progressively mature, enhance, and stabilize the system and related operational processes.

2. Recruit and hire full-time employees in the core business departments and operating departments who have an understanding of the Oracle EBS and PeopleSoft systems, and have previously used and are well-versed in the system. While not all the employees need to be experts or experienced with Oracle or PeopleSoft, it will benefit the County if the day-to-day managers, who are leading the various core departments, are well-versed and experienced (or at a minimum well trained) in the respective systems. The County should consider reducing reliance on contractors and consultants to support the ERP system. (See finding no. 2 in Results section).

Steering Committee Response:

We concur with the recommendation.

The County is in the process of creating and funding an ESC with skilled Oracle, PeopleSoft and Hyperion functional and technical full time County employees, leveraged by consultants as required. To support this effort, the County has established a new job classification for the ESC that better reflects the skill sets required; prior to this time, there was no existing job classification that reflected the knowledge, skills, and abilities required in this new Oracle environment. Consultants were involved to evaluate skill sets and experience required, and to ensure appropriate classification and pay scales for these positions based on regional and industry practices. It is planned that the ESC will be comprised of both existing positions and the newly created job positions.

Therefore it is anticipated that the ESC will comprise experienced County employees, and Oracle/PeopleSoft experienced individuals in the form of both new employees and consultants.

In addition, the core departments (Finance, Human Resources (OHR), Technology Services (DTS) and MCERP) are incorporating Oracle/PeopleSoft preferred criteria in their recruitment of new positions.

3. Initiate a new Business Process Re-engineering (BPR) initiative, or complete the original effort, wherein core business department and operating departments should be responsible for analyzing their existing business process and operations and identifying improvements that can increase efficiencies, allow for stronger internal controls, and take advantage of the functionality available via County enterprise systems like ERP. This may require core business departments and operating departments to invest in tools and training for effectively mapping business processes. The County should:
    a. To take advantage of the centralized nature of the ERP system, consider the costs and benefits of centralizing financial functions (shared services model) from County departments such as Accounts Payable, Accounts Receivables, Purchasing, Procurement, Project and Grants into one central core Finance Department, and the HR functions under the Office of Human Resources. While each agency/business unit or department can have onsite personnel for each of the identified areas, personnel should be reporting to one County central function and should be following policies, procedures, and standards as outlined by the central authority.
    b. Prepare for BPR by building cross functional teams; identify the objectives, and develop a strategic purpose.
    c. Map and analyze the "as-is" process and design the "to-be" processes. The County can take advantage of the already existing "as-is" process and "to-be" process flowcharts that were developed as part of the ERP implementation and identify the gaps, if any, in the "to-be" processes as the flow charts are dated back couple of years.

d. Plan to implement the re-engineered processes ("to-be") by developing an implementation and transition plans, prototyping and simulating the transition plans, developing training programs for the new processes, and implementing the transition plans.
e. Monitor the newly implemented process and continuously measure the performance of the processes against a target. The County should allow for continuous process improvements in the newly designed and implemented business processes. County can monitor the performance of the processes leveraging industry wide accepted practices or approach like Balanced Scorecard or Total Measurement Development Method (TMDM) (See finding no. 3 in Results section).

Steering Committee Response:

We partially concur with this recommendation.

The County did implement significant business process re-engineering (BPR), consistent with best practices embedded in the system, as part of the initial system implementation. Implementation of a centralized billing system and project and grants system, along with certain related business processes, implementation of receiving functionality in the purchasing process, and establishment of a central accounts receivable operation including a focus on centralized policies and procedures, are a few such examples.

The County is performing BPR efforts, including business process mapping, in conjunction with implementation of major new ERP modules. This documentation will be used to evaluate against best practice functionality embedded in the ERP system, with a goal of identifying gaps and ultimately reaching policy conclusions regarding implementation of such best practices.

As it relates to modules and functionality already implemented, the County has identified, either during or after implementation, business process re-engineering opportunities for policy consideration and possible implementation. An example of a change about to be implemented in production is the re-engineering of the change order process for purchase orders, to eliminate certain impediments to being able to close months on a timely basis. Another significant change in process is noted below.

The audit report notes that the controls embedded in an ERP system are generally designed for centralized processes. To take advantage of enhanced controls, the Department of Finance has already begun a pilot phased program to recentralize accounts payable transaction processing within the Accounts Payable unit. Certain billing and receipt functions are also being centralized within the Accounts Receivable unit. These efforts have been initiated because of the enhanced controls and improved transaction accuracy that are anticipated to result. However, any such effort has resource and budgetary considerations,

which will be part of the evaluation process and feasibility consideration as later phase-in stages are addressed.

As it relates to a more formal enterprise-wide BPR initiative, this would need to be the subject of a focused effort, dedicated resources, and would likely require additional external best practice and consulting input. As part of implementation of the ERP ESC, the County will evaluate and determine, in conjunction with core business owners, the feasibility and cost/benefit of more significant enterprise BPR recommendations, such as additional movement towards centralization and shared service models. As part of that evaluation, the role and authority of the ERP ESC and core business departments in identifying and advancing core business process-related BPR within the operating departments would need to be determined.

As it relates to a comment in the report regarding lack of management review over closing procedures, year-end closing procedures are updated annually and subject to management review. The County is continuing to review such documentation, especially in light of modified and enhanced business processes since going live with the system, to ensure all outdated references are eliminated.

4. Define and develop a strong user access administration process to manage user access to the ERP systems.
    a. The user access administration process should include processes to create, modify, and delete access to Oracle and ERP. The process should be centralized and a central repository should be used to document, receive, track, and fulfill access requests.
    b. The process to request new/modify access should be based on the principle of "need-to-know" or "least privileged". Requests should be approved by the module or business process owners. For example, the request to get new or modify existing access to the Accounts Payable module should require the user request to be approved by the identified Accounts Payable module owners or delegates of the owners. Only with proper approval should the new access be granted or existing access be modified. While granting new access or modifying existing access, the ERP security team, in conjunction with the business units or owners, should determine if the new access or modification of access is going to create conflict of duties or grant excessive access. The team should do a segregation of duties analysis at the roles and responsibilities level and at the individual employee level before access is granted. The process to disable/delete access should require the ERP security team to disable access within Oracle and PeopleSoft within a pre-defined timeframe upon receipt of notification.
    c. The process should require business process and module owners to do a periodic user access review of all the users who have access to their respective modules along with their associated responsibilities and privileges. The review should encompass assessing whether the user needs

access and if the access he or she has through the assigned responsibility is appropriate and needed for future. Any identified changes through the access review process should be made in a timely manner, and documented and tracked in the central repository.

d. Annually, the ERP ESC team and the various module owners, business units, and core departments should review all the responsibilities and the access that the responsibilities grant and ensure that the access is appropriate and there is no segregation of duties weaknesses. The roles, responsibilities, and access privileges should be documented in detail indicating the access each role grants and the functionalities that they can execute.
e. Set up a small ERP security administration team (possibly 3-4 County personnel) to support the security administration functions such as user access, security configurations, SOD analysis, user access reviews, and maintaining roles and responsibilities within ERP. The team, in conjunction with the ESC personnel and SMEs, can facilitate how security roles and responsibilities are defined and maintained in the system. The team can also assist with change control, and other administration functions like logging and monitoring, etc. (See finding no. 4 in Results section)

Steering Committee Response:

We concur with the recommendation.

The following actions have been, or are in the process of being, implemented:

- *The County will utilize iamMCG Identity Management to validate and grant user access to Oracle, PeopleSoft and Hyperion in FY 14. All user rules will be defined in iamMCG.*

- *To reduce the number of individuals with access that was too broad or allowed for conflicting privileges:*
  - *The ERP team has completed an annual review of user access and has cleansed all responsibilities for ERP SMEs and core business owners. As part of that effort, new responsibilities have been created to segregate super user responsibilities into other responsibilities for Payroll, Projects and Grants, Accounts Payable, and other functions. Super User responsibility is only granted on a temporary basis when requested and approved through the Change Control Process. The SMEs' actions and the timeframe access is granted are limited as specified in the Change Request Process.*
  - *HR Generalist and PeopleSoft responsibilities have been reviewed, user access modified, and the number of individuals with such access reduced.*

- *Review of core business and operating department access, as described above, will continue to be performed by ERP, and coordinated with the core business departments, on an annual basis. This will complement the annual review process with the operating departments that has been conducted by ERP since the system was implemented.*
- *The ERP team is in the process of better documenting a matrix analysis and comparison of system/module user access roles to ensure no conflicting roles/responsibilities within and across modules. As part of this effort, areas such as monitoring controls over broad DPO authority would be addressed. These efforts will be coordinated with the core business owner departments. Completion is anticipated during FY14. Upon completion of this analysis, determination will be made of the most effective way to incorporate the "need-to-know" principle, and any other most appropriate role of the core business owner department, as referenced in the report.*

- *ERP is strengthening user access privileges through work list (delegated backup capability) functionality in the system.*

- *ERP is developing policies and procedures for:*

  - *Annual review of Accounts Payable users and their associated approver, since this represents the largest volume of decentralized module access. Core business input will be obtained. This process will be implemented in FY14.*
  - *Review for orphan accounts, annually or more frequently.*

- *The County has assigned 1.5 positions to ERP System Administration. Additional resources will be examined as part of the FY 14 budget cycle.*

As the County implements the ERP ESC and additional clarification of roles and responsibilities in Recommendation 1, assigned security and access roles and responsibilities will also be reviewed to ensure they are aligned with the outcomes of that process.

The following should also be noted relating to certain observations in the report:

- *Regarding the system administrator's prior record retention practice, it was to save requests to the administrator's Outlook PST files, not a hard drive; the PST files were originally backed up on a County network drive. When that drive became full, the administrator was provided an external hard drive, which is a backup process option in use at the County. While the files were backed up, we acknowledge that this was a manual, not automated and recurring process. Record retention procedures have since been modified to retain such documentation in a shared drive.*

Ultimately this will be replaced with iamMCG Identity Management workflow as noted above.

- *The user ID's with access to the PeopleSoft system resulted from pre-set configurations at implementation that were not completely disabled at implementation. As noted above, PeopleSoft security access has since been resolved.*

5. Establish processes and internal controls around master data within the ERP system. The County should implement preventive and detective internal controls to project integrity of master data relevant to each module within ERP. Master data may be different for each module and, hence, controls would have to be implemented specifically for each module. For example, preventive controls (access controls, ability to make changes, etc.) and detective controls (regular monitoring of activities, privileged and business user) should be implemented for employee data (Name, SSN, Salary, Benefits, etc.) within the HR module. Changes to supplier master data (vendor name, vendor tax ID, etc.) in the purchasing module should be prevented by using adequate access controls or be fully disclosed by using reports that show what data was changed and by whom. The reports should be reviewed on a regular basis by the authorized and appropriate personnel in the Office of Procurement. (See finding no. 5 in Results section)

Steering Committee Response:

We concur with the recommendation, with resource and responsibility qualifications noted below.

The County is currently reviewing and enhancing internal controls for each module as it relates to master data. The following has been implemented or is planned:

- *The County is creating an interface to eliminate manual input in converting an active employee to a retiree (moving from the Oracle Business Group to the Oracle non-Business Group) to limit and control errors, since the majority of errors in this area are due to manual-intensive change processes. The interface is currently being tested with an estimated completion date of August 15, 2013.*

- *User access was reviewed and modified limiting access to critical HR and Financial data (see response to Recommendation 4).*

- *The majority of duplicative suppliers or missing fields in the supplier master database relate to pre-Oracle implementation, and result from both manual processes and the lack of required data and automated controls. Since the system implementation, the Finance Department Accounts Payable Section has established a number of controls to*

ensure completeness and accuracy of ongoing updates to supplier master file data such as:

- *W-9 forms are now required from new suppliers.*
- *For vendors established through the CVRS (vendor registration system, owned and managed by the Office of Procurement) interface, which represents the majority of new vendors, TIN is now a required field. For the limited number of vendors manually established by Accounts Payable, TIN is required and there is a system alert generated if a duplicate TIN is identified.*
- *Oracle automated controls are established to prevent duplicate suppliers from being established, when exact duplicates of supplier names are entered.*
- *Each record from CVRS is checked to ensure both that the tax ID number (TIN) matches the IRS site and that the TIN and name combination is valid; and*
- *The Oracle supplier database is searched by name and TIN prior to loading new supplier in Oracle, to avoid creating duplicate vendor records.*

As referenced above, the County has identified the need to cleanse the supplier database for duplicative and incomplete records. This was an effort that was unable to be completed prior to Oracle implementation, after evaluation of relative costs/benefits. Coordination efforts have begun with Finance, Procurement and ERP to identify issues that will need to be addressed and resolved before longer-term permanent solutions can be identified. An example of operational and workload issues to be addressed is the issue of open purchase orders against duplicative vendors. Currently, Accounts Payable has deactivated several hundred duplicative or old vendors. Additional resources/dedicated staff, as acknowledged in the audit report, and potentially automated tools, will likely be required to implement long-term solutions in this area. We will also continue to explore other workaround solutions, such as suppressing, deactivating from use, or flagging supplier names as identified to be closed. It should also be noted that, while the report recommends regular review by the Office of Procurement, the Finance Department Accounts Payable Section has primary responsibility for the supplier master database.

6. Establish a Configuration Management (CM) process which will allow the County to maintain consistency of ERP's performance, functional, and technical attributes along with its requirements, design, and operational information throughout the ERP lifecycle. The CM process will provide the County visibility and control of how the ERP is performing and allows for orderly management of ERP information and changes. The CM process will be beneficial if the County needs to change configurations to revise capability; improve performance, reliability, or

maintainability; extend ERP lifecycle; reduce cost, risk and liability; or correct defects.

a. Establish ownership to maintain application configuration documents to help the Enterprise Service Center team and other users with troubleshooting, accountability for configuration changes, and with obtaining a better understanding of the current state of configuration for each module.
b. Implement monitoring controls as part of the CM process to detect changes made to the configurations so that any unauthorized changes or errors can be identified or detected. (See finding no. 6 in Results section)

Steering Committee Response:

We partially concur with recommendation, with an evaluation of the cost-benefit of purchasing tools and a process to update existing DEDs.

The County does have and did utilize configuration management in the ERP implementation; this process has improved over time.

As noted in the auditor positive comments on page 16 finding #6 paragraph one, we do manage changes requests; deployment documents and testing results are attached to the CR and submitted for approval. After the CR is approved the associated code changes are checked into the County software versioning system (SVN) and numbered. Only code changes, patches and scripts in SVN system can be deployed to Production and only by Apps DBA personnel. Only Oracle provided code changes, patches and scripts will be executed. All ESB Patches require a patch analysis performed by the AppsDBA team. Extensive patches require multi-module formal testing which include testing scripts, automated testing tools and a smoke test.

For example, since the time of the audit, in-depth analysis of the impact of proposed changes on end-to-end transactions across modules is performed. This is occurring for new module implementations like those for the Department of Liquor Control (DLC) and for post-implementation configuration changes to modules already implemented, such as recent changes to sub-ledger accounting (SLA's) and configuration of certain payment controls. This analysis has shown to be critical in the ERP environment of tight integration, as noted in the audit report. Both ERP team members and core business owner departments, across modules, teams, and departments, participate as appropriate in the analysis.

However, the County's processes did not include all components and elements referenced in the audit report.

As alluded to in the report, configuration management is documented in the form of Data Element Definitions (DEDs), prepared by the implementer and reviewed/approved by County ERP SMEs. DEDs were prepared for each ERP

module under the implementation contract. During extensive post-implementation support efforts, configuration changes have been made but not necessarily updated to the DEDs. Such configuration changes generally have been documented as part of the Change Control Process. So documentation generally exists, but is not captured in one document. Such an effort would require significant effort and resources. Maintenance of such documentation may also require automated tools that are not currently available at the County. The County will evaluate the cost-benefit of tools and processes to update existing DEDs as part of its next major ERP upgrade.

For new functionality yet to be implemented, the County will evaluate assignment of responsibility for updating configuration management documents.

As it relates to monitoring controls, the County is identifying options for automated tools for monitoring and detecting unauthorized changes to configuration, based on feedback on options from Oracle. The goal is to implement several tools for Oracle EBS and one for PeopleSoft during FY14. The specific processes and methods for monitoring will be determined in conjunction with identifying and selecting appropriate tools.

7. Continue to enhance the new issue management process where ERP-related issues can be documented, tracked, and managed through the newly created central issues repository (SharePoint). Once established and matured, the County should consider extending the issue management process and the system to be leveraged by and for other County projects. (See finding no. 7 in Results section)

Steering Committee Response:

We concur with the recommendation.

In October 2012, the ERP team implemented a centralized tracking and management of issues and changes to Oracle EBS, Hyperion, PeopleSoft and OBIEE through SharePoint. Updates are determined and made by the ERP team, based on priorities coordinated between the core business departments and ERP, or directly between the operating departments and the ERP team.

SharePoint is a central repository for all ERP-related hardware, applications, network, interface, database changes, ESC-related operational and support procedures, version upgrades, enhancement and patches. In addition, testing and configuration documents are housed in SharePoint. A more formal process is being developed for the updating and maintenance of SharePoint; as part of that process and relating to issue management, ERP SME and core business owner department roles in determining the validity of issues, approving updates, and assigning priorities will be determined.

The SharePoint application and process will be shared with the Department of Technology Services to determine its applicability to existing Project Management Office processes and programs.

8. Expedite the availability of reports to assist the core departments, business units, and other County agencies with their day-to-day tasks and activities. The ERP team should outline a firm plan with milestones indicating when the reports will be available either directly from Oracle or through the use of the Business Intelligence (BI) tool. Monitoring of the plan's implementation should be performed. (See finding no. 8 in Results section)

Steering Committee Response:

We concur with the recommendation.

The County made a conscious decision to remove additional report development, beyond implementation of Oracle seeded reports, from the implementer's scope of deliverables. This was based on cost/benefit and an understanding that most reporting needs could be met from online inquiries and standard Oracle seeded reports. Any additional reports needed would be developed after go-live, using experienced Oracle report development consultants other than the implementer, once unmet needs could be identified.

The ERP team has successfully implemented the Business Intelligence (BI) reporting tool. To date the following BI models, for the modules noted, are in Production. From these models, a significant number of reports have been created and are in use, by both core business departments and operating departments. Reporting dashboards have also been developed and are in Production for the models below, to provide users with commonly required reports and the related ability to input specified parameters, and with associated chart and graph displays and graphical key performance indicators.

Oracle/Mainframe Module	BI Report/Dashboard
Accounts Payable (AP)	AP iExpense AP Invoice Distribution Payments Distribution
Labor Distribution	Labor Distribution (biweekly payroll) Labor Schedules
Purchase Orders (PO)	PO Distribution PO Requisitions PO Contract PO Receiving
General Ledger	GL Summary GL PC Projection
HRMS Legacy	MCG legacy HADA History Adjustments MCG Legacy Job History MCG Legacy Pay Biweekly Gross MCG Legacy Payroll Earnings MCG Legacy Payroll Gross CY 2010 MCG Legacy Payroll Hours CY 2010 MCG Legacy Payroll Year To Date MCG Payroll Gross-to-Net

The following BI reporting models have also been implemented in Production; related dashboards are not currently planned since user needs are anticipated to be met through the current tools:

- *Fixed Assets*
- *GL Detail (Actual)*

In addition, the following BI reporting models are in development and planned for release in the summer of 2013:

- *HR Assignments (Employee)*
- *HR Position Management*
- *Projects and Grants (Expenditure/Revenue/Encumbrance Budget/Funding/Funding Pattern/Summary)*
- *FAMIS and FAACS Legacy*
- *GL Detail (Budget/Encumbrance)*

Additional BI tools are in development and planned for later release.

9. Establish an improved testing process.
    a. Ensure that all applicable tests (unit, regression, system, user acceptance testing, etc.) are conducted successfully, documented with expected and actual results, approvals obtained from all relevant entities, including the business process owners and core departments as applicable, and retained.
    b. The testing process should be managed and monitored by a County project team to ensure that all required tests are conducted and any failures during the testing phase are recorded, investigated, resolved, and the failed tests are repeated before the modules or functionality goes live.
    c. In the event there are defects or failures that require detail analysis and collaboration with the vendor, an assessment should be made whether the identified failures or defects could have a material negative impact if not corrected. The assessment and recommendations should be presented to the stakeholders, business units, and core department owners. Resulting decisions (i.e. to go live or defer) should be fully documented and based on detailed analysis of the information presented. (See finding no. 9 in Results section)

Steering Committee Response:

We concur with the recommendation; however it should be noted that the model used during the implementation of ERP was different then above recommendation.

The County identified key business owner SMEs from the core departments. The SMEs were charged with identifying all applicable test scenarios, successfully completing testing, documenting expected results and involving core department staffs where applicable. Other core business department personnel also participated in the testing process, but not to the extent recommended in the report.

For post-implementation changes, core business department representatives outside of the ESC are playing a greater and more integral role in the testing and approval process. For future module implementations, the County will also explore how to better utilize business process owner and core departments in the testing and approval process.

The County is managing and monitoring the testing process to ensure all required tests are conducted, failures are documented, resolved and retested, and results of successful tests are documented and centrally maintained in SharePoint (see Recommendation 7).

10. Establish an improved data validation/migration/conversion process wherein data from legacy systems, when converted, are verified for completeness, accuracy, and integrity.

    a. The data conversion process should require documentation and execution of a strategy that includes conducting detailed data conversion tests. It should also require validation for data completeness, integrity, and accuracy.

    b. The data validation/conversion/migration testing process should be similar, if not the same, as the one recommended in recommendation no. 9 above. The results of all the tests should be approved by the business users and business unit owners and the approvals, along with the test cases and results, should be retained in a central repository for future reference. (See finding no. 10 in Results section)

Steering Committee Response:

We concur with the recommendation; however the model used during the implementation of ERP was different then above recommendation.

The County identified key business owner SMEs from the core departments. The SMEs were charged with data validation, migration, and the conversion of legacy data.

With future implementations, the County will involve business process owners, and operating departments as applicable, in the validation and testing of data migration/conversion. The County will also incorporate to the process required approval of data conversion plans, and test/ validation results, by the business unit owners in the core business departments and, if applicable, the operating departments.

11. Develop a central repository for document retention dedicated to the ERP project. The repository should be owned and managed by the County, not contractors, and all project-related documentation should be stored and retained in accordance with the County's document retention policy and procedures. (See finding no. 11 in Results section)

Steering Committee Response:

We concur with the recommendation.

The ERP team utilizes SharePoint as the central repository for all project-related documentation (see response to Recommendation 7). The County will own and manage this repository.

12. Develop a Requirements Traceability Matrix (RTM) for future ERP modules and track all County requirements that were included in the Statement of Work (SoW).
    a. Ensure that all requirements are documented and tracked in RTM.
    b. The RTM should be used for tracking any changes that have been made to the requirements or if the initially stated requirements cannot be met.
    c. The RTM should be a living document and be updated as the modules are implemented.
    d. The RTM can also be used as the source document for the configurations that were set in the system when the system was first implemented. (See finding no. 12 in Results section)

Steering Committee Response:

We concur with the recommendation.

With the implementation of ERP, the Requirements Traceability Matrix (RTM) was not a required document. The County utilized the implementer's process known as the Data Element Definition (DED). Each SME was responsible for tracking module specific requirements. However, those requirements were not maintained in a central repository, and staff turnover complicated the retrieval of such documentation.

For future implementation, the RTM will be incorporated and stored in a central repository to track the status of all requirements.

As it relates to the specific issues and opportunities for enhanced use of system controls noted under Results 12, the County had already identified a majority of the issues noted and was either addressing solutions or tracking the issue for required resolution.

13. Training for the ERP and its modules provided by the County ERP project team and/or contractors should be developed or updated, as applicable, in collaboration with the business and core department owners as much as possible. (See finding no. 13 in Results section)

Steering Committee Response:

We concur with the recommendation, which has been underway since prior to the audit.

The ERP team in conjunction with the core department has updated and revamped online training and instructor led training for the following Oracle EBS modules:

Purchasing Fundamentals
Accounts Payable Fundamentals
IExpense

Transaction Approver
General Ledger
Project and Grants
HR Liaison
iRecruitment
Workforce Performance Management
Oracle Learning Management

Also in development are the following:
Advanced Purchasing for Procurement Buyers
Accounts Receivable

Remaining modules will be reevaluated and updated as changes are made to the system and related business processes. The County will review its processes to ensure procedures and roles currently occurring are formally documented.

14. Develop long term solutions and fixes to remediate and resolve CAFR related issues.
    a. The solutions should be preventive or detective in nature and where possible through the use of functionality within ERP. If ERP does not allow or support the long term solution then a process outside of the system should be developed to mitigate the issue.
    b. The solutions should consider leveraging the existing resources of the County to the extent possible.
    c. Where needed and deemed necessary enhancements or re-engineering of County processes should be considered. (See finding no. 14 in Results section)

Steering Committee Response:

We concur with the recommendation, which has been underway since prior to the audit.

As noted in the report, subsequent to ERP implementation, the Department of Finance implemented a process of identifying issues and required improvements to financial transaction processing and financial reporting, with both the ERP system and related business processes. These issues were inventoried in a tracking system, classified by ERP module, prioritized, and subject to weekly review and monitoring. One key objective of this process was to prioritize resource allocations, and ERP team tracking of system issues and related Change Requests, towards the most significant issues, which at the time were those that impacted the preparation and issuance of the County's Comprehensive Annual Financial Report (CAFR).

Therefore, the highest priorities at that time were identifying adjustments required to financial data and financial reporting, and short-term workaround solutions to business process issues that caused the need for those adjustments.

While some permanent long-term solutions were implemented, those that involved significant system changes, or complex enterprise-wide business process changes, were required to be deferred to ensure sufficient resources and time were available to appropriately analyze, test, and implement such changes.

Since that time, enhancements have been made to the tracking system, including the categorization of issues as permanent long-term solution, short-term workaround solution, or adjustment to general ledger financial data. The primary focus of both Finance core business staff and the ERP team, as it relates to these issues, has been on permanent solutions, a significant number of which have been implemented. The approach used to identify and address permanent solutions takes into account the recommendations made by Internal Audit, including:

- *Focus on preventive or detective solutions;*
- *Solutions that use the functionality within ERP, wherever possible;*
- *Consideration of existing resources; and*
- *Consideration of system re-configuration, and business process re-engineering, where appropriate.*

Since the inception of this process, 118 issues have been classified as Resolved, of which 54 issues, or 46 percent, were categorized as Permanent Solutions. Of the 44 issues currently tracked as In Progress, 36 issues, or 82 percent, are categorized as Permanent Solutions. This process will continue until remaining issues have been addressed.