



## CITY OF PALO ALTO OFFICE OF THE CITY AUDITOR

February 16, 2010

The Honorable City Council  
Attn: Finance Committee  
Palo Alto, California

### Update on Monitoring of SAP Upgrades and Utilities Module Implementation

#### OVERVIEW

##### *Monitoring role and summary of open items*

In accordance with our annual work plan, the City Auditor's Office has monitored the implementation of the SAP upgrades and Utilities module implementation. Since February 2008, we reviewed the proposed workflows, general controls in the new system, and provided inputs on industry best practices. Prior City Auditor Quarterly Reports highlighted updates in the monitoring progress; this informational update serves as a summary of the final monitoring results.<sup>1</sup>

In accordance with Government Auditing Standards, the City Auditor's Office review was limited to identifying good business practices for management to utilize in evaluating the system implementation and coordinating the external auditors' reviews. Management has not relied on the monitoring as a basis for determining system design, acceptance, or adequacy.

Overall, staff has incorporated best practices suggested throughout our monitoring, with the following items in-process:

1) Ensuring the system is compliant with Payment Card Industry Data Security Standards (PCI-DSS) to protect credit cardholder data; 2) Ensuring security procedures and processes are in place to identify and apply security patch updates; and 3) Continuing to resolve post-implementation issues while minimizing reliance on manual adjustments.

##### **SAP Background**

The City of Palo Alto implemented SAP as the City's Enterprise Resource Planning (ERP) system in June 2003. The original modules included human resources, financial accounting, and budgeting.

In November 2007, the City started upgrading the SAP software system. In July 2008, the City completed Phase 1 of the upgrades to automate payroll functions and to include self-service tools for employees and managers. In July 2008, the City began Phase 2 of the upgrades to implement the SAP Utilities Module. The Utilities Module replaced the 10 year-old Utilities Customer Information System (CIS Banner) and was designed to: (1) create and manage customer accounts

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<sup>1</sup> In 2003, the City Auditor's Office monitored the implementation of the initial SAP system. In July 2005, the City Auditor issued a "Review of SAP Controls over Accounts Payable" and in September 2007, issued "An Audit of the SAP Payroll Controls."

and offer an on-line bill payment feature, and (2) collect customer revenue and generate bills for the City's seven utilities - electric, gas, water, wastewater, refuse, storm drain, and fiber optics. According to staff, the system processes over 30,000 customer accounts and annually generates over 370,000 utilities bills for an estimated \$220.8 million in billed revenues.

Staff initially anticipated the Phase 2 upgrades would take 9.5 months to complete, however, implementation was more complex and slower than expected. During 2009, staff reported to City Council on some of the system implementation challenges they encountered with the Utilities Module (CMR:129:09 and CMR:350:09). In May 2009, staff completed migration of the utility data to the SAP system and began beta testing with a sample of 463 utility customers. In January 2010, staff activated the on-line bill payment feature for all utility customers.

## **MONITORING RESULTS**

- ***There were no major deficiencies noted during Phase 1 upgrades.***

For the SAP upgrades to the employee and manager self-service tools (Phase 1), we reviewed previously noted areas of weakness from the 2007 Audit of SAP Payroll Controls. Our monitoring results indicated internal controls had improved with the Phase 1 upgrades.

SAP uses a system of assigned "roles" to prevent users from entering transactions and changes outside the scope of their authority. Prior to the Phase 1 upgrades, some managers were able to approve timecards and transactions Citywide, instead of only within their assigned function. With the implementation of the Phase 1 upgrades, approval for timecards and transactions are now generally restricted to approved employees and managers within the departmental organization.

- ***Phase 2 implementation of the SAP Utilities system was more complex and encountered more problems than staff initially anticipated. While the system was fully operational in January 2010, staff continues to address post-implementation issues.***

During Phase 2, we did not identify any major deficiencies during the initial blue printing and design stages of the Utilities Module. However, during the unit and integration testing phases, our monitoring identified potential concerns regarding the incorporation of user input from integration testing, system security, and contingency planning for the transition from the existing system to the new SAP Utilities module. In December 2008, the City Auditor's Office met with SAP project management staff to discuss these areas and reported this in our Quarterly Report. The Administrative Services Department (ASD) followed up with audit staff to report progress in these areas and expressed interest in obtaining an external test of the system's vulnerabilities to further address the areas of concern.

The City Auditor's Office coordinated with the independent external auditors, Maze and Associates, to conduct a network scan of the system, including a network vulnerability scan and a web application scan. The results were reported in Maze and Associates' Memorandum on Internal Control in December 2009 (see attached). Their assessment evaluated the following:

- Internet access defenses including hacker prevention, detection and deterrent systems,
- Security of data from physical or network access,
- Adequately protecting data from unauthorized internal access, and
- Reasonable measures to ensure continuation of service.

Maze's network assessment did not indicate material weaknesses or serious exploitable

vulnerabilities, but did identify best practices to implement. These areas included the use of audit logs, firewalls, encrypting cardholder data, using unique system administrator names, a change control process, implementing periodic vulnerability scans, ensuring timely updates or patches are made to the system, and implementation of National Institute of Standards and Technology (NIST) standards. Maze's assessment also verified concerns regarding system security and noted the importance of PCI-DSS compliance and potential liability if there is a data breach and the organization is found to be out of compliance at the time of the breach (i.e. the organization could be held liable for losses of cardholders, banks, and card brand). According to the assessment, PCI-DSS standards apply to any organization that transmits, processes, or stores credit card information to ensure the protection of cardholder data.

Since the network assessment, staff reports the SAP Utilities system now encrypts cardholder data, has an internal firewall, and activated the audit logs. Staff is still in the process of developing processes to ensure they identify and apply security patch updates as soon as they are available. Staff is also considering implementation of NIST and an intrusion detection system.

Although staff reports several of these areas have been resolved, the "My Utilities Account" for the on-line bill payment feature has not yet been certified as PCI-DSS compliant. According to ASD staff, SAP is responsible for seeking this approval and has not yet received confirmation of the certification.

In addition to the network assessment, Maze and Associates conducted a limited review of the system implementation during the Fiscal Year (FY) 2009 audit of the City's financial statements. They sampled 45 billings under the new system, reviewed revenues for the utility funds for FY 2009, reviewed correcting journal entries staff had identified, and noted the impact on customer support time due to billing and transition issues.

The external auditors did not find material errors in the utility fund revenue, but they did categorize their review of the utility system implementation on the Schedule of Significant Deficiencies stating, *"...the system implementation issues if left uncorrected represent a potential for errors to occur and go undetected without timely identification and resolution. We are aware that staff has[sic] continued to work on resolving these issues and bringing increased reliability to the system. Resources should continue to be brought to bear to complete the implementation and correct system issues so that accurate data is produced without staff intervention."*

In response, staff reported that these prior billing errors were limited and 99.33% of utility bills were correct, with staff detecting and correcting the remaining errors. Staff also noted additional resources had been committed to improving the system (see attached). As of January 2010, staff reported improvements in billings, with a billing accuracy rate of 99.97%.

In addition to the above noted areas, staff also reported progress in addressing 17 critical "post-implementation" areas identified in the October 2009 Amendment No. 2 to the Axon Consultant contract. Axon is the City's consultant for upgrading and implementing the SAP Utilities module. At the time of Amendment No. 2, staff utilized manual workarounds until permanent system solutions could be developed. As of the writing of this update, ASD and Utilities staff reported progress in developing system solutions to address 16 of these 17 critical areas, but also noted that other non-critical issues and enhancements may still require attention and resources. Since the City Auditor's Office has not audited the SAP Utilities system, we are relying on management's assessment. As staff continues to identify system enhancements and adjustments, staff should ensure the system produces accurate data without staff intervention. This is especially important given the system's key function as a financial internal control for the seven utility revenues and expenses.

In January 2010, staff activated the on-line bill payment feature for all utility customers. With the completion of our monitoring, the City Auditor's Office plans to move forward with the next phase of SAP assessments outlined in our workplan - to conduct audit sampling of SAP transactions. This audit sampling will allow us to analyze specific units within the City's entire SAP system, which we believe to be an integral part of the City's financial internal control structure and merits additional review.

We thank the staff in the Administrative Services Department, Utilities Department, and the Information Technology Division for their continuing cooperation and assistance during this project.

Respectfully submitted,

A handwritten signature in cursive script that reads "Lynda Flores Brouchoud".

Lynda Brouchoud, City Auditor

Attachment: Excerpts from Maze and Associates' 2009 Memorandum on Internal Control pertaining to the Utility system implementation

Audit staff: Edwin Young, Senior Auditor

## **SAP Chronology**

### **Background:**

July 2002: SAP chosen as the Enterprise Resource Planning (ERP) system for human resources, financial accounting, and budgeting. EA Consulting, Inc. contracted to implement SAP in the amount of \$3,168,328.

FY 2003: SAP implementation completed for the areas noted above.

October 2007: City Council approved a \$6,292,073 contract with Axon Solutions, Inc. to upgrade SAP software and implement SAP Utilities module (CMR:386:07)

November 2007: SAP Phase I upgrades started.

July 2008: SAP Phase I upgrades completed for employee and manager self-service tools.

July 2008: SAP Phase II for Utilities module started. Original SAP Utilities module project timeline:

- April 2008: Project preparations
- May-July 2008: Blueprint and design processes
- August – November 2008: Project realization and discussions
- December 2008 to January 2009: Final Preparations (including training)
- February 2009: “Go-Live” planned
- February – March 2009: Post- support planned

The 8 workteams included: Customer Service, Device Management, Billing, Contract Accounts, Integration, Technical and Data Migration, Biller Direct, and Quality and Change Management.

December 2008: City Auditor’s Office meets with SAP project managers and steering committee to discuss monitoring.

February 2009: Axon Solutions, Inc. contract increased \$1,259,290 for a total of \$8,047,368 for the SAP upgrades and Utilities module (CMR:129:09).

April 2009: City Auditor coordinates with external auditors to conduct a network scan of the Utilities SAP system. The assessment was conducted in May and discussed with staff in early June 2009.

May 4, 2009: SAP Utilities module activated (actual “go-live”) and beta testing of on-line bill payment begins for about 463 customers.

August 2009: Utilities SAP Billing Update (CMR:350:09) details SAP Utilities system problems. Utilities billing issues affected approximately 6% of customers and impacted customer service. The staff report included examples of bill print errors and delays in customer billings.

October 2009: Amendment No. 2 to the Axon contract provides for system support through June 2010, for a total contract value of \$8,774,579. In Exhibit B-4A of Amendment No. 2, staff identified 17 issues to resolve during the maintenance and enhancement of the system. In approving Amendment No. 2, City Council directed the City Attorney to retain outside counsel to conduct a legal review of the contract. According to staff, outside counsel worked with ASD and the City Attorney’s Office to perform this review, which resulted in the identification of the 17 issues contained in Exhibit B-4A.

December 2009: Maze and Associates audit of the City of Palo Alto financial statements (as of June 30, 2009) includes the Utilities System Implementation in its category of Significant Deficiencies.

January 2010: City staff activated the on-line bill payment feature for all utility customers.

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## MEMORANDUM ON INTERNAL CONTROL

October 23, 2009

To the City Council of the  
City of Palo Alto, California

In planning and performing our audit of the financial statements of the City of Palo Alto as of and for the year ended June 30, 2009, in accordance with auditing standards generally accepted in the United States of America, we considered the City's internal control over financial reporting (internal control) as a basis for designing our auditing procedures for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of the City's internal control. Accordingly, we do not express an opinion on the effectiveness of the City's internal control.

A control deficiency exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent or detect misstatements on a timely basis. A significant deficiency is a control deficiency, or combination of control deficiencies, that adversely affects the entity's ability to initiate, authorize, record, process, or report financial data reliably in accordance with generally accepted accounting principles such that there is more than a remote likelihood that a misstatement of the entity's financial statements that is more than inconsequential will not be prevented or detected by the entity's internal control.

A material weakness is a significant deficiency, or combination of significant deficiencies, that results in more than a remote likelihood that a material misstatement of the financial statements will not be prevented or detected by the entity's internal control.

Our consideration of internal control was for the limited purpose described in the first paragraph and would not necessarily identify all deficiencies in internal control that might be significant deficiencies or material weaknesses. We noted no matters that we consider to be material weaknesses, however, we identified certain deficiencies in internal control that we consider to be significant deficiencies that are included on the Schedule of Significant Deficiencies

Included in the Schedule of Other Matters are recommendations not meeting the above definitions that we believe to be of potential benefit to the City.

The City's written responses included in this report have not been subjected to the auditing procedures applied in the audit of the financial statements and, accordingly, we express no opinion on them.

This communication is intended solely for the information and use of management, City Council, others within the organization, and agencies and pass-through entities requiring compliance with generally accepted government auditing standards, and is not intended to be and should not be used by anyone other than these specified parties.

*Maze & Associates*

**CITY OF PALO ALTO  
MEMORANDUM ON INTERNAL CONTROL  
SCHEDULE OF SIGNIFICANT DEFICIENCIES**

**2009-01 – Utility System Implementation**

Effective May 2009 the City implemented a new utility billing system. There are a number of complications which occurred in fiscal 2008-09 and required staff to record correcting journal entries. For example,

- Certain interfund billings for utility services were corrected with journal entries due to system errors.
- A duplicate billing was detected by staff and corrected late in fiscal 2008-09.
- Certain remittance advices contain data errors such that the amount listed as due on the remittance stub portion of the invoice is erroneous while the detail on the customer invoice portion is correct.
- Customer support time has dramatically increased due to billing and transition issues.

We met with staff and reviewed documentation of the above issues and discussed the status of the system implementation. We also selected a sample of billings under the new system and tested utility billings for propriety. We noted one exception out of forty-five billings due to refuse charge from the former hauler that staff could not support. We also perform certain analytical procedures to gain further evidence that revenues for the utility funds were materially accurate for fiscal 2008-09 and did not note material errors.

While it is important to note that staff detected the above errors and made appropriate corrections in fiscal 2008-09, the system implementation issues if left uncorrected represent a potential for errors to occur and go undetected with out timely identification and resolution. We are aware that staff have continued to work on resolving these issues and bringing increased reliability to the system. Resources should continue to be brought to bear to complete the implementation and correct system issues so that accurate data is produced without staff intervention.

*Management Response:* Since implementation of the SAP utility billing and customer information system in May 2009, the system has performed as expected overall. The vast majority of utility bills (99.33%) are going out on time and are correct. However, in the area of billing, staff has experienced unexpected challenges with a small number of billing errors. Shortly after go-live, a small number of bills, approximately 200 out of 30,000 monthly bills were sent to customers with incorrect amounts in the bill detail. Correct bills were later sent. Since that time, bills that have an incorrect bill detail have been caught by staff and corrected. In these instances, the total bill amount is correct on the bill payment stub on the front of the bill; however, the bill detail inside the bill does not reflect the same total. Staff is working to eliminate any instances of errors in billing detail. Additional resources have been committed to this effort.

Since the August timeframe, customer service response time has improved and it continues to trend downward reflecting improved response. This is reflected in the call hold time measure which was nearly 50 minutes in late August and has dropped to less than four minutes in October.

**CITY OF PALO ALTO  
MEMORANDUM ON INTERNAL CONTROL**

**SCHEDULE OF OTHER MATTERS**

**2009-02 – Utility Billing System IT Controls**

During fiscal 2008-09 staff requested that we perform an Information System Review of the new utility billing system. Our work was performed using the certification and accreditation framework developed by the National Institute of Standards and Technology (NIST) for the Federal Information Security Management Act (FISMA). Our procedures included performing an external network scan based on NIST criteria and in determining that internal control provides for:

- Internet access defenses including hacker prevention, detection and deterrent systems
- Security of data from physical or network access
- Adequately protecting data from unauthorized internal access
- Reasonable measures to ensure continuation of service

While the results of our work did not indicate material weaknesses or serious exploitable vulnerabilities, we did note a few areas which could be improved which were communicated to staff for follow-up.

*Management Response:* The City has encrypted credit card data and installed an internal firewall device. An existing process to review role assignments in SAP has been revised to include the new roles in SAP/CCS. This continues to provide protection against unauthorized internal access.

**2009-03 – Other Internal Control Areas**

With our current year audit we rotated some of our emphasis to delve deeper in to a variety of areas as we were able to build on the extensive controls work conducted last year due to new audit standards. As a result we noted the following controls which were not deemed material weaknesses, but did warrant improvement. We communicated these to staff for their use in determining appropriate action.

*Accounts Receivable Reconciliation* - Based on our control testing of receivable oversight and reconciliations, we noted that staff had not performed the sub-module reconciliation to the General ledger in December 2008. The reports generated from module were not properly reflecting correct balances as the IT department was in the process of updating the reports in order to fix the problem.

*Management Response:* The report has been corrected and the reconciliation has been completed for each month of the fiscal year.

*Check Register Review and Approval* - Based on our control testing, we noted no evidence that check register reports were reviewed and approved since the Sr. Accountant in charge was transferred to the Enterprise Accounting section in August 2008. Check register reviews should be documented to ensure proper internal control for disbursement in place. We recommend the City assign a designated staff to review and approve the check register report at least on monthly basis to ensure proper control of disbursement during the transition period.

*Management Response:* The Accounts Payable Supervisor now reviews the check register in detail each time checks are issued. The Supervisor then certifies in writing that the register has been reviewed and indicates on the certification whether there were any exceptions that were noted during the review. This certification is then attached to the check register and filed in the appropriate binder.