CITY OF PALO ALTO OFFICE OF THE CITY AUDITOR

April 27, 2015

The Honorable City Council
Palo Alto, California

Policy and Services Committee Recommendation to Accept the Utility Meter Audit: Procurement, Inventory, and Retirement

The Office of the City Auditor recommends acceptance of the Utility Meter Audit: Procurement, Inventory, and Retirement. At its meeting on March 10, 2015, the Policy and Services Committee approved and unanimously recommended the City Council accept the report. The Policy and Services Committee minutes are included in this packet, as well as an updated response matrix from the City Manager's Office.

Respectfully submitted,

Harriet Richardson

Harriet Richardson
City Auditor

ATTACHMENTS:

- Attachment A: Utility Meter Audit Updated City Manager's Response Matrix   (PDF)
- Attachment B: Utility Meter Audit: Procurement, Inventory, and Retirement   (PDF)
- Attachment C: Policy and Services Committee Meeting Minutes Excerpt (March 10, 2015) (PDF)

Department Head: Harriet Richardson, City Auditor

APPENDIX C – City Manager's Response

The City Manager has agreed to take the following actions in response to the audit recommendations in this report. The City Manager will report progress on implementation six months after the Council accepts the audit report, and every six months thereafter until all recommendations have been implemented.

Recommendation	Responsible Department(s)	Agree, Partially Agree, or Do Not Agree and Target Date and Corrective Action Plan	Status
Finding 1: The Utilities Department has not established adequate processes and procedures for organizing and setting up meters in SAP, causing data discrepancies and errors.			
1.1 The Utilities Department should establish written policies and procedures that clearly define roles and responsibilities for managing the City's utility meters. The Utilities Department should coordinate with Engineering, Operations, Purchasing, and Stores Inventory to address: a) Defining individual and cross-functional responsibilities for setting up, procuring, and receiving meters, and training key staff to understand the workflow process and controls. b) The setup, user authorization, and ongoing maintenance of meter material master files. c) The responsibility of assigning badge numbers to meters, ensuring the use of a meter type and badge number combination for the purchase and receipt of all meters.		**Concurrence: Agree** **Target Date: June 2015** Action Plan: Utilities staff is updating policies and procedures document including outlining roles and responsibilities for organizing and managing utility meters. A – Polices, procedures and role responsibilities are being updated; Utilities will schedule quarterly training sessions for specific workflows. B – Changes in user authorization are completed. C – Utilities and Administrative Services Department (ASD) agree to transfer the responsibility of creating meter badge numbers to Purchasing Division after Utilities completes recommendation 1.3.	
1.2 The Engineering Division of the Utilities Department should re-examine and update the City's engineering specifications to explicitly include all utility meter types purchased and used by the City, and make future updates to the specifications as changes occur. Based on these changes, and		**Concurrence: Agree** **Target Date: Completed** Action Plan: Engineering specifications are intended to clearly identify the functions and minimum performance requirements that must be satisfied.	

Recommendation	Responsible Department(s)	Agree, Partially Agree, or Do Not Agree and Target Date and Corrective Action Plan	Status
ongoing, the Engineering Division should work with Purchasing to ensure that meter types established in SAP can be reconciled to an approved list of meters.		Engineering will work with Purchasing on an ongoing basis to ensure that sufficient detailed information is provided so that meter types established in SAP can be reconciled to an approved list of meters.	
1.3 The Utilities Department should review its existing list of utility meter types in the SAP material master list to redefine and reorganize existing and future meter types. This recommendation should be applied if the Utilities Department changes from SAP to another system.		**Concurrence: Agree** **Target Date: June 2015** Action Plan: Utilities will review the existing list of meter types in SAP. Utilities will create, discontinue or consolidate material master for a specific meter type if required.	
1.4 The Utilities Department should give responsibility to Purchasing for assigning badge numbers to meters and make the process for assigning the numbers more efficient by allowing the technology of SAP to designate an automated badge number at the time of procurement and use the controls built into SAP to mitigate errors resulting from the manual assignment of badge numbers.		**Concurrence: Agree** **Target Date: June 2015** Action Plan: Utilities and Purchasing have agreed to transfer the responsibility of new badge number creation to Purchasing after Utilities completes recommendation 1.3 including discontinuation of duplicate and obsolete descriptions in SAP for meter master records. Utilities will provide Purchasing training and documentation of the badge creation process.	
Finding 2: The Utilities Department has incomplete, incorrect, and inconsistent meter records, which causes data reliability concerns and increases the risk for incorrect customer billing.			
2.1 The Utilities Department should establish a policy for meter inventory error tolerance and, based on this metric, develop a plan to identify high-risk meters, verify the accuracy of these meters, and correct accordingly.		**Concurrence: Agree** **Target Date: Completed** Action Plan: Utilities already has in place a testing policy and error tolerance procedure for new and existing meters. Approximately 10% of all new meters delivered are tested for accuracy and the meters must perform within three percent of the manufacturers' reported meter specifications.	

Recommendation	Responsible Department(s)	Agree, Partially Agree, or Do Not Agree and Target Date and Corrective Action Plan	Status
2.2 The Utilities Department should provide process and SAP training to staff involved in meter activities on the policies, processes, and procedures for physically and electronically maintaining meter data accuracy.		**Concurrence: Agree** **Target Date: Completed** Action Plan: Training has been underway for the past several months; Utilities will continue to conduct quarterly training sessions to ensure all current and new staff are properly trained. All meter testing data is electronically recorded.	
2.3 The Utilities Department should work with the Administrative Services Department and the Information Technology Department to integrate the various SAP modules to automate controls or implement other appropriate processes to ensure that meter descriptions carry through from procurement to retirement.		**Concurrence: Agree** **Target Date: June 2015** Action Plan: Utilities and ASD will investigate the cost of adding automation and enhancement to the SAP system. Depending on the estimated cost and outcome of the ERP system evaluation, it may or may not be cost-effective to implement any enhancements at this time. Instead of manually assigning meter badge numbers, SAP will automatically generate serialized badge numbers.	
2.4 The Utilities Department should take corrective action to address the 115 incorrect water billings by notifying customers of the error and that future billings will reflect the correction, and recover revenues to the City of approximately $43,000. The Utilities Department should also establish a policy and procedure for the immediate correction of future errors identified.		**Concurrence: Agree** **Target Date: Completed** Action Plan: Utilities has notified all the customers of the billing error. The average back-bill amount for a customer was $452.54 for three years of service. Utilities also offered payment plans to the customers in case they wanted to spread their payments across multiple months. Utilities will continue to implement established policy and procedure regarding correction of errors.	
2.5 The Purchasing Division should correct the purchase order documents to accurately reflect the engineering specifications.		**Concurrence: Agree** **Target Date: Completed** Action Plan: The Purchasing Division has updated	

Recommendation	Responsible Department(s)	Agree, Partially Agree, or Do Not Agree and Target Date and Corrective Action Plan	Status
		the purchase order documents to accurately reflect the current engineering specifications.	
2.6 The Purchasing Division should ensure that bidder's Affidavits of Compliance are received and documented.		**Concurrence: Agree** **Target Date: June 2015** Action Plan: Purchasing and Utilities will develop a process to track the vendor's Affidavits of Compliance.	
2.7 The Utilities Department should establish responsibility for: a) Determining and ensuring that meter testing is appropriately and consistently performed. b) Testing and analyzing the test results of meters for compliance with performance specifications. c) Analyzing meter test data to determine if use of the manufacturer's guaranty and warranty is needed.		**Concurrence: Agree** **Target Date: Completed** Action Plan: A: Utilities will continue to test 10% of new meters; the meters must perform within three percent of the manufacturers reported meter specifications. B: Utilities will continue to test all meters removed from the field; testing results will be tracked electronically for data retrieval or analysis if needed. C: Utilities will verify application of any warranties for any failed meters.	
2.8 The Utilities Department should reassess and develop a maintenance and replacement plan for all electronic meters.		**Concurrence: Agree** **Target Date: December 2015** Action Plan: Utilities will include electronic meters in the replacement plan.	
Finding 3: The Utilities Department inaccurately reported the retirement of meters, which affected their value in the City's accounting records.			
3.1 The Utilities Department should develop a policy, process, and procedure for the timely and accurate retirement of meters, both		**Concurrence: Agree** **Target Date: June 2015**	

Recommendation	Responsible Department(s)	Agree, Partially Agree, or Do Not Agree and Target Date and Corrective Action Plan	Status
physically and in SAP.		Action Plan: Meter retirement policy has been defined, procedures are updated, and staff is fully trained on the meter retirement process. The meters identified in the report have been properly retired in the utility system and reported to Accounting. Utilities will coordinate with Accounting on the fixed asset retirement in the financial system.	
3.2 In conjunction with Recommendations 1.3 and 3.1, the Utilities Department should work with Accounting to align meter types when adding and retiring meters in the SAP asset management module.		**Concurrence: Agree** **Target Date: June 2015** Action Plan: Utilities and Accounting will review and align meter types in SAP if necessary.	
3.3 The Utilities Department should work with the Administrative Services Department to properly coordinate and process for meter recycling credits.		**Concurrence: Agree** **Target Date: June 2015** Action Plan: Utilities and ASD will coordinate and review the meter recycling processes.	

CITY OF PALO ALTO OFFICE OF THE CITY AUDITOR

March 10, 2015

The Honorable City Council
Attention: Policy & Services Committee
Palo Alto, California

Utility Meter Audit: Procurement, Inventory, and Retirement

In accordance with the Fiscal Year 2015 Annual Audit Work Plan, the Office of the City Auditor has completed the Utility Meter Audit: Procurement, Inventory, and Retirement. The audit report presents three findings with a total of fifteen recommendations. The Office of the City Auditor recommends that the Policy and Services Committee review and recommend to the City Council acceptance of the Utility Meter Audit.

We would like to thank the staff of the Utilities Department and Administrative Services Department for their time, information, and cooperation during the audit process.

Respectfully submitted,

Harriet Richardson

Harriet Richardson
City Auditor

ATTACHMENTS:

- Attachment A: Utility Meter Audit: Procurement, Inventory, and Retirement   (PDF)

Department Head: Harriet Richardson, City Auditor

UTILITY METER AUDIT:
Procurement, Inventory, and Retirement

March 2015

Office of the City Auditor

Harriet Richardson, City Auditor
Mimi Nguyen, Senior Performance Auditor

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Office of the City Auditor

EXECUTIVE SUMMARY:
Utility Meters: Procurement, Inventory, and Retirement

Purpose of the Audit:
The objectives of the audit were to determine if proper procedures were followed and to assess the efficiency and effectiveness of procuring, managing, and retiring utility meters.

SUMMARY OF RESULTS

The Utilities Department has not established adequate processes and procedures for organizing and setting up meters in SAP, causing data discrepancies and errors. We could not reconcile 50 percent of meter types to engineering specifications and identified 13 of 60 master records that had comingled meter price data. At most, 86 percent of meters were tracked in the City's inventory management module of SAP and some meters were not assigned the necessary identifier for continuous tracking. When tracked, meter data contained incorrect, missing or incomplete information. The lack of procedures to prevent errors and the lack of emphasis on maximizing the use of SAP raises data reliability concerns and increases the risks for incorrect customer billings. The errors and inconsistencies in meter inventory and data management carry through to the retirement of meters, which affected the value of meters in the City's accounting records.

The audit emphasizes:

- The importance of effectively organizing and setting up meter data files in SAP to ensure data consistency and reliability.

- The value of using SAP to maintain complete and accurate meter data records, reconciling to meters actually installed, to reduce the risk of incorrect customer billing.

- Internal control is not one event, but a series of actions that occur throughout an entity's operations; therefore, errors can create inefficiencies across many workflow areas and can increase the cost of operations.

- The use of technology with built-in efficiencies and controls to manage data and transform raw data into usable information for good reporting for decision making and improved performance.

Although it is difficult or often not feasible to completely eliminate all risks, most risks relating to meter management may be mitigated through a strong commitment to develop effective, consistent, and controlled processes. The diagram below shows the audit findings in each workflow area that collectively cause data reliability concerns, which increases the risk for incorrect customer billing.
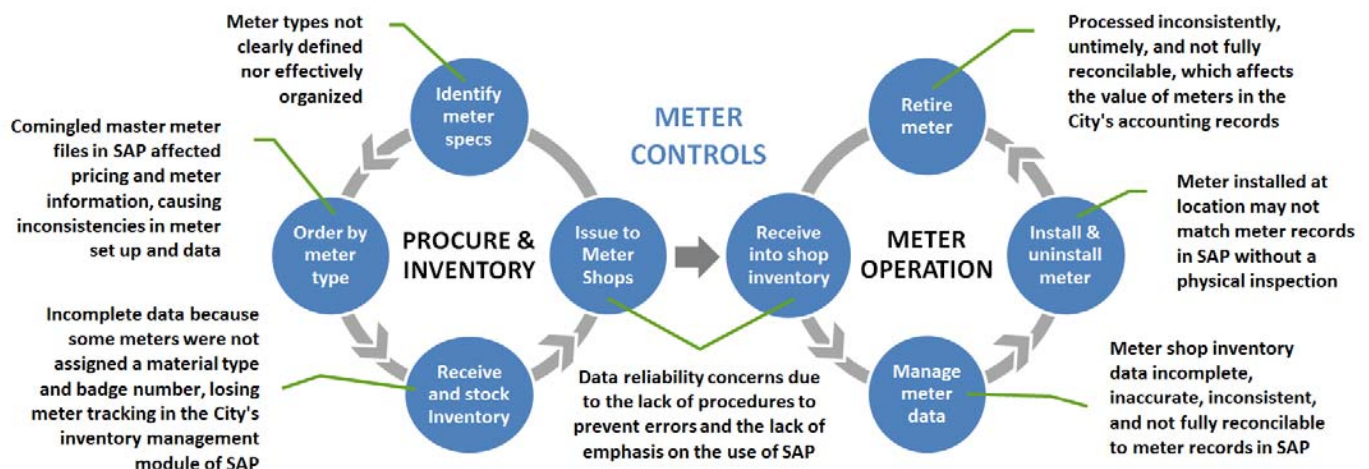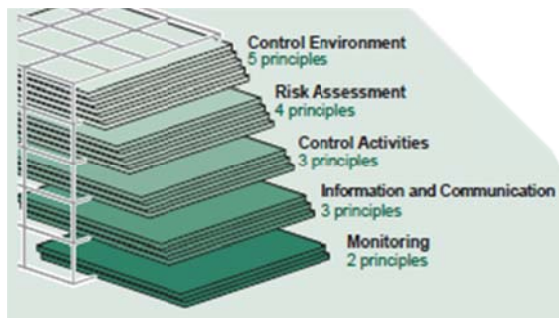
Internal control is a process used by management to help an entity achieve its objectives. Internal control helps an entity run its operations efficiently and effectively, report reliable information about its operations, and comply with applicable laws and regulations. The five components of internal control are 1) Control Environment, 2) Risk Assessment, 3) Control Activities, 4) Information and Communication, and 5) Monitoring.

Internal control serves as the first line of defense in safeguarding assets and helps management achieve internal control objectives. Internal control is not one event, but a series of actions that occur throughout an entity's operations.

REPORT HIGHLIGHTS

FINDING 1: *The Utilities Department has not established adequate processes and procedures for organizing and setting up meters in SAP, causing data discrepancies and errors (Page 8)*

- We could not reconcile 50 percent of meter types to engineering specifications and identified 13 of 60 master records with comingled data, causing discrepancies and errors throughout SAP.

- Some meters were not assigned the necessary identifier to ensure its tracking, which resulted in incomplete records and loss of chronological and continuous tracking of meters.

- The Utilities Department should establish policies and procedures for setting up and managing meters. Engineering specification and Purchasing processes should be updated accordingly.

- When established, the Utilities Department should give responsibility to Purchasing for assigning badge numbers to meters and use the technology and controls built into SAP for automatic numbering.

FINDING 2: *The Utilities Department has incomplete, incorrect, and inconsistent meter records, which causes data reliability concerns and increases the risk for incorrect customer billing (Page 15)*

- At most 86 percent of meters were continuously tracked in the City's SAP inventory management system; and when tracked, meter data contained incorrect, incomplete, and inconsistent information.

- The lack of procedures to prevent errors and the lack of emphasis on the use of SAP raises data reliability concerns and increases the risk for incorrect customer billing.

- The Utilities Department should establish a policy for meter inventory and data error tolerance, and provide process and SAP training to staff involved in meter activities.

- The Utilities Department should implement a policy and process to ensure that meter descriptions carry through from procurement to retirement and develop procedures to prevent errors and increase data reliability.

FINDING 3: *The Utilities Department inaccurately reported the retirement of meters, which affected their value in the City's accounting records (Page 26)*

- Electric meters were not retired in over a year and gas meters in over six months, and when meters were reported for retirement, the data was incorrect and inconsistent.

- The Utilities Department should develop a policy, process, and procedure for the timely and accurate retirement of meters, working with Accounting to align meter types for retirement.

APPENDICES A & B: *Two case studies showing examples of errors and inconsistencies, and missing or incorrect meter data in SAP (Pages 29 & 36)*

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ABBREVIATIONS

ASD	Administrative Services Department
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
GFOA	Government Finance Officers Association
MGO	Macias Gini & O'Connell, LLP
NMA	National Meter Automation

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INTRODUCTION

Audit Objective

The objectives of the audit were to determine if proper procedures were followed and to assess the efficiency and effectiveness of procuring, managing, and retiring utility meters.

Background

The City of Palo Alto Utilities Department provides electric, gas, and water service, which generated $198 million in operating revenues and $160 million in operating expenses in Fiscal Year (FY) 2014. The charges for service to customers included, but were not limited to:

- Use of electric, gas, or water, <u>based on meter size</u> and consumption.

- The <u>cost of new meter</u> equipment by size.

Uniquely identifying a utility meter for tracking

A utility meter is the material used to measure electricity or water usage, or the volume of gas flow. Approximately 74,000 meters, valued as a $13 million asset in the City's FY 2014 financial statements, are installed throughout the City. Unique meter identification allows individual meters to be tracked from procurement and receipt, through inventory and installation at a service location, to retirement. Meter identification is also used to track utility usage at the service location and maintenance or testing of the meter. Having a reliable data system that effectively gathers data, completely and accurately, for each individual meter helps protect the asset and its use.

The procurement and specific data for each meter are maintained in the City's SAP Enterprise Resource Planning (SAP) system. This application supports the City's core business functions such as purchasing, inventory, utilities, and accounting. It is also the data system which stores and manages all material information such as meters.

SAP has material master tables, which are the collective repository of data where all the information on a meter is entered, accessed, and used throughout the SAP system. Meter data can be organized by type; grouped by similar or separated by different attributes. Understanding the differences between the various meters, including use of the meter data, will determine if it can be grouped or needs to be separated.

A badge number is a City assigned number that is required to be stamped on or affixed to all meters. The badge number is called a serial number in SAP, which is different from the manufacturer's serial number also shown

on the meter. The meter type is identified as a material number in SAP. The terms meter type and badge number are used throughout the document.

Unique meter identification is a way to keep track of each meter and its data individually. In SAP, the combination of a meter type and badge number uniquely identifies each meter. Effectively organizing meter data and using the meter type and badge number combination ensures complete and reliable meter data in SAP.

Organizing meter data in SAP

As an example, a 5/8 x 3/4" bronze water meter and a 5/8 x 3/4" water E-meter are the same size, but because they are different in product and price, they should be organized as two meter types. In another example, a Class 750 House gas meter may be purchased from two different vendors with two different descriptions but actually be the same meter type. This would require one meter type but allow for multiple vendors. Based on the examples, Exhibit 1 shows how these meters may be organized in SAP:

EXHIBIT 1: Sample Hierarchy for Organizing Meters by Type

MATERIAL MASTER TABLE	
Meter Group/Number:	Water Meters (#89100)
Meter Type/Number:	5/8" x 3/4" Bronze Water Meter
Attributes:	Size: 5/8" x 3/4", Displacement Type
Vendor:	Badger (Sole Source)
Vendor Meter:	Recordall M25 Bronze
Price:	$55.00 per meter
Meter Type/Number:	5/8" x 3/4" Bronze Water E-Meter
Attributes:	Size: 5/8" x 3/4", Displacement Type,
Vendor:	Badger (Sole Source)
Vendor Meter:	P/N E25-SS
Price:	$150.00 per meter
Meter Group/Number:	Gas Meters (#67001)
Meter Type/Number:	Class 750 House Gas Meter
Attributes:	Class 800 Type Diaphram Meter
Vendor:	Itron, Inc.
Vendor Meter:	P/N 8EA80281A5KD, AL-800
Price:	$700.00 per meter
Vendor:	Meter, Valve & Control, Inc.
Vendor Meter:	GMI-800A-NTC-25-45LT, CL750 House
Price:	$700.00 per meter
Meter Group/Number:	Electric Meters (#28200)
Meter Type/Number:	2S Electric Meter
Badge Number: (1 per meter) * (#58858)	
The combination of a meter type and badge numbers uniquely identifies each	

Source: Material Management with SAP ERP – Functionality and Technical Configuration, Third Edition, 2011

Work areas managing utility meters

<u>Work Areas, Roles and Responsibilities, Internal Control and Risks</u>: Responsibility for the accuracy, completeness, and transparancy of utility meter data is shared across and between various work areas within the Utilities Department and the Administrative Services Department (ASD), as shown in Exhibit 2. However, the overall management of utility meters, the meter management workflow, and meter data and data systems are the main responsibility of the Utilities Department.

EXHIBIT 2: Work Area Responsibilities for Managing Meters

DESIGN	PROCURE	STORE	UTILIZE	DISPOSE	ACCOUNT
Utilities Engineering	ASD Purchasing	ASD Stores Inventory	Utilities Meter Operations	Utilities Meter Operations	ASD Accounting
Specification *Type* *Warranty* *Testing* **Sole Source Justification** **Capital & Special Projects**	**Procurement** *Vendor* *Price and Award* *Material Master* *Purchasing Documents* *Procure*	**Inventory** *Goods Receipt* *Physical Custody* *Inventory Data Mgmt* *Goods Issue*	**Inventory** *Goods Receipt* *Physical Custody* *Movement* **Performance** *Testing (new, installed, retired)* **Meter Data Management**	**Disposal and Recycling** **Retired Meter Reporting**	**Meter Asset Addition & Retirement** **Recycling Revenue**

Source: City of Palo Alto Workflow Process and Procedure

Internal control[1] is a process used by management to help an entity achieve its objectives. Internal control helps an entity run its operations efficiently and effectively, report reliable information about its operations, and comply with applicable laws and regulations.

The five components of internal control are:

1) **Control Environment** - The foundation for an internal control system. It provides the discipline and structure to help an entity achieve its objectives.

2) **Risk Assessment** - Assesses the risks facing the entity as it seeks to achieve its objectives. This assessment provides the basis for developing appropriate risk responses.

3) **Control Activities** - The actions management establishes through policies and procedures to achieve objectives and respond to risks in

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[1] United States Government Accountability Office (GAO-14-704G, September 2014), *Standards for Internal Control in the Federal Government*, known as the "Green Book," provide the overall framework for establishing and maintaining an effective internal control system. The Green Book may be adopted by federal, state, local, and quasi-governmental entities, as well as not-for-profit organizations.
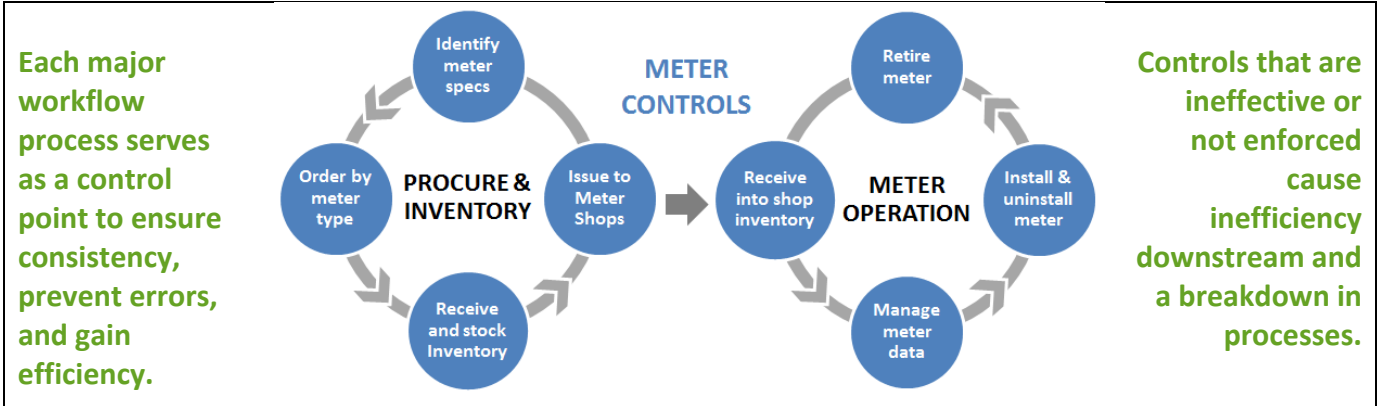
the internal control system, which includes the entity's information system.

4) **Information and Communication** - The quality information management and personnel communicate and use to support the internal control system.

5) **Monitoring** - Activities management establishes and operates to assess the quality of performance over time and promptly resolve the findings of audits and other reviews.

Internal control serves as the first line of defense in safeguarding assets and helps management achieve internal control objectives. One internal control objective states that management should design an internal control system to provide reasonable assurance regarding prevention or prompt detection and correction of unauthorized acquisition, use, or disposition of an entity's assets. Another states that effective operations should produce the intended results from operational processes, while efficient operations do so in a manner that minimizes the waste of resources. And related to data, gathering and communicating financial and non-financial information is needed by management to support decision making and evaluate performance.

Internal control is not one event, but a series of actions that occur throughout an entity's operations. Exhibit 3 shows the main operational processes for managing the meter asset and Exhibit 4 shows examples of some risks and the work area that can help mitigate the risks specific to the meter or its use.

EXHIBIT 3: Operational Processes for Managing Meters

Each major workflow process serves as a control point to ensure consistency, prevent errors, and gain efficiency.

Identify meter specs

METER CONTROLS

Retire meter

Order by meter type

PROCURE & INVENTORY

Issue to Meter Shops

Receive into shop inventory

METER OPERATION

Install & uninstall meter

Receive and stock Inventory

Manage meter data

Controls that are ineffective or not enforced cause inefficiency downstream and a breakdown in processes.

Source: City of Palo Alto Workflow Process and Procedure

EXHIBIT 4: Risks and Mitigating Risks Relating to a Meter and Its Use

RISK	PROCESS CONTROL
Meters are purchased that do not meet accuracy and performance requirements.	Engineering establishes clear specifications, including preformance, testing, and warranty/guaranty requirements, for distribution and communication to the Purchaser and Operations.
Meters are delivered without an assigned and affixed City badge number.	The Purchaser issues City badge numbers to the vendor/manufacturer, and Stores receives and accepts the order after verifying the badge numbers and registering the meters.
Not knowing the physical location of a meter.	All departments must ensure that meters are identifiable from cradle to grave. They do this by: • Verifying that meters have a City badge number at purchase. • Verifying that meters have a record of purchase and receiving by badge number. • Managing meter inventory with an inventory management system. • Managing meter movement from one location to another, when installed or uninstalled, and when retired.
Meters do not accurately perform or record utility usage.	The meter shops test meters through statistical sampling of new meter shipments, aging or usage sampling of used meters, and all retired meters. Engineering reviews and analyzes the test results from the meter shops and manufacturer to compare with performance and accuracy requirements every six months.

Source: Auditor's Risk Assessment

Audit Scope

We reviewed electric meter data from July 1, 2009, through June 30, 2014, and water and gas meter data from July 1, 2009, through June 6, 2014. During this period, the City purchased approximately 11,000 meters for $1.8 million. We did not:

• Quantify the costs resulting from operational inefficiencies.

• Assess the accuracy or inaccuracy of customer utility accounts and utility bills. This will be addressed in a future audit.

Audit Methodology

To conduct this audit, we:

• Reviewed work completed during the Inventory Management Audit pertaining specifically to utility meters and inventory management and controls in SAP.

• Reviewed the Municipal Code, ordinances, and the City's policies, procedures, and processes relative to utility meter workflow specific to meter procurement, inventory management, and retirement.

- Reviewed inventory management guidelines set forth by the American Society for Testing and Materials (ASTM), the American Water Works Association (AWWA), the Government Finance Officers Association (GFOA), and the SAP Library (online guidance for the SAP ERP system).

- Interviewed the Utilities Department and ASD staff responsible for procuring, managing and safeguarding, and retiring the City's utility meters.

- Reviewed meter inventory reported in the City's financial records and analyzed inventory data in the City's SAP system. Assessed the accuracy and completeness of meter records.

- Consulted with the City's external auditing firm, Macias Gini & O'Connell, LLP (MGO), regarding the valuation of meter fixed assets in the City's financial statements.

- Determined data reliability by interviewing knowledgeable data users and data system supporters, reviewed existing information about the data, performed tests, traced data to and from source documents, and reviewed selected system controls. Due to the incomplete and inconsistent meter data in SAP system and the manual recordkeeping of meter data outside of the SAP system, we have concerns regarding the reliability of the data. We based our analysis of meter data on the data that was available in or entered into the SAP system.

We conducted this performance audit of utility meter procurement, inventory, and retirement in accordance with our FY 2014 Annual Audit Work Plan and generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

How to use this report

The background section of this report provides a general understanding of the utility meter device, how it is established in the City's SAP system, roles and responsibilities, and processes and controls. The body of the report states the audit findings and provides a high-level overview of the issues identified. The findings are accompanied by case studies in the appendices that provide detailed examples of the effect of those issues.

Although many of the examples used throughout this report were specific to water meters, the findings may also be applicable to gas and electric meters, and the audit recommendations address all types of meters.

Each finding begins with a general process flow chart, separating the procurement and inventory functions from the operation functions. The process control areas discussed in that audit finding are shown in blue.
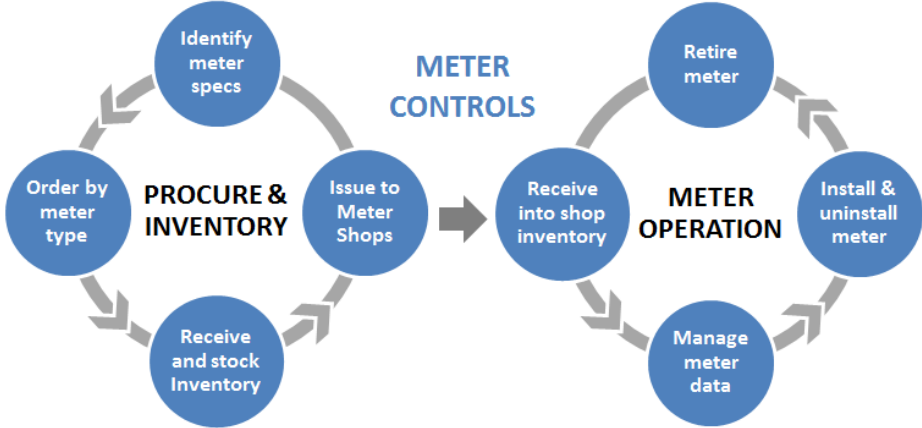
The case study examples in Appendices A and B should be used in conjunction with the discussion in Findings 1 and 2.

Based on our review, we identified several areas of improvement which resulted in recommendations to City Management stated at the end of each finding.

We would like to thank the staff of the Utilities Department and the Administrative Services Department for their time, information, and cooperation during the audit process.

FINDING 1

The Utilities Department has not established adequate processes and procedures for organizing and setting up meters in SAP, causing data discrepancies and errors.

We could not reconcile 50 percent of meter types to engineering specifications and identified 13 of 60 master records that had comingled meter price data, causing meter data discrepancies and errors throughout the SAP system. The Utilities Department did not consistently assign the necessary meter type and badge number combination required to make a meter uniquely identifiable, losing partial traceability of the meter in SAP and its physical inventory.
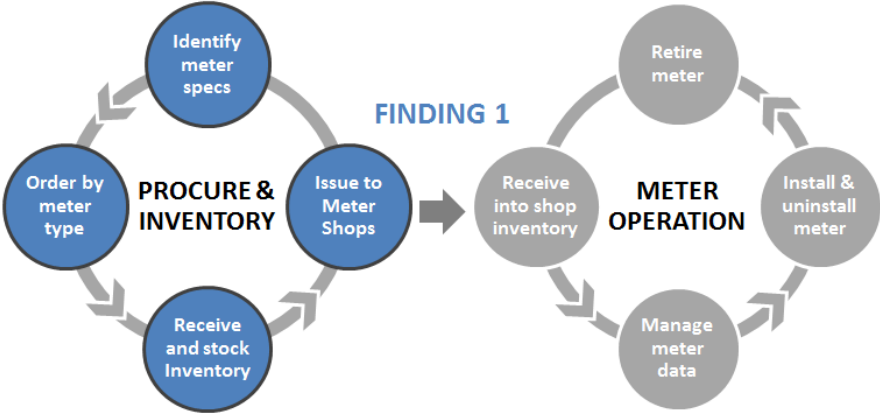
An error or misstep when organizing and setting up a meter at the beginning of the process has compounding impacts downstream. An efficient and effective workflow requires that each work area understand and perform its purpose and function, as well as collaborate with other areas of interdependencies. When everyone does not clearly understand their roles and responsibilities, vulnerabilities and misunderstandings can develop and cause errors, inefficiencies, and ineffectiveness.

Meter types were not clearly defined or well organized in SAP, resulting in the comingling of data and inconsistencies

The Utilities Department did not have a clear process or procedure for organizing meters in SAP. The Engineering Division of the Utilities Department determines and approves all meters procured and used; however, the Purchasing and Stores Inventory Divisions of the Administrative Services Department have the role and responsibility for creating and maintaining the master records, procuring, receiving, and inventory management of meters in SAP. To ensure that meters are organized correctly when set up, procured, and received, Purchasing and Stores Inventory need to know what meters are approved for purchase and need a clear understanding of how to organize the meter data, by meter type in SAP.

Most of the existing meter types in SAP are not well organized, having migrated from a legacy system, and the Utilities Department did not redefine or reorganize the meter types during system implementation.

Based on our review of 60 meter types for 11,228 meters in SAP over the past 5 years, we could not reconcile 30 meter types to a specific meter type listed in the engineering specification. Exhibit 5 shows that 50 percent of meter types did not reconcile, which represents 2,108 or 19 percent of meters.

EXHIBIT 5: Count of Meter Type and Meter not Reconcilable to Engineering Specification

Meter	Number of Meter Types	Meter Type Not in Specs	Number of Meters	Meter Not in Specs
Water	18	5	7,666	639
Gas	19	9	1,799	185
Electric	23	16	1,763	1,284
TOTAL	**60**	**30**	**11,228**	**2,108**
		50%		**19%**

SOURCE: Auditor's reconciliation between SAP and engineering specifications

According to Utilities staff, gas and electric meters listed under the same meter type but given different descriptions in SAP may be grouped correctly. The legacy practice is for Utilities staff to use the various manufacturers' descriptions for the same meter type; however, this practice is not effective because it causes an inconsistency in the meter type description across the same meter type. Meter type should have one description and be grouped together based on similar attributes but segregated based on key differences. We identified the following discrepancies:

- The same meter type/number had various different meter descriptions, causing inconsistencies in the meter data.

- The same meter type issued for more than one meter type number, causing the master information for individual meter types to be separated.

- The reuse of a meter type/number when a new meter type/number should have been created, causing the comingling of meter master files and incorrectly changing meter prices.

Comingled meter types in master meter records caused incorrect pricing and meter data

As a result of the Utilities Department not clearly defining and organizing meters by type and allowing the use of different descriptions for the same meter type, Purchasing sometimes comingled meter data in the master records when procuring meters. This has caused changes and inconsistencies in the purchasing data, including information on purchases and vendor, inventory, and pricing and accounting information that are essential for data analysis and purchasing cost control.

Comingling information of different meters types changes the original meter type information, the average moving price, and key historical information. The change in the average moving price is particularly important because when Utilities takes a meter out of inventory, Stores Inventory charges at the current average moving price stated in SAP, which should be close to the price that the City actually paid for the meter.

In Exhibit 6, 13 of the 60 material types had a price difference of plus or minus 10 percent between the average moving price and the purchase price. We were unable to analyze 9 electric meter types due to the lack of purchase price information.

EXHIBIT 6: Meter Types With Different Average Moving Prices

Meter Type	Average Moving Price	Purchase Price	Price Difference	% Difference
WATER *				
5/8" x 3/4"	$164	$59	**$105**	178%
3/4" x 1"	$80	$91	**($11)**	(12%)
1"	$214	$142	**$72**	50%
GAS				
250 House	$81	$73	**$8**	11%
ELECTRIC				
12S	$55	$484	**($429)**	(89%)
12SAMR	$120	$313	**($193)**	(62%)
2S320CL	$80	$27	**$53**	194%
5SKVARH	$484	$674	**($324)**	(28%)
9SAMR	$350	$674	**($324)**	(48%)
16S	$109	$484	**($375)**	(78%)
2SAMI	$700	$110	**$590**	536%
12SAMI	$0	$135	**($135)**	(100%)
* The 3 water meter types listed were comingled as a result of the E-meter purchase identified in Appendix A: Case Study 1.				

SOURCE: Auditor's analysis of prices in SAP Material Management and Purchasing modules

We were unable to determine the actual financial impact of the average moving prices due to unknown variables, such as how many meters were in inventory and issued out of inventory at what average moving price at a point in time. Exhibit 6 represents SAP's calculated average moving price compared to an analysis of selected purchase prices available in SAP purchase order documents.

SAP offers guidance stating that master data files require a significant amount of understanding, not only on the part of the SAP consultant but also on the part of the SAP customer. The master is not just a single file but a number of tables of information that, combined, reflect all of the information for that meter type; it is used throughout the SAP system. "Errors made in the Material Master can have serious effects on other functionalities. Any change should be carefully considered before you make it and should be audited after it is made."[2] It is important that master files for meters are accurately maintained and effectively organized.

Ineffective use of meter type and badge number to uniquely identify all utility meters

The meter type is not only important for organizing meters, it is also one of the key elements in making a meter uniquely identifiable. A meter is individually identified when it is assigned a meter type number and a badge number at the beginning of the process. A badge number is a City-assigned number and is required to be stamped or affixed on the meter. The badge number is issued when the meter is procured and registered to the meter when received into Stores inventory. This process starts the tracking of each individual meter, in SAP and physically, until its retirement.

Some Utilities Department staff did not have a clear understanding of the use, intended purpose, or importance of assigning an identifier to each meter. According to Utilities staff, the badge number concept was originally established so field technicians could informally determine the age of a meter for replacement when on-site. Our assessment determined that this concept was ineffective and was applied inconsistently.

The meter shops were responsible for assigning the badge numbers; however, we determined that the responsibility should be in Purchasing. Purchasing is the work area responsible for maintaining the master file for meters and procuring approved meters. Both areas of responsibilities are inherently connected to the process for assigning the meter type and

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[2] Material Management with SAP ERP – Functionality and Technical Configuration, Third Edition, 2011

badge number to meters. Also by working closely with Stores inventory, Purchasing can ensure that meters are delivered in compliance with the procurement requirements and that all meters are received into the warehouse to begin physical inventory tracking. Assigning the responsibility to the meter shops created work and manual processes that caused errors, unnecessary work, and inefficiencies.

The following are some areas where we found the assigning of badge numbers to be ineffective:

- Badge numbers were requested by Purchasing, manually assigned by meter shop staff and communicated to Purchasing by email, and later entered into SAP by different meter shop staff. This manual process was unnecessary and created errors in the transfer of information.

- Meters were not uniquely identifiable by the badge number; electric, gas, and water may each have the same badge numbers. Due to the reliance on the meter type and badge number combination for individual identification, this further emphasizes the need to effectively organize meters by their types.

- Issuing badge numbers using a numbering range to determine the replacement of a meter based on age was ineffective because:

  ➢ With each passing year, the sequential badge numbering should change in range for a rolling replacement period; however, the numbering information was not used to determine this.

  ➢ Badge numbers for electric meters were not assigned in a sequential order.

  ➢ Meters were not stocked into or issued out of inventory, nor installed, based on first-in-first-out or lowest badge number.

- Not all meters were purchased and identified with the necessary meter type and badge number combination on the purchase order.

- Some badge numbers were erroneously assigned in duplicate for the same type of meter, and later corrected when identified by the meter shop staff, the manufacturer, or Stores staff upon delivery.

- Some badge numbers were skipped and unaccounted for in the sequential numbering order: 173 water, 10 gas, and an unknown number of electric meters because the Electric Shop did not sequentially assign badge numbers.

- Not every meter had a badge number affixed to it; a workaround process allowed meters to be purchased and delivered without the

badge number affixed. When this occurred, Utilities staff should have but did not manually affix the badge number to the meter immediately, making the meter more susceptible to potential misplacement, loss, or theft.

Inefficiencies and rework increases operating costs

An effective internal control process holds key areas responsible for understanding and complying with the policy and procedures assigned. The controls help to avoid workflow breakdown, mitigate inefficiencies, and stop the compounding effects of errors that can affect operating revenues and expenses.

The case studies in Appendices A and B show how the correction of errors and inefficiencies directly affects the cost of operations. Exhibit 7 shows other examples of direct and indirect impacts, including:

EXHIBIT 7: Risks and Potential Impacts as a Result of Meter Errors and Inefficiencies

Control Area	Risk if Control not in Place	Potential Output Results	Potential Financial Result*
Engineering determines meter type approval; Purchasing enters meter type and description; Operations manages meter inventory and meter installation	**Meter is recorded as one size or type of meter but a different meter is installed**	Incorrect billing	Increases or decreases revenue
Purchasing assigns meter type and badge number to all meters procured; Stores Inventory receives all meter orders into inventory	**Meter is not uniquely identifiable and is not traceable, in SAP or physically**	Incorrect billing	Increases or decreases revenue
Engineering approval and recommendation of meter purchase or sole source; Purchasing procurement of meters	**Meter data is not organized effectively for analysis and procurement**	Incorrect billing or charge to fund; overpaying for cost of meter	Increases expenses
Engineering, Operations, and Purchasing clearly understand their roles and responsibilities, ensure compliance, and have strong communication with each other	**Processes and procedures are ineffective**	More resources or time to complete the task	Increases expenses
	Errors are made that require rework	More resources or time to correct the errors	Increases expenses
* The actual financial impact will be determined in a future audit.			

Source: Auditor's risk assessment and analysis

An efficient and effective workflow requires that each work area understand and perform its purpose and function because when everyone does not clearly understand their roles and responsibilities, vulnerabilities

and misunderstandings can develop and cause errors, inefficiencies, and ineffectiveness. The efficiency of operations directly impacts costs – lower costs when operations are efficient and higher costs when operations are inefficient. Controlling costs requires managing both revenue and expenses, such as ensuring that all utility costs are billed correctly to fully capture all revenues and that the operation is operating efficiently to control and minimize costs where possible. Although utility meter management is only one of the many variables affecting the outcome of revenues and expenses, it is one that can be controlled internally and managed effectively and efficiently to protect revenue and control costs.

Finding 1 Recommendations to City Management:

1.1   The Utilities Department should establish written policies and procedures that clearly define roles and responsibilities for managing the City's utility meters. The Utilities Department should coordinate with Engineering, Operations, Purchasing, and Stores Inventory to address:

     a)   Defining individual and cross-functional responsibilities for setting up, procuring, and receiving meters, and training key staff to understand the workflow process and controls.

     b)   The setup, user authorization, and ongoing maintenance of meter material master files.

     c)   The responsibility of assigning badge numbers to meters, ensuring the use of a meter type and badge number combination for the purchase and receipt of all meters. (In conjunction with recommendation 1.4)

1.2   The Engineering Division of the Utilities Department should re-examine and update the City's engineering specifications to explicitly include all utility meter types purchased and used by the City, and make future updates to the specifications as changes occur. Based on these changes, and ongoing, the Engineering Division should work with Purchasing to ensure that meter types established in SAP can be reconciled to an approved list of meters.

1.3   The Utilities Department should review its existing list of utility meter types in the SAP material master list to redefine and reorganize existing and future meter types. This recommendation should be applied if the Utilities Department changes from SAP to another system.

1.4   The Utilities Department should give responsibility to Purchasing for assigning badge numbers to meters and make the process for assigning the numbers more efficient by allowing the technology of SAP to designate an automated badge number at the time of procurement and use the controls built into SAP to mitigate errors resulting from the manual assignment of badge numbers. (After completion of recommendation 1.3)

FINDING 2

The Utilities Department has incomplete, incorrect, and inconsistent meter records, which causes data reliability concerns and increases the risk for incorrect customer billing.

Inconsistent practices and processes between the Electric, Water, and Gas Meter Shops cause incomplete and data reliability concerns. At most, 86 percent of meters were continuously tracked in SAP; and when tracked, meter data contained incorrect, missing or incomplete information. The lack of procedures to prevent errors and the lack of emphasis on maximizing the use of SAP functionality increase the risks for incorrect customer billings. The change to different meters may require a more rigorous testing process to ensure performance expectations are met.
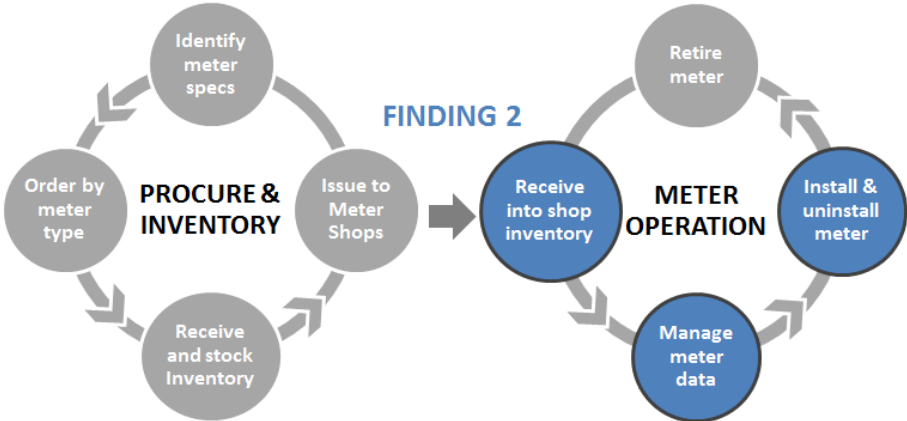
Raw meter data must be maintained and transformed into usable information to maximize its use. Data can inform and support the fundamental utility goals of improved operational efficiency, asset optimization, lowest possible costs, revenue protection, and customer satisfaction. It is important to accurately record and maintain meter data because the information about the meter type, its installation, and what it reads generates the customer bill.

**Data reliability concerns due to incomplete and inconsistent meter records**

In May 2013, as part of the Inventory Management Audit, we identified areas of concern regarding the inventory management of all utility meters. Our concerns included Utilities having a manual inventory management system that could not identify all meters stored at the meter shops, an ineffective and inefficient inventory tracking system, and a lack of safeguarding the meter asset.

Since the Inventory Management Audit, the Utilities Department has made significant efforts to physically reorganize the water meters to a shed location and intends to use that as a model to also reorganize gas and

electric meters. However, effective property management is more than physical inventory; maintenance of adequate property records is a fundamental responsibility.

In conjunction with Finding 1, our in-depth review of meter data in SAP identified data reliability concerns. Based on the information available, Exhibit 8 shows that only 86 percent of meters were continuously tracked in SAP. There are also an unknown number of meters not included in SAP because meters were purchased without the meter type and badge number and were not received into Stores inventory. Even when tracked, meter data contained various discrepancies, incorrect meter descriptions across the individual meter, and missing or incomplete information.

EXHIBIT 8: Incomplete Water, Gas, and Electric Meter Records in SAP
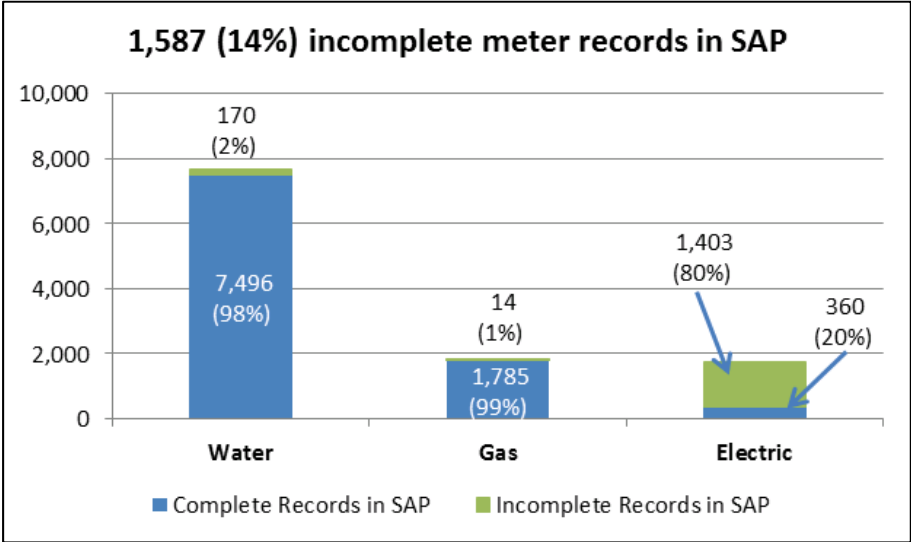

Source: SAP

Inconsistent practices and processes between the Electric and Water and Gas Meter Shops

Other areas of concern specific to recordkeeping practices, processes, and procedures included:

- The Electric Meter Shop's practices and processes were outdated and differed significantly from those of the Water and Gas Shops, causing incomplete and inconsistent meter records:

  ➢ Electric recorded assigned meter badge numbers in blank page books, as shown in Exhibit 9, prenumbering all pages and assigning badge numbers randomly. This practice does not ensure that badge numbers are issued sequentially for effective tracking and reconciliation.

EXHIBIT 9: Electric Meter Shop's Records for Assigning Badge Numbers to Meters
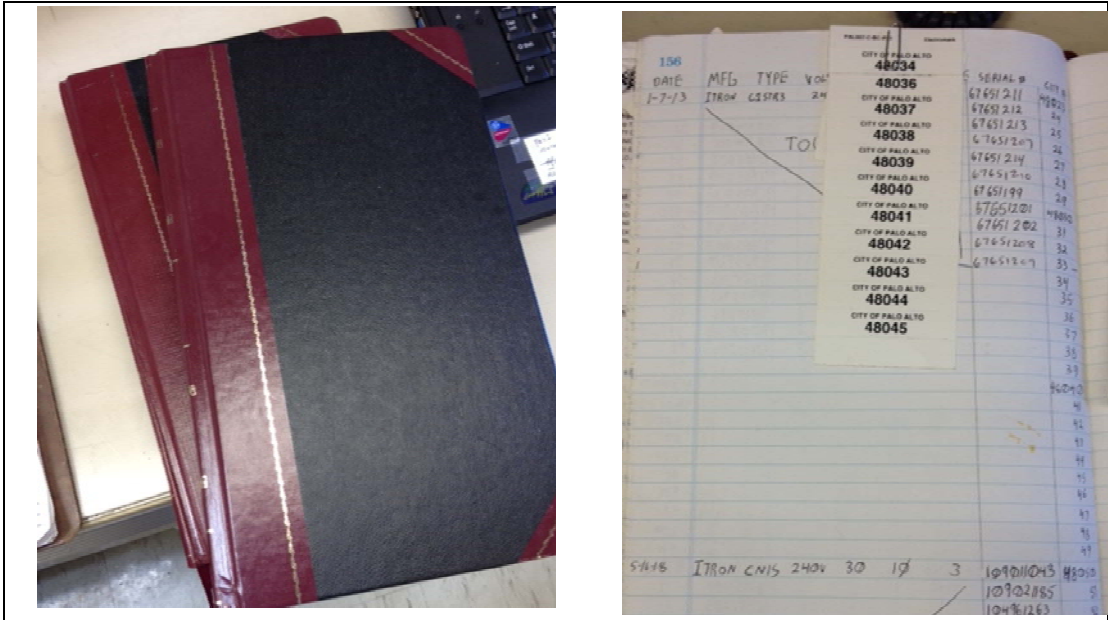
Source: Photographed by Auditor

> ➢ Electric recorded meter testing and retirement information on blank paper logs. The information was subject to handwriting interpretation, and the raw data in this format was not usable for reconciling or analysis. For example, the column labeled "PA#" in Exhibit 10 lists the badge numbers of meters tested and retired, physically and in SAP. If the data were in a computer spreadsheet format, the badge numbers could be sorted, extracted, and entered into an SAP query to verify that they have all been changed in SAP to a retired status.

EXHIBIT 10: Electric Meter Shop's Records for Meter Testing and Retirement

Source: Photographed by Auditor

> ➢ Electric assigned and retired meters one at a time in the SAP system although SAP allows for multiple and automated entries. Although this efficiency was available, the Electric Shop staff were not aware of this option.

> ➢ Most Electric meters were not stored as stock inventory in the Stores Warehouse. As a result, inventory management information is not available in SAP for these meter types and meters.

Insufficient inventory recordkeeping and tracking of meters by the meter shops

Inventory and records management responsibilities transfer from Stores Warehouse and Purchasing to the meter shops when meters are issued out of Stores inventory. The meter shops physically receive and store the meters and manage the tracking of the meters from installation to retirement. We identified the following areas of concern:
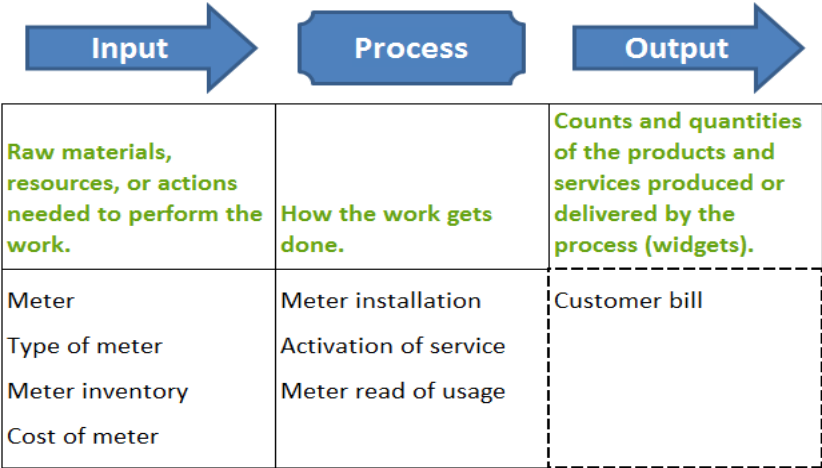
- Physical inventory lists for water and electric meters were incomplete, and the Gas Shop did not have an inventory list. To protect the asset and ensure its proper use, these meters should be inventoried and subject to reconciliation.

- Water, gas, and electric meter records contained inconsistent meter type descriptions across the various SAP modules, which makes it difficult to determine the actual meter type or size. When a meter is being prepared for use, records are generated in other modules of SAP that link to the individual meter. These separate modules do not require that the meter descriptions for an individual meter be the same. Upon review of the discrepancies, Utilities staff were unable to confirm what meters on record in SAP were actually installed; only a physical viewing could determine that.

- Same sizes, but a different type of electric meters, were replaced in a route designated for a specific type of meter because there were no replacement meters in inventory. There were no formal records documenting the service locations where the exchange was made and there were no formal plans to replace the incorrect meter. These meters were not subject to Stores inventory controls. This specific example affected a process downstream; the meter reader had to identify and manually read the meter after discovering missing automatic reading uploads. Meter inventory levels should be managed and stock inventory should available for meter replacement.

- The process for tracking and testing uninstalled, used meters in SAP was inconsistently applied. A work process was developed in SAP to specifically track uninstalled meters; however, it was not used as intended and the physical tracking was incorrect in SAP. Used meters also need to be inventoried and subject to reconciliation and recordkeeping because they may be reinstalled and reused.

Meter data reliability is important because the information can determine accurate or inaccurate billing

The Utilities Department has not been preventive in accounting for and managing utility meters due to a lack of emphasis on the importance of using the SAP system to ensure complete and reliable meter data and to maximize the City's SAP investment. Utilities staff acknowledged that SAP is the cornerstone of the City's business continuity, including its integration functionalities; however, staff at all levels of the organization have not been trained to use and understand the capabilities of SAP to support their workflow processes. Rather than preventing data errors and inconsistencies, the Utilities Department has developed a reliance on manual controls and processes downstream to identify billing inaccuracies resulting from incomplete or unreliable data.

The utility meter, meter type, meter installation, and meter reading all contribute to the output of a customer bill; therefore, integration of the core businesses and utilities modules in the SAP system is critical to maintain the consistency and integrity of meter data and ensure data reliability. Exhibit 11 illustrates that the meter, its type and inventory, how it is installed, and how it is executed generates the output of a customer bill.

EXHIBIT 11: Input and Output Diagram for Meters

Input	Process	Output
Raw materials, resources, or actions needed to perform the work.	How the work gets done.	Counts and quantities of the products and services produced or delivered by the process (widgets).
Meter Type of meter Meter inventory Cost of meter	Meter installation Activation of service Meter read of usage	Customer bill

Source: Auditor analysis

Although the "output" of this flowchart, accuracy of utility customer bills, will be addressed in a future audit, it is identified in this audit to indicate that the risk of incorrect billing exists and may be directly caused by incorrect meter records of inventory or installation, and the lack of system integration in SAP to control meter information.

Errors should be mitigated and avoided through effective processes and procedures (preventive) because errors that have to be corrected after-the-fact (reactive) create unnecessary work and can result in incorrect

billings. The two examples below demonstrate the effect on customer bills:

- In February 2014, a meter reader on one of the City's routes identified incorrect billings to 115 water customers. A 1-inch meter was installed, but SAP records and the billing showed a 5/8-inch meter. Water utility customers pay a service charge based on the size of the meter; therefore, an incorrect meter size causes an incorrect billing.

  Exhibit 12 lists the differences in billing between the two sizes, dated back to the installation date in 1995, to show the full cost; however, the entire amount will not be cost recoverable. The undercharge to customers resulted in an estimated $52,000 loss in revenue; the Utilities Department expects to recover $43,000 through a back bill to customers. The meter data migrated from a legacy system and the error would not have been detected by reviewing the records in SAP; only a physical viewing would show it.

EXHIBIT 12: Billing Error for 115 Water Customers

Rate Effective Date	Monthly Service charge		Number of Months	Difference in rate per customer		115 Affected Customers
1 Meter Route of 209 Service Locations **Service Charge - Per Month, Per Customer**						
	5/8"	**1"**				
7/1/95 – 6/30/99	$4.00	$4.50	48	**$24.00**		**$2,760.00**
7/1/99 – 6/30/03	$5.00	$5.63	48	**$30.24**		**$3,477.60**
7/1/03 – 6/30/07	Service charge incorporated into usage rate.					n/a
7/1/07 – 9/30/11	$5.00	$6.50	51	**$76.50**		**$8,797.50**
10/1/11 – 6/30/12	$10.00	$13.00	9	**$27.00**		**$3,105.00***
7/1/12 – 6/30/13	$13.74	$27.35	12	**$163.32**		**$18,781.80***
7/1/13 – 6/30/14	$14.67	$29.18	12	**$174.12**		**$20,023.80***
Total Revenue Loss:				**$495.18**		**$56,945.70**
*The Utilities Department Rules and Regulations 11 states, "Where a Customer has been undercharged or overcharged for metered service, the retroactive billing adjustment (back bill or refund) shall not exceed three years." The back bill is estimated to be $43,000.						

Source: Auditor analysis from Utilities Rate, Rules and Regulations

The amount of time that passed before Utilities staff discovered this error emphasizes the importance of having accurate data, whether it is new data being entered into the SAP system or data being carried over from a legacy system.

- In a similar example, the Water Meter Shop discovered a misidentified meter during a meter exchange In April 2014. A 1-inch meter was installed at a customer location; but the meter recorded in SAP was a 5/8-inch meter. The customer was underbilled based on the incorrect

SAP record. Although Utilities identified the meter error and physically exchanged it, as of November 2014, Utilities staff had not corrected the 5/8-inch meter to a 1-inch E-meter in SAP or made the billing.

Exhibit 13 shows the meter record in SAP that caused the incorrect billing and the exchanged meter. The meter migrated from the legacy system and was installed in 1992. This error would not have been detected by reviewing the records in SAP; only a physical viewing. This example is concerning because secondary controls were ineffective in correcting the error and the meter was replaced with an E-meter containing inconsistent meter descriptions.

EXHIBIT 13: Input and Output Diagram for Meters

Date	* In PA #	In Read	Size	* Out PA #	Out Read	Size	Comments
4/22/2014	58121	0	1"	**32640**	**7945**	**1"**	CIP, found 1", not 5/8" as in system.
							The meter shop uninstalled the 5/8 x 3/4 inch size meter and replaced it with a 1" E-meter.

Material	Serial number	SysSt...	UserSt...	Install. date	Description of technical object	Device category description	Material Description	Construc. type desc.
028000	32640	ESTO	RETI	03/12/1992	Meter, Water Disp 5/8"x 3/4"	Meter WT 5/8" X 3/4"	Meter WT 5/8 X 3/4 (See 28800)	
028802	58121	INST	INST	04/22/2014	Meter WT 1 E-METER	Meter, WT 1" E-Series	Meter WT 1 E-METER	Meter WT 1

* PA # is the same as badge number; "In" refers to installed and "Out" refers to uninstalled.
Source: Water Meter Shop's daily work log and SAP report

According to ASTM International Standards, "entities should maintain adequate records accountability systems for property under its (sic) control, physically or electronically, to confirm the existence, location, and quantity of assets. A key element in the asset management process is that the system provides data that may be used for the accountability, planning, and execution of the asset."[3]

Changing meters and rising costs may require a more rigorous testing and warranty tracking process

The City's meters are accuracy and performance based, meaning they are bid with the expectation that the meter will meet or exceed the accuracy and performance requirements stated in the engineering specifications. Meter testing and its records, whether by the manufacturer or by the Utilities Department, should be managed to ensure that the performance expectations are met, to provide assurance that the customer's final meter bill will be accurate, and to use the warranties and guarantees as necessary.

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[3] ASTM International provides a global forum for the development and publication of international voluntary consensus standards for materials, products, systems and services. The information cited is from the Standard Practice for Establishing the Guiding Principles of Property Management (E2279-09) and Standard Practice for Inventory Verification: Electronic and Physical Inventory of Assets (E2132-11).

- The Utilities Department requires and depends on the manufacturer to provide certified meter test results. It is advantageous to transfer these results to a database to establish the complete history of a meter. Although this information is available, the Utilities Department has not used it in combination with its own operational testing to make informed decisions about current and future meter performance and replacement needs.

- In May 2013, the water meter test bench was not fully operable and was not repaired or replaced by the end of our audit field work. Utilities' practice is to sample test a percentage of new water meters, customer requested testing, and retired meters to keep on record to support final billing. During this period, some testing was outsourced, while others were not tested prior to discarding. Consisent meter testing and recordkeeping of meter test results are important to validate and document meter performance and accuracy.

- The Manufacturers supplying the meter are required to furnish an affidavit of compliance and testing records, and the City reserves the right to evaluate and test any meter for approval or rejection within a warranty period. However, neither Purchasing nor Utilities obtained Affidavits of Compliance. They also did not track or consider warranty and guarantee information and cited incorrect or outdated engineering specifications in the purchase order. Warranties and guarantees protect the City's asset and allow for replacement, recovery, or legal remedy if the expectations are not met.

The purchase cost of meters has increased due to the change from bronze water meters to E-meters. The Utilities Department's practice is to discard meters that are smaller than 3" after use. However, based on an estimated 123 percent increase, shown in Exhibit 14, this practice should be further assessed. These costs may continue to increase as a modified, automatic meter reading type of E-meter is introduced, and according to Utilities staff, the E-meter may have a shorter useful life due to its battery life.

EXHIBIT 14: 123 Percent Increase in Costs for E-meters

Water Meter Size	Old Meter (Cost/Meter)	New E-meter (Cost/Meter)	Previous meters purchased over 5 yrs	Cost of previous meters over 5 yrs	Cost of New E-meters over 5 yrs
5/8"	$59.27	$164.48	5,578	**$330,608**	**$917,469**
3/4"	$91.17	$195.37	56	**$5,106**	**$10,941**
1"	$142.46	$213.97	900	**$128,214**	**$192,573**
1-1/2"	$307.97	$493.45	173	**$53,279**	**$85,367**
2"	$430.32	$660.38	171	**$73,585**	**$112,925**
Total investment of meters smaller than 3":				**$590,792**	**$1,319,275**

Source: Auditor's analysis based on SAP meter records of cost and quantities purchased.

Exhibit 15 shows that the actual costs of water and electric meters purchased in fiscal years 2013 and 2014 increased by 97 percent and 197 percent, respectively, while Utilities purchased 7 percent fewer water meters and 11 percent more electric meters.

EXHIBIT 15: Increases in Meter Costs From FY 2013 to FY 2014
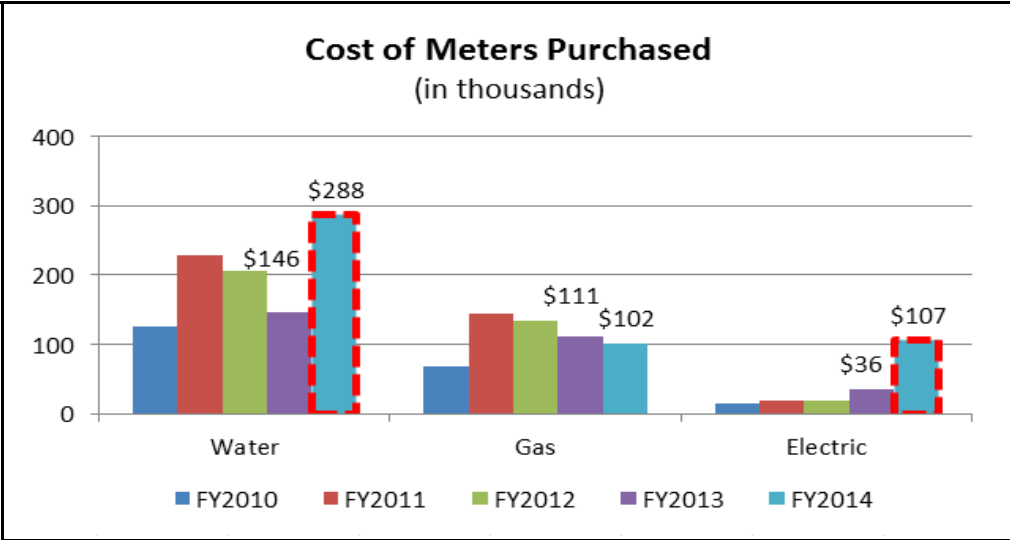
Source: Auditor's analysis based on SAP meter records of cost and quantities purchased

A utility meter, like any other mechanical device, is subject to wear and deterioration and loses its peak efficiency over time. According to the AWWA, the only way to determine if a specific meter is operating efficiently is to test it.[4]

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[4] The American Water Works Association is the authoritative resource for securing economy and uniformity in the operations of water-works. The information cited is from the Manual of Water Supply Practices (M6-Fifth Edition), Water Meters – Selection, Installation, Testing, and Maintenance.

The importance of testing meters, to support accurate billings to customers, is to:

- Ensure that meters are operating as intended, including meeting their life expectency, security, accuracy, and reliability requirements.

- Ensure that meters continually perform under actual conditions by periodically reviewing and analyzing operational meter testing records.

- Maintain the test record of retired meters for final billing inquiries.

- Optimize the City's investment in meters by considering the manufacturer's warranty and guaranty.

Finding 2 Recommendations to City Management:

2.1 The Utilities Department should establish a policy for meter inventory error tolerance and, based on this metric, develop a plan to identify high-risk meters, verify the accuracy of these meters, and correct accordingly.

2.2 The Utilities Department should provide process and SAP training to staff involved in meter activities on the policies, processes, and procedures for physically and electronically maintaining meter data accuracy.

2.3 The Utilities Department should work with the Administrative Services Department and the Information Technology Department to integrate the various SAP modules to automate controls or implement other appropriate processes to ensure that meter descriptions carry through from procurement to retirement.

2.4 The Utilities Department should take corrective action to address the 115 incorrect water billings by notifying customers of the error and that future billings will reflect the correction, and recover revenues to the City of approximately $43,000. The Utilities Department should also establish a policy and procedure for the immediate correction of future errors identified.

2.5 The Purchasing Division should correct the purchase order documents to accurately reflect the engineering specifications.

2.6 The Purchasing Division should ensure that bidder's Affidavits of Compliance are received and documented. (after completion of recommendation 2.7)

2.7 The Utilities Department should establish responsibility for:

a) Determining and ensuring that meter testing is appropriately and consistently performed.
b) Testing and analyzing the test results of meters for compliance with performance specifications.
c) Analyzing meter test data to determine if use of the manufacturer's guaranty and warranty is needed.

2.8 The Utilities Department should reassess and develop a maintenance and replacement plan for all electronic meters.

FINDING 3

The Utilities Department inaccurately reported the retirement of meters, which affected their value in the City's accounting records.

The Utilities Department did not retire electric meters for over a year and gas meters for over six months; and when meters were reported for retirement, the reporting was inaccurate. Combined with a myriad of inconsistencies and inaccuracies, retired meters were underreported, which affected their value in the City's accounting records.
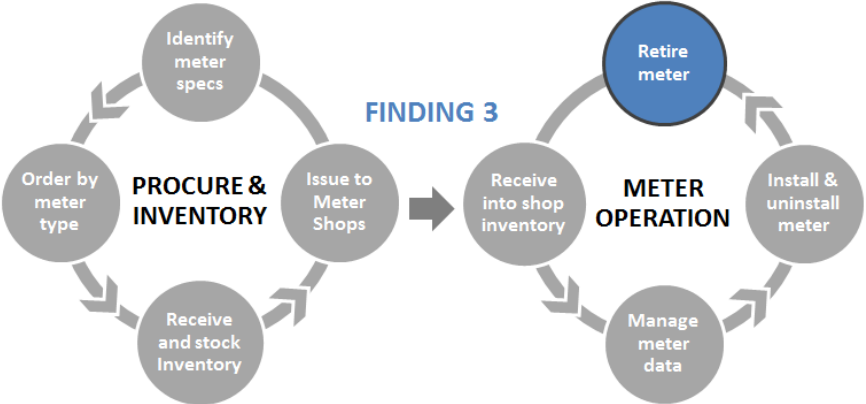
The end of a workflow process can often reveal the efficiency and effectiveness of processes and identify vulnerabilities in a specific work area. It offers the opportunity to reconcile and determine if the purpose and goal of the workflow was achieved. Errors made at the beginning of a process often continue throughout the entire process and may reveal themselves at the end. This is true for meters.

Errors and discrepancies with meter asset processes, reporting, and retirement

Some of the concerns discussed in Findings 1 and 2, such as the lack of defined policies and procedures, not effectively categorizing meter types in SAP, not identifying all meters with the meter type and badge number combination, using manual processes, and not fully utilizing the integrated SAP system are further supported as the meters are retired.

The Utilities Department did not have formal policies or procedures, but in practice, used both manual and automated processes for meter retirement. The two steps to fully retire a meter include:

1) The technical retirement in the SAP system for inventory and asset management purposes.

2) The physical retirement, which is the recycling or scrapping of the meter.

Exhibit 16 shows the most significant results of our reconciliation of meters retired over the past five years.

Exhibit 16: Results of Meter Retirement Data Reconciliation and the Causes

Retirement Reconciliation Result	Cause From Findings 1 and 2
133 meters were physically but not technically retired because the meter badge number did not exist or there was not a meter record in SAP.	Meter was not entered into the SAP system or the identifying meter number was not a City-assigned badge number.
3,644 meters were not retired in the same year as reported by the meter shops.	Lack of clear procedures requiring that reporting of meter retirement be completed timely and coordinated with Accounting's fixed asset retirement schedule.
710 meters were retired twice, using the same badge number, in two different years.	Manual processes, lack of reconciliation, retirement systems in SAP not integrated.
933 meters were reported to Accounting for retirement, but not listed on the meter shop's manual report.	Manual processes – processed in SAP, but not recorded on paper.
2,375 meters were listed on the meter shop's manual report, but not reported to Accounting for retirement.	Manual processes – recorded on paper, but not processed in SAP.
850 meters were reported for asset retirement, but Accounting did not retire the asset.	The meter type or quantity for that meter type did not exist in the asset retirement module of SAP.

Source: Auditor's analysis of meter retirement records in SAP

Based on our analysis, if the underreported meters were retired using the City's asset retirement methodology, it would likely result in a financial overstatement of at least $280,000 (3 percent of total meter assets as of June 30, 2014). According to the City's external financial auditor, the overstatement is not a material misstatement. Our calculation considers some assumptions based on inconsistent data and does not attest to the beginning asset balance value or the valuation of meters at the time of addition. The overstatement does not include the calculation of 314 electric meters that we could not reconcile.

Inconsistent and ineffective meter retirement processes

Process: The Utilities Department did not establish a consistent and effective process for the physical and technical retirement of meters, including:

- The three meter shops (water, gas, and electric) each used a different paper-based process to document the meter retirements, which was inconsistently applied and subject to misinterpretation.

- Although the City's fixed asset policy and procedures require the Utilities Department to report the retirement of meters on a quarterly basis to Accounting, the Gas Meter Shop did not report meters that it retired for over six months, and the Electric Meter Shop did not report meters that it retired for over one year.

- The responsibility of reporting meter retirements to Accounting was not coordinated between Utilities staff who perform the physical and technical retirement, causing reporting inaccuracies.

Reporting of retired meters did not reconcile

Reporting: Documentation of retired meters did not reconcile with the retirement report submitted to Accounting. The errors and discrepancies include:

- Physically retired meters that did not exist in the SAP system.

- Duplicate retirement of the same badge number meters in multiple reporting periods or fiscal years.

- Meters reported in a different year than reported as retired in the meter shops.

- Meters reported for retirement in the meter shops documentation but were not reflected in reporting to Accounting, and vice-versa.

- Variance between the number of reported retirements compared to actual number of retirements in Accounting.

- Meter type descriptions were different between the inventory and asset management systems in SAP, which caused incorrect reconciliations of meters retired.

Refund credit of physically retired meters incorrectly processed

Retirement: The physical recycling of meters as a part of the retirement and disposal process were different for each of the meter shops.

- Water recycled to National Meter Automation (NMA), which held water meter recycling funds as a continual credit. Upon instruction from Utilities staff, NMA applied the credits against an invoice to offset the payment due. The recycling credits should have been issued as a check payable to the City and recorded as other revenue, rather than understating expenses.

- Gas and Electric recycled to the City's general recycling bin located at the Municipal Service Center.

- Recycling credits for all three were applied to the General Fund account, in accordance with the City's Municipal Code; however, since the recycling credit stems from Enterprise Fund expenses, the Governmental Accounting, Auditing and Financial Reporting[5] guidance indicates it should be applied to the Enterprise Fund.

Finding 3 Recommendations to City Management:

3.1   The Utilities Department should develop a policy, process, and procedure for the timely and accurate retirement of meters, both physically and in SAP.

3.2   In conjunction with Recommendations 1.3 and 3.1, the Utilities Department should work with Accounting to align meter types when adding and retiring meters in the SAP asset management module. (After completion of recommendation 1.3)

3.3   The Utilities Department should work with the Administrative Services Department to properly coordinate and process for meter recycling credits.

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[5] *Governmental Accounting, Auditing and Financial Reporting (GAAFR)* by the Government Finance Officers Association.

Appendix A – Case Study 1: Meter Management Errors and Inefficiencies

The following example demonstrates the downstream effects of the Utilities Department not having policies and procedures that establish roles and responsibilities and provide guidance and direction for managing meters. Specifically, it shows the effects of incorrectly combining different meter types and not understanding the importance of maintaining master files. This example shows the breakdown of a workflow process that caused errors to 400 meter records, operational inefficiencies, and data reliability concerns. Time spent to correct errors and compounding inefficiencies increase operating costs.

The Utilities Engineering Division submitted incorrect changes to Purchasing

In July 2013, Utilities Engineering Division submitted changes to replace the master file for an existing meter type, bronze water meter to a new water E-meter, rather than add it as a new meter type.

The form was marked as a request for Revision rather than Addition.

The price for a 5/8" x 3/4" E-meter was estimated at $151.25, while the average moving price of a 5/8" x 3/4" bronze water meter was $57.77.

Based on "Revision to Existing Stock," direction was given to deplete remaining stock of the existing 5/8" x 3/4" water meters and then replace the existing stock with the 5/8" x 3/4" E-meters.

The Stock No. is the meter type/number in SAP. Revisions to an existing material master with a different material type may irreversibly corrupt and distort the master data for previous meters that were set up for that specific material and are still in use.

Engineering specifications lacked the guidance for Purchasing to understand that there was a difference between the existing 5/8 x 3/4-inch bronze water meter and the 5/8 x 3/4-inch E-meter; the specifications simply allowed for the water meter upgrade.

> **2.04. COLD WATER METERS DISPLACEMENT TYPE MAGNETIC DRIVE DESIGN**
>
> **A.   GENERAL**
>
> 1.   Scope
>
>   Water meters shall be of the cold water displacement type and shall comply with American Water Works Association Standard C700-latest edition and shall be AMR / AMI ready / deployable for future meter upgrades. These specifications establish a level of quality, performance and workmanship. Compliance with these specifications, along with field performance under actual conditions will be evaluated to determine if a meter is acceptable.
>
>   This specification covers bronze water meters of the following sizes; 5/8 inch by 3/4, 3/4 by 1 inch, 1 inch, 1-1/2 inch, 2 inch.

> The specification allows meter upgrades for Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI); however it does not state that explicitly by meter type.

Engineering updated the Request for Sole Source form to allow procurement of these new 5/8 x 3/4-inch E-meters based on revising the existing material master number.

> **REQUEST FOR SOLE SOURCE OR EXEMPTION FROM COMPETITIVE SOLICITATION**
> (Purchases in excess of $5,000)
>
> **To:** ▮▮▮▮▮▮▮   **Buyer**
>
> **From:** ▮▮▮▮▮▮▮   Utilities / WGW Engineering
>   (Requestor)   (Department/Division)
>
> **Request for the purchase of:** Badger Water Meters: CPA #28000 5/8"X3/4" E WM, CPA #28001 ¾"X1" E WM, CPA #28002 1" E WM, CPA #28003 1-1/2" DISC WM, CPA #28004 2" DISC WM, CPA #28005 2" COMP WM, CPA #28006 2" TURB WM, CPA #28013 3" COMP WM, CPA #28014 4" COMP WM, CPA #28016 6" COMP WM, CPA #28017 3" TURB WM, CPA #28018 4" TURB WM, 6" FSAA-01 WM, 8" FSAA-01 WM.
>
> **Requested supplier/vendor, if known:**   National Meter & Automation, Inc.
> **Vendor Address:**
>   2250 Apollo Way, Suite 300
>   PO Box 8339
>   Santa Rosa, CA 95407
> **Vendor Contact:** ▮▮▮▮▮▮   **Phone:** ▮▮▮▮▮▮
> **Purchase Requisition #:**   Multiple   **Cost Estimate $:**   200,000 per year
>
> **JUSTIFICATION:**
>
>   **Justification must include the following:**
>   1. A description of the unique need that necessitates a sole source purchase, a product standardization request, or other type of exemption from competitive solicitation.
>   2. A statement describing the actions taken by the department during the search for the project or service.
>   3. Any reviews, reports, or specifications prepared by the department during the research for available products or services.
>   4. Expected length of contract.
>
> **PROVIDE YOUR JUSTIFICATION HERE:**

> As an example, meter type number 28000 was established for a 5/8 x 3/4-inch bronze water meter and was identified in purchasing master records as "Displacement Meter, Water Disp 5/8" x 3/4", Cu. Ft. w/o Connections, Bronze Body." However, it is now replaced as a 5/8 x 3/4-inch E meter.

Purchasing Division of the Administrative Services Department should not have processed Utilities Engineering's requested changes:

Purchasing processed the Inventory Stock Request form in SAP without further communication or clarification about why Utilities Engineering was requesting a complete change of the master file. As requested, Purchasing changed the master file description for meter type/number 028000 from "Meter WT 5/8 x 3/4" to "Meter WT 5/8 x 3/4 E-METER" and initiated the purchase of 304 meters. This began the comingling and distortion of information between the two different types of meters.

Unintended changes to the material average moving price

Prior to the change, the net price for the purchase of material number 028000 was consistently priced at about $55; however, the revision to this existing master file with a different material type (the E-meter) produced a change to the "moving price":

a) **Meter WT 5/8 x 3/4 is $59.27** (calculation $14,817.19/250 {Value divided by Quantity})
b) **Meter WT 5/8 x 3/4 E-METER is $164.48** (calculation $50,003.25/304 {Value divided by Quantity})

> Changed the average moving price from $59.27 to $164.48.
> (*Note: The average moving price is the net price plus tax and delivery costs; the sum is the Net Value.*)

Average moving price change caused an overcharge to Utilities for the price of the meter

As a result of the moving price change, the expense charged to Utilities when a meter is issued by Stores Inventory for a water meter under this meter type/number would be at the recalculated moving price, regardless of the price actually paid for the meter. This means, for example, if 50 meters from the second most recent purchase were still in stock after the E-meter purchase, Utilities would be charged the new moving price of $164.48 although the moving price at the time of purchase was only $59.27.

Below is the accounting transaction for the next goods issued transactions subsequent to the moving price change to $164.48. The results were similar for all transactions that followed for this material.

Material		Material Description		CoCd ValA	
Type	DocumentNo Itm Pstng Date		Quantity BUn	Amount in LC Crcy	
028000		Meter WT 5/8 X 3/4 (See 28800)		CPA CPA	
WA	4900050210	1 10/09/2014	10- EA	1,644.84- USD	
WA	4900048541	1 05/06/2014	120- EA	19,738.14- USD	
WA	4900047701	5 02/12/2014	2- EA	328.97- USD	
WA	4900047570	1 01/29/2014	1- EA	164.48- USD	
WA	4900047405	1 01/10/2014	3- EA	493.45- USD	
WA	4900047398	1 01/09/2014	96- EA	15,790.50- USD	
WA	4900047202	1 12/11/2013	16- EA	2,631.75- USD	
WA	4900047169	3 12/09/2013	1- EA	164.48- USD	
WA	4900047087	15 11/27/2013	31- EA	5,099.02- USD	
WA	4900047084	1 11/27/2013	1- EA	164.48- USD	
WA	4900046964	1 11/14/2013	1- EA	164.48- USD	
WA	4900046823	1 10/30/2013	22- EA	3,618.66- USD	
WE	5000028570	1 10/30/2013	304 EA	50,003.25 USD	

Document Overview - Display

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Doc.Type : WA (Goods issue) Normal document
Doc. Number   4900046823   Company code   CPA   Fiscal year   2014
Doc. date   10/30/2013   Posting date   10/30/2013   Period   04
Calculate Tax ☐
Doc.currency   USD

> The overcharge was to Fund 522, which is the Water Fund.

Itm	PK	Account	Account short text	Amount	Funds Ctr	Cost Ctr	Order	WBS element	BusA	Fund	Text
1	99	55020	Stores Inventory	3,618.66-	10900000				ASD	109	Water Meter Shop
2	81	32250	Pipes-Valves-Fitting	3,618.66	20020904	20020904			UTL	522	Water Meter Shop

Neither Utilities nor Purchasing realized that the moving price changed or understood its affects. It was not feasible for us to determine how many goods were issued, overstated transactions occurred, or the value of the overstatement to the charged funds. It is reasonable to have incremental increases in the moving price over time due to inflation or increases in the cost of manufacturing the meter, but unexpected and significant increases should be an indication for concern and review. If pricing errors are not identified and corrected timely, the overcharge error could be significant.

Purchasing and Stores Warehouse staff discovered the error in combining two different meter types into one existing master file when the Stores Warehouse could not issue the meters affected out of inventory. The discovery was reactive to the error it caused rather than preventive. Errors should be mitigated and avoided through effective processes and procedures (preventive) because errors that have to be corrected after-the-fact (reactive) create unnecessary work.

This specific example depicts only one meter type, the 5/8 x 3/4-inch water meter, which affected 304 meter records; however this occurred with two other water meter types, affecting another 96 meter records.

The Engineering Division corrected and resubmitted the request

Six months after becoming aware of the problem caused by revising the master file description for an existing meter type instead of creating a new meter type, Engineering corrected the forms requesting that Purchasing delete (discontinue) the purchase and inventory of meter type/number 028000 and add the new 028800 meter type/number for the E-meter.

The incorrect changes made to the material master caused errors to 400 water meter records

When Stores and Purchasing staff identified the error, 400 E-meters had been purchased under three existing meter types/numbers and meter information was comingled, which creatied inconsistencies and inaccuracies in the inventory management records. The newly created meter type/number is 028800 for a 5/8" x 3/4" E-meter and 028802 for a 1" E-meter; however, despite the efforts to correct the error, meter type/number and description records remain incorrect and inconsistent across the various modules in SAP.

The same meter type should all have the same meter type number, and each individual meter should have the same description across all description fields in SAP for that meter. The E-meters identified in this example do not have the same meter type number for their meter type and do not have the same description across all description fields.

In the following SAP screen shot, the discrepancies and inconsistencies for the same range of meter badge numbers were caused by the original incorrect transaction. Multiple attempts to correct the error were not successful.

Original Report printed on June 9, 2014)

Serial ▾	System s ▾	User Status ▾	Material ▾	Device category description ▾	Description of technical object ▾	Material Description ▾	Construc. type desc. ▾
57787	AVLB	AVLB	028000	Meter WT 5/8" X 3/4"	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4	
57788	AVLB	AVLB	028000	Meter WT 5/8" X 3/4"	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4	
57789	AVLB	AVLB	028000	Meter WT 5/8" X 3/4"	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4	
57790	AVLB	AVLB	028000	Meter WT 5/8" X 3/4"	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4	
57791	INST	INST	028000	Meter WT 5/8" X 3/4"	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4	
57792	INST	INST	028000	Meter WT 5/8" X 3/4" E-Series	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4
57793	INST	INST	028000	Meter WT 5/8" X 3/4" E-Series	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4
57794	INST	INST	028000	Meter WT 5/8" X 3/4" E-Series	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4
57795	INST	INST	028000	Meter WT 5/8" X 3/4"	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4	
57796	INST	INST	028000	Meter WT 5/8" X 3/4" E-Series	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4
57797	INST	INST	028000	Meter WT 5/8" X 3/4" E-Series	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4
57798	INST	INST	028000	Meter WT 5/8" X 3/4"	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4	
57799	INST	INST	028000	Meter WT 5/8" X 3/4"	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4	
57800	INST	INST	028000	Meter WT 5/8" X 3/4"	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4	
					Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4

Originally created under #028000, the corrections to change it to #028800 only fixed the meter type number for some of the meters; the data shows both the old and the inconsistently changed meter type numbers.

The errors and corrections created the various discrepancies and inconsistencies in meter description for the same meter.

(Report printed on November 4, 2014)

Material	Serial number	SysSt...	UserSt...	Device category description	Install. date	Description of technical object	Material Description	Construc. type desc.
028000	57787	INST	INST	Meter WT 5/8" X 3/4"	08/19/2014	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)	Meter WT 5/8 X 3/4 (See 28800)
028000	57788	INST	INST	Meter WT 5/8" X 3/4"	08/21/2014	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)	Meter WT 5/8 X 3/4 (See 28800)
028000	57789	AVLB	AVLB	Meter WT 5/8" X 3/4"		Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)	Meter WT 5/8 X 3/4 (See 28800)
028000	57790	INST	INST	Meter WT 5/8" X 3/4"	08/21/2014	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)	Meter WT 5/8 X 3/4 (See 28800)
028000	57791	INST	INST	Meter WT 5/8" X 3/4"	12/12/2013	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)	Meter WT 5/8 X 3/4 (See 28800)
028800	57792	INST	INST	Meter WT 5/8" X 3/4" E-Series	12/12/2013	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)
028800	57793	INST	INST	Meter WT 5/8" X 3/4" E-Series	12/12/2013	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)
028800	57794	INST	INST	Meter WT 5/8" X 3/4" E-Series	12/12/2013	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)
028000	57795	INST	INST	Meter WT 5/8" X 3/4"	12/12/2013	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)	Meter WT 5/8 X 3/4 (See 28800)
028000	57796	INST	INST	Meter WT 5/8" X 3/4" E-Series	12/12/2013	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)
028800	57797	INST	INST	Meter WT 5/8" X 3/4" E-Series	12/12/2013	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)
028000	57798	INST	INST	Meter WT 5/8" X 3/4"	12/12/2013	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)	Meter WT 5/8 X 3/4 (See 28800)
028000	57799	INST	INST	Meter WT 5/8" X 3/4"	12/12/2013	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)	Meter WT 5/8 X 3/4 (See 28800)
028000					12/12/2013	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)	Meter WT 5/8 X 3/4 (See 28800)
028000					12/12/2013	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)
028000					12/12/		8 X 3/4 E-METER	Meter WT 5/8 X 3/4 (See 28800)
028000					10/27/		8 X 3/4 (See 28800)	Meter WT 5/8 X 3/4 (See 28800)
028000					10/27/		8 X 3/4 (See 28800)	Meter WT 5/8 X 3/4 (See 28800)
028000					10/29/		8 X 3/4 (See 28800)	Meter WT 5/8 X 3/4 (See 28800)

Discrepancies based on how the meter description is selected when installed.

Discrepancies resulting from two different attempts to correct the meter description.

(Report printed on November 12, 2014)

Material	Serial number	Install. date	Device category description	Description of technical object	Material Description	Construc. type desc.
028800	57787	08/19/2014	Meter WT 5/8" X 3/4" E-Series	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4
028800	57788	08/21/2014	Meter WT 5/8" X 3/4" E-Series	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4
028800	57789		Meter WT 5/8" X 3/4" E-Series	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER
028800	57790	08/21/2014	Meter WT 5/8" X 3/4" E-Series	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4
028800	57791	12/12/2013	Meter WT 5/8" X 3/4" E-Series	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4 E-METER	Meter WT 5/8 X 3/4

Meter type number remains inconsistent with Purchase Order.

Another attempt to correct the meter description did not correct all the descriptions within the range of affected badge numbers.

General	Vendor		

Document Date 10/30/2013
Posting Date 10/30/2013   Vendor
☐ Individual S...   HeaderText

Line	Purchase Order	Item	Material	Mat. Short Text	PO Quan...	Received	Qty in UnE	E...	D...	Requisitioner	Unloading Po...
1	4514000126	10	028000	Meter WT 5/8 X 3/4 E-METER	304	304	304	EA	☑	MSC Planner	

<u>Meter data discrepancies and inaccuracies created data reliability concerns</u>

Utilities Operations Division did not identify the meter data description discrepancies in SAP and proceeded to install these E-meters. As of November 5, 2014, 394 of the 400 E-meters had been installed to a service location.

In this instance, we were certain that these 400 meters were E-meters and were, therefore, able to isolate the errors. The concern, however, is that meter inventory records are inconsistent and incorrect and may not accurately reflect what meter type or size is actually assigned to the individual meter nor what meter type or size is actually installed at the service location.

Appendix B – Case Study 2: Missing, Incorrect, and Inconsistent Meter Records

The following example demonstrates the effect of what happens to inventory records when roles and responsibilities are not well understood, procedures are not enforced, or when processes are bypassed.

Utilities bypassed processes and lost physical control and continuous traceability of meters

In November 2013, the Water Meter Shop assigned badge numbers for the procurement of 3" compound water meters for a replacement project, badge numbers (58191-58213), meter information (meter type number 28013 for 3"C), and quantity (23). The information was discussed between Utilities staff in the Water Meter Shop and Operations.

Date	Manufacturer	MM #	PA # Sequence	Meter Size	Qty	Ordered by	Remarks	Processed in SAP
10/25/2013	Badger	28000	58174 – 58180	5/8"	7	Svc1	n/a	10/25/13 - Svc1
11/4/2013	Badger	28014	58181 – 58190	4"C	10	270	Replacement Project	11/13/13 - Svc1
11/4/2013	Badger	28013	58191 – 58213	3"C	23	270	Replacement Project	11/13/13 - Svc1
11/4/2013	Badger	28016	58214 – 58216	6"C	3	270	Replacement Project	11/13/13 - Svc1

Utilities staff completed a purchase requisition for Purchasing to procure the meters without identifying the required meter type and badge numbers. Purchasing processed the order in SAP, with an anticipated delivery date of January 2, 2014, without requiring Utilities to cite the meter type and badge numbers.

| Standard PO | ▼ | 4514000336 | Vendor | 104604 NATIONAL METER & AU… | Doc. date | 11/07/2013 |

S..	Itm	A	I	Material	Short Text	Matl Group	PO Quantity	O...	Deliv. Date	Net Price	Curr...	Per
	10	F			4 "compund series w/tes…	Manhole Co…	10	EA	01/02/2014	2,562.00	USD	1
	20	F			RTR(electronic)register o…	Manhole Co…	10	EA	01/02/2014	162.75	USD	1
	30	F			100WP Itron ERT	Manhole Co…	20	EA	01/02/2014	94.00	USD	1
	40	F			4" plate strainers with st…	Manhole Co…	10	EA	01/02/2014	611.10	USD	1
	50	F			6" compound series w/t…	Manhole Co…	3	EA	01/02/2014	3,990.00	USD	1
	60	F			RTR (electronic) register …	Manhole Co…	3	EA	01/02/2014	162.75	USD	1
	70	F			100 WP Itron ERT	Manhole Co…	6	EA	01/02/2014	94.00	USD	1
	80	F			6" Plate Strainers w stud…	Manhole Co…	3	EA	01/02/2014	891.45	USD	1
	90	F			3" Compound Serries w …	Manhole Co…	23	EA	01/02/2014	1,811.25	USD	1
	100	F			RTR (electronic) register …	Manhole Co…	23	EA	01/02/2014	162.75	USD	1
	110	F			100 WP Itron ERT	Manhole Co…	46	EA	01/02/2014	94.00	USD	1
	120	F			3" Plate Strainers w stud…	Manhole Co…	23	EA	01/02/2014	471.45	USD	1
	130	K			6" fire service meter asse…	Manhole Co…	1	EA	06/27/2014	9,799.60	USD	1
	140	K			8" fire service mete asse…	Manhole Co…	1	EA	06/27/2014	13,336.56	USD	1

When delivered, Stores Warehouse staff checked the meters for the meter type and badge numbers. If the information is not present, the material cannot be received into inventory and the meters lose traceability. These 23 meters were delivered in two batches, on January 9, 2014, and on March 10, 2014. Due to the missing meter type and badge numbers, Stores could not receive them into inventory and the meters were physically delivered to the Water Meter Shop.

SAP allows materials to be received generically without a meter type or badge number, which is what happened in this example. The concern, specific to meters, is that if they are received generically into SAP, the meter type and badge numbers do not get registered to uniquely identify each meter. Without the unique identifier, the meter cannot be tracked to its location even though the meters have been physically received.

The Water Meter Shop was not aware of 23 meters physically received, of which 8 were installed, and SAP records showed a "not-yet received" status.

On June 30, 2014, during a meter count field visit to the Meter Shop, we identified and inquired about a pile of meters on the side of the Meter Shop shed (shown below). The Meter Shop staff, who should be responsible for the physical inventory of meters that are not in Stores inventory, were not aware of what the meters were for or why they were stored there. The Meter Shop staff did not consider the meters as inventory responsible to the Meter Shop. Upon further inquiry, another Meter Shop staff indicated that it might be for a special project.

Photo of the meters on 6/30/14, previously delivered to the side of the meter shed.	Photo of meter serial #58203, identified in the pile of meters.

Upon opening one of the boxes, we identified the meter serial #58203 (shown above) and looked up the meter record in SAP. Although all the meters had been physically received in January or March and 8 of the 23 meters had already been installed into service, the status of meter serial #58203 in SAP was "AVLB" and "PORD," meaning available but not-yet received, or cleared the purchase order and inventory receiving process.

Physically received in January or March, however the status of meter #58203 on June 30, 2014, was "PORD." The status, if received into Stores, should be "ESTO" (in the warehouse) or "AVLB" (in the Meter Shop).

Material	Serial number	Reg. Grp	SysStatus	UserStatus	Install. date	Device category description
028013	58191	WC2R54D	AVLB	AVLB		Meter WT 3"
028013	58192	WC2R54D	AVLB	AVLB		Meter WT 3"
028013	58193	WC2R64...	INST	INST	06/20/2014	Meter WT 3"
028013	58194	WC2R54D	AVLB	AVLB		Meter WT 3"
028013	58195	WC2R54D	AVLB	AVLB		Meter WT 3"
028013	58196	WC2R54D	AVLB	AVLB		Meter WT 3"
028013	58197	WC2R54D	AVLB	AVLB		Meter WT 3"
028013	58198	WC2R54D	AVLB	AVLB		Meter WT 3"
028013	58199	WC2R54D	AVLB	AVLB		Meter WT 3"
028013	58200	WC2R54D	AVLB	AVLB		Meter WT 3"
028013	58201	WC2R54D	AVLB	AVLB		Meter WT 3"
028013	58202	WC2R54D	AVLB	AVLB		Meter WT 3"
028013	58203	WC2R54D	AVLB	AVLB		Meter WT 3"
028013	58204	WC2R64...	INST	INST	01/28/2014	Meter WT 3"
028013	58205	WC2R64...	INST	INST	01/28/2014	Meter WT 3"
028013	58206	WC2R64...	INST	INST	01/29/2014	Meter WT 3"
028013	58207	WC2R64...	INST	INST	06/20/2014	Meter WT 3"
028013	58208	WC2R64...	INST	INST	01/29/2014	Meter WT 3"
028013	58209	WC2R54...	INST	INST	01/29/2014	Meter WT 3"
028013	58210	WC2R54D	AVLB	AVLB		Meter WT 3"
028013	58211	WC2R64...	INST	INST	04/29/2014	Meter WT 3"
028013	58212	WC2R54D	AVLB	AVLB		Meter WT 3"
028013	58213	WC2R54D	AVLB	AVLB		Meter WT 3"

A chronological and continuous tracking of a meter is lost when processes are not followed

The example below is the history screen in SAP for meter serial #58203. The history shows that the Meter Shop received the meter on July 11, 2014, and issued it back out on the same day. Then on August 28, 2014, the Stores warehouse received the meter into inventory. There is no indication that the meter was actually received on March 10, 2013, and the records suggest that the inventory is in the Stores warehouse, even though the physical location was near the Meter Shop. These entries were the attempts to correct the initial problem.

Material	028013	Material Description	Meter WT 3, Compound
Serial number	58203		
Equipment	10090165	Equipment descriptn	Meter WT 3, Compound

▼ ⬜ Serial Number History
- 📦 08/28/2014 5000174704 2014 0003 WE   101 CPA   S
- 📦 07/11/2014 4800060586 2014 0001 WA   Z03 UTL UTL2 H
- 📦 07/11/2014 4800060584 2014 0001 WA   Z01 UTL UTL2 S

🔳 Color Legend   ✕

▼ ⬜ Serial Number History
- 📦 Goods receipt
- 📦 Goods issue

In another illustration, when a meter is not assigned the necessary meter type and badge numbers at procurement and is not registered upon receipt, the chronological and continuous tracking of the meter is lost. The meter record shown below, ordered in the same batch as the previous example and received on March 10, 2014, does not begin traceability until the installation date on April 29, 2014. All prior history of what should have been received into inventory and moved between the storage locations was not captured.

Material	028013	Material Description	Meter WT 3, Compound
Serial number	58211		
Equipment	10090173	Equipment descriptn	Meter WT 3, Compound

▼ ⬜ Serial Number History
- 📦 08/28/2014 5000174704 2014 0003 WE   101 CPA   S
- 📦 04/29/2014 4800059615 2014 0001 WA   Z03 UTL UTL2 H
- 📦 04/29/2014 4800059614 2014 0001 WA   Z01 UTL UTL2 S
- 🔧 04/29/2014 00:00:00   4000073373

🔳 Color Legend   ✕

▼ ⬜ Serial Number History
- 🔧 Installation

Below is an example of a properly received and continuously tracked meter from inventory to installation:

1) The meter was received into Stores inventory on May 13, 2013.
2) Held under the responsibility of Stores, the meter was subject to inventory counting on July 8, 2013.
3) The meter was issued by a reservation request on August 21, 2013, issued out of Stores inventory, received into the Meter Shop inventory, and issued out of the Meter Shop for installation.
4) The meter was installed to a service location on August 23, 2013.

```
▼ 📁 Serial Number History
  · 👥 08/23/2013 00:00:00   4000062214
  · 📦 08/21/2013 4800056388 2013  0001 WA        Z03 UTL  UTL2 H
  · 📦 08/21/2013 4800056387 2013  0001 WA        Z01 UTL  UTL2 S
  · 📦 08/21/2013 4800056367 2013  0001 WA        201 CPA  MSC  H
  · 📦 07/08/2013 4739       019  2014 CPA  MSC  1   07/08/2013
  · 📦 07/08/2013 4739       019  2014 CPA  MSC  1   07/08/2013
  · 📦 05/13/2013 5000156860 2013  0001 WE        101 CPA  MSC  S
```

Once the meter is issued and physically removed from inventory for installation, Utilities staff installs the meter to a service location and activates the meter for service. According to Utilities staff, meters are installed to a service location without verifying the meter information in SAP, which can be another cause for having a different meter on record versus what is actually installed for service.

A key element to the meter management process is that the system provides data that can be used for the accountability, planning, and execution of the meter. When the meter record is incorrect because it does not reflect the meter actually installed, it may result in an incorrect billing to the customer and incorrect revenues to the City.

APPENDIX C – City Manager's Action Summary

The City Manager has agreed to take the following actions in response to the audit recommendations in this report. The City Manager will report progress on implementation six months after the Council accepts the audit report, and every six months thereafter until all recommendations have been implemented.

Recommendation	Responsible Department(s)	Agree, Partially Agree, or Do Not Agree and Target Date and Corrective Action Plan	Status
Finding 1: The Utilities Department has not established adequate processes and procedures for organizing and setting up meters in SAP, causing data discrepancies and errors.			
1.1 The Utilities Department should establish written policies and procedures that clearly define roles and responsibilities for managing the City's utility meters. The Utilities Department should coordinate with Engineering, Operations, Purchasing, and Stores Inventory to address: a) Defining individual and cross-functional responsibilities for setting up, procuring, and receiving meters, and training key staff to understand the workflow process and controls. b) The setup, user authorization, and ongoing maintenance of meter material master files. c) The responsibility of assigning badge numbers to meters, ensuring the use of a meter type and badge number combination for the purchase and receipt of all meters.		**Concurrence: Agree** **Target Date: June 2015** Action Plan: Utilities staff is updating policies and procedures document including outlining roles and responsibilities for organizing and managing utility meters. A – Polices, procedures and role responsibilities are being updated; Utilities will schedule quarterly training sessions for specific workflows. B – Changes in user authorization will be completed by March 2015. C – Utilities and Administrative Services Department (ASD) agree to transfer the responsibility of creating meter badge numbers to Purchasing Division after Utilities completes recommendation 1.3.	
1.2 The Engineering Division of the Utilities Department should re-examine and update the City's engineering specifications to explicitly include all utility meter types purchased and used by the City, and make future updates to the specifications as changes occur. Based on these changes, and		**Concurrence: Partially Agree** **Target Date: June 2015** Action Plan: Engineering specifications are intended to clearly identify the functions and minimum performance requirements that must be satisfied.	

Recommendation	Responsible Department(s)	Agree, Partially Agree, or Do Not Agree and Target Date and Corrective Action Plan	Status
ongoing, the Engineering Division should work with Purchasing to ensure that meter types established in SAP can be reconciled to an approved list of meters.		Engineering will work with Purchasing to ensure that sufficient detailed information is provided so that meter types established in SAP can be reconciled to an approved list of meters.	
1.3 The Utilities Department should review its existing list of utility meter types in the SAP material master list to redefine and reorganize existing and future meter types. This recommendation should be applied if the Utilities Department changes from SAP to another system.		**Concurrence: Agree** **Target Date: June 2015** Action Plan: Utilities will review the existing list of meter types in SAP. Utilities will create, remove or consolidate material master for a specific meter type if required.	
1.4 The Utilities Department should give responsibility to Purchasing for assigning badge numbers to meters and make the process for assigning the numbers more efficient by allowing the technology of SAP to designate an automated badge number at the time of procurement and use the controls built into SAP to mitigate errors resulting from the manual assignment of badge numbers.		**Concurrence: Agree** **Target Date: TBD (pending completion of 1.2 and 1.3 by Utilities)** Action Plan: Utilities and Purchasing have agreed to transfer the responsibility of new badge number creation to Purchasing after Utilities completes recommendation 1.3 including removal/discontinuation of duplicate and obsolete descriptions in SAP for meter master records. Utilities will provide Purchasing training and documentation of the badge creation process.	
Finding 2: The Utilities Department has incomplete, incorrect, and inconsistent meter records, which causes data reliability concerns and increases the risk for incorrect customer billing.			
2.1 The Utilities Department should establish a policy for meter inventory error tolerance and, based on this metric, develop a plan to identify high-risk meters, verify the accuracy of these meters, and correct accordingly.		**Concurrence: Agree** **Target Date: Completed** Action Plan: Utilities already has in place a testing policy and error tolerance procedure for new and existing meters. Approximately 10% of all new meters delivered are tested for accuracy and the meters must perform within three percent of the manufacturers' reported meter specifications.	

Recommendation	Responsible Department(s)	Agree, Partially Agree, or Do Not Agree and Target Date and Corrective Action Plan	Status
		Utilities has a robust exception validation system in SAP. All meters are scheduled to be read every month and the reads must pass a rigorous review process. The system has pre-defined exception tolerance ranges for meter reads, bills and invoices. Customers will not be billed until all exception records have been reviewed and released.	
2.2 The Utilities Department should provide process and SAP training to staff involved in meter activities on the policies, processes, and procedures for physically and electronically maintaining meter data accuracy.		**Concurrence: Agree** **Target Date: March 2015** Action Plan: Training has been underway for the past three months; Utilities will conduct quarterly training sessions; new employees will be given proper training and documentation prior to managing meter data.	
2.3 The Utilities Department should work with the Administrative Services Department and the Information Technology Department to integrate the various SAP modules to automate controls or implement other appropriate processes to ensure that meter descriptions carry through from procurement to retirement.		**Concurrence: Agree pending confirmation of cost-effectiveness of any change** **Target Date: June 2015** Action Plan: Utilities and ASD will investigate the cost of adding automation and enhancement to the SAP system. Depending on the estimated cost and outcome of the ERP system evaluation, it may or may not be cost-effective to implement any enhancements at this time.	
2.4 The Utilities Department should take corrective action to address the 115 incorrect water billings by notifying customers of the error and that future billings will reflect the correction, and recover revenues to the City of approximately $43,000. The Utilities		**Concurrence: Agree** **Target Date: Completed** Action Plan: Utilities has notified all the customers of the billing error. The average back-bill amount for a customer was $452.54 for three years of service. Utilities also offered payment plans to the customers in case they wanted to	

Recommendation	Responsible Department(s)	Agree, Partially Agree, or Do Not Agree and Target Date and Corrective Action Plan	Status
Department should also establish a policy and procedure for the immediate correction of future errors identified.		spread their payments across multiple months. Utilities will continue to implement established policy and procedure regarding correction of errors.	
2.5 The Purchasing Division should correct the purchase order documents to accurately reflect the engineering specifications.		**Concurrence: Agree** **Target Date: March 2015 for Gas and Water Meters; TBD Electric Meters (pending transfer of meters from Utilities to Stores)** Action Plan: The Purchasing Division will update the purchase order documents to accurately reflect the current engineering specifications.	
2.6 The Purchasing Division should ensure that bidder's Affidavits of Compliance are received and documented.		**Concurrence: Agree** **Target Date: June 2015** Action Plan: Purchasing and Utilities will develop a process to track the vendor's Affidavits of Compliance.	
2.7 The Utilities Department should establish responsibility for: a) Determining and ensuring that meter testing is appropriately and consistently performed. b) Testing and analyzing the test results of meters for compliance with performance specifications. c) Analyzing meter test data to determine if use of the manufacturer's guaranty and warranty is needed.		**Concurrence: Agree** **Target Date: Completed** Action Plan: A: Utilities will continue to test 10% of new meters; the meters must perform within three percent of the manufacturers reported meter specifications. B: Utilities will continue to test all meters removed from the field; testing results will be tracked electronically for data retrieval or analysis if needed. C: Utilities will verify application of any warranties for any failed meters.	

Recommendation	Responsible Department(s)	Agree, Partially Agree, or Do Not Agree and Target Date and Corrective Action Plan	Status
2.8 The Utilities Department should reassess and develop a maintenance and replacement plan for all electronic meters.		**Concurrence: Agree** **Target Date: December 2015** Action Plan: Utilities will include electronic meters in the replacement plan.	
Finding 3: The Utilities Department inaccurately reported the retirement of meters, which affected their value in the City's accounting records.			
3.1 The Utilities Department should develop a policy, process, and procedure for the timely and accurate retirement of meters, both physically and in SAP.		**Concurrence: Agree** **Target Date: March 2015** Action Plan: Meter retirement policy has been defined, procedures are updated, and staff is fully trained on the meter retirement process. The meters identified in the report have been properly retired in the utility system and reported to Accounting. Utilities will coordinate with Accounting on the fixed asset retirement in the financial system.	
3.2 In conjunction with Recommendations 1.3 and 3.1, the Utilities Department should work with Accounting to align meter types when adding and retiring meters in the SAP asset management module.		**Concurrence: Agree** **Target Date: June 2015** Action Plan: Utilities and Accounting will review and align meter types in SAP if necessary.	
3.3 The Utilities Department should work with the Administrative Services Department to properly coordinate and process for meter recycling credits.		**Concurrence: Agree** **Target Date: June 2015** Action Plan: Utilities and ASD will coordinate and review the meter recycling processes.	

APPENDIX D – City Manager's Memorandum Response

CITY OF PALO ALTO

MEMORANDUM

TO:	**City Auditor**
FROM:	**James Keene, City Manager**
PREPARED BY:	**Valerie Fong, Utilities Director and Lalo Perez, Administrative Services Director/CFO**
DATE:	**February 26, 2015**
SUBJECT:	**City Manager's Response to Utility Meter Audit: Procurement, Inventory, and Retirement (Audit Report)**

The City Auditor's and her staff's attention and efforts on this audit are appreciated. The Utilities and Administrative Services (ASD) Departments acknowledge the importance of meter management throughout the lifecycle of the equipment from design, procurement, inventory, installation and retirement. Many of the findings suggest improvements that Utilities (in particular) and ASD should consider. Since the audit, Utilities and ASD have updated and established new policies, procedures and processes to improve consistency and accuracy of meter record keeping. Utilities will provide additional and ongoing SAP training to staff to enhance operational efficiency and mitigate errors.

Staff agrees with the findings in the report and proposes corrective actions as noted in the attached matrix.

Finding 1: The Utilities Department has not established adequate processes and procedures for organizing and setting up meters in SAP, causing data discrepancies and errors.

The City owns approximately 74,000 meters serving three utilities: electric, gas and water. The audit covered roughly 11,000 meters over a five year span. The Audit Report observed some data discrepancies and errors in SAP that stemmed from a failure to explicitly specify all of the new or existing meter types used or intended to be used in SAP. Utilities staff will work closely with the Purchasing Division in ASD to ensure the meters being purchased comply with the specified needs.

The Audit Report recommends that the process for specifying meters be modified so that each meter type is explicitly specified. Staff finds that it is more efficient and effective to clearly specify the functions and minimum performance requirements that must be satisfied by the meter. The typical meter specification is a performance-based specification listing features typically found in meters for each utility. The material master record identifies the meter features required in the specific meter being ordered. When the manufacturer receives the request for quote, the required features can be fully identified from the material master and the

ordering request. The meter specifications are attached to the Request for Quotes issued by the City that define both the performance required for the general meter and specific features identified for the meter. Due to the many different types and sizes of meters and varying number of meters required in any given order, retaining the current system of performance-based specifications is the most efficient way to specify and order meters. Furthermore, current specifications used to solicit and purchase meters are written broadly with the minimum requirements and meter types grouped in a manner so as to not restrict vendor participation in the bidding process.

However, over the years some duplicates have crept into the material master records. Staff will cleanse the duplicate information from the material master lists to improve efficiency and accuracy of meter procurement.

The Audit Report discusses an occasion when Utilities staff failed to request new material master numbers for electronic water meters (E-meters), different from the typically-used mechanical water meters. It should be noted that in that particular example, a summer intern was tasked with making the request to purchase the E-meters, and due to the intern's inexperience,   failed to request new material master numbers for the E-meters. E-meters have a higher cost because they provide new functionalities including: low water flow detection, advanced meter reading capability, and cost-effective service upgrades. As soon as Utilities and Purchasing became aware of the oversight, and prior to the audit, corrective actions were implemented. All E-meters have been reassigned to new material master numbers with the proper attributes. It bears noting that this oversight had no impact on customer bills.

Finding 2: The Utilities Department has incomplete, incorrect, and inconsistent meter records, which causes data reliability concerns and increases the risk for incorrect customer billing.

Utilities staff agrees with the concept of getting things right at the beginning of any process so as not to require re-works and to avoid the compounding of errors. In addition, on-going checks offer additional protections to customers to flag any bills that are not within a reasonable range. While the SAP system can be characterized as complex and user-time-intensive, SAP has a robust exception validation and billing system.   In the case of electric, gas and water meters, all 74,000 meters are scheduled to be read on a monthly basis. Every meter read is uploaded into the utility billing system which was designed to identify certain ranges within which a meter read will be considered to be "plausible."   If the meter readings fall outside of the established error-tolerance range, the system generates a flag noting an exception for the reading. Utilities Customer Service reviews the exception logs daily and where the readings do not seem reasonable, will request a follow-up reading or meter investigation. Once the follow-up read or investigation is complete, Customer Service approves the read in the system. Utilities reviews and processes between 150,000 – 200,000 exception reads (17%-23% of total reads) annually. In addition to meter read validation, the system has pre-defined billing and invoicing exception limits. A customer will not be invoiced and billed until all the exception records in the customer's account have been reviewed and released. Customer Service processes approximately 1,000 to 1,500 billing adjustments on an annual basis. Given the volume of meter reads (880,000 per year) and invoices billed (290,000 per year), Utilities processes a very low percentage of billing adjustments (0.3% - 0.5% of total invoices).

In terms of meter tracking, all meters are recorded in SAP prior to installation and are monitored on a monthly basis. Based on the audit findings, both the gas and water meter shops have very low numbers/percentages of incomplete or inconsistent meter records: 14 gas meters (1% of installed/exchanged gas meters) and 170 water meters (2% of installed/exchanged water meters) over a five year period.   Under the unusual or special circumstances involving either emergencies or special projects, meters are received directly by the meter shop instead of the warehouse to expedite repair and service connection. The Audit Report findings are mainly with

regard to the electric meter shop, primarily the result of past practice exercised in the electric utility of meter procurement being ordered and shipped directly to the electric meter shop for testing, processing and safeguarding.

The Audit Report pointed to the significant differences in procurement and storing of meters between the electric meter shop and the gas and water meter shops.   As a direct result, Utilities has implemented new policies and procedures (i.e. procurement, inventory, retirement) in the electric meter shop which are now consistent with those in the gas and water meter shops allowing for standardized meter procurement, recordkeeping and tracking across all three meter shops. Utilities has also provided staff with additional SAP training and documentation to ensure accuracy and completeness of records.   Utilities and ASD have coordinated efforts to ensure that future meter procurement and safeguarding will be managed by the warehouse.

The Audit Report recommends the establishment of a policy and procedure for immediate correction of future errors identified.   In fact, there currently exists such a procedure, established in the Utilities Rules and Regulations, which requires the collection or return of three years of back bills for erroneous charges. The Rules and Regulations are currently and will continue to be consistently followed by Utilities staff.

The Audit Report suggested more aggressive observation of meter warranties along with regular meter testing prior to expiration of associated warranties. Utilities staff will be trained to check the warranties on any meters that fail in the field. With regard to warranties, shipments of new meters must perform within three percent of the manufacturers' reported meter specifications. To ensure the standards are met, roughly 10% of all new meters delivered are tested for accuracy. If the meters do not pass the test requirements, the entire batch of meters is returned to the manufacturer. Note that in the past eight years, Utilities has not had any issues with meters deployed in the field during the warranty period (typically one year), nor returned any shipment while under warranty. As an added discipline, it is a continuing practice to test all meters removed from the field, with the test results stored for the purpose of ensuring information is available for any disputes over the final meter readings

Finding 3: The Utilities Department inaccurately reported the retirement of meters, which affected their value in the City's accounting records.

After experiencing a loss of institutional knowledge (due to retirements and departures) and a backlog of metering activities, Utilities did not retire meters in a timely manner. Since the audit, all the meters identified in the report have been properly retired in the utility system and reported to Accounting. Utilities will coordinate with Accounting on the fixed asset retirement in the financial system. Utilities has implemented new policies and procedures on meter retirement including controls on tracking and reconciling meter retirements.

Staff agrees that retirement of meters should be done accurately and efficiently. The report identifies the estimated amount of the financial overstatement of retired meters analyzed of at least $280,000. As the report notes, this amount was deemed immaterial by the City's external financial auditor for accounting purposes. In addition, Utilities staff acknowledges that the methodology used to determine the value of the overstatement follows proper accounting procedures. For further context, Utilities notes that the original purchase costs of the meters are approximately $156,000 and when depreciation is factored in, the value of the meters more reasonably ranges between $13,000 to $53,000 depending on whether one regards the useful meter life as 20 or 40 years respectively.

As a general last comment, the City is in the process of completing a comprehensive assessment of the City's SAP-based financial and utilities billing systems to determine how best to meet the business needs of the City. To the extent the City determines that it should migrate away from the current SAP-based systems, and because many of the findings do not result in customer billing impacts, solutions responsive to the Audit Report findings should be considered in light of the costs to implement such systems versus the benefits gained.

APPENDIX E – City Auditor's Memorandum Response

The City Auditor's Office would like to thank the Utilities and Administrative Services Departments for their participation in the meetings and discussions that led up to issuing this audit report. Despite the collaborative efforts during the audit, we continue to have some concerns with the response.

Finding 1 emphasizes the need to have clear guidance for how to set up utility meters in SAP to ensure consistency in the collection and monitoring of meter information; prevent comingling of records, particularly when the affected meters have different prices; and establish a uniform system for identifying each meter throughout its life.

The response does not recognize and accept responsibility for determining how meters are established and organized in SAP prior to purchase. The setup and organization of meters in SAP affects many workflow areas, including Utilities Operations, Purchasing, Inventory, and Accounting; and the data contained within the setup, such as the average moving price, affects data analysis, purchasing cost control, and the cost to customers. To reiterate, Utilities recently submitted requests to add new and change existing meters in the SAP system. The requests contained incorrect and inconsistent instructions, and Purchasing rejected them. If Purchasing had set these up based on Utilities' request, it would have resulted in duplicating meter types, comingling meter types, incorrect meter descriptions, and potentially incorrect average moving prices. Utilities management needs to conscientiously determine how meters should be set up and organized in SAP to satisfy the needs of all workflow areas, with consistency and process in mind.

Finding 2 emphasizes the importance of having complete, consistent, and reliable data to ensure accuracy as the data flows into and is a component of customer bills. Capturing reliable meter data will also assist in tracking its movement (e.g., receipt, issuance, inventory, installation, and retirement), analyzing meter costs, and maximizing warranty opportunities.

The response minimizes being preventive through the use of complete and reliable data, and instead focuses reliance on manual controls and processes downstream to identify and clarify billing inaccuracies. We analyzed only the meter inventory management data available within SAP, which we identified as incomplete and inconsistent. There is importance and value in enforcing the use of SAP to collect and store data completely, effectively, and accurately. The controls inherent to the SAP system assist in eliminating work redundancies and errors.

We identified areas of concern and inaccuracies at every control point throughout the meter workflow process, which increases the risk for incorrect billing. The report focused on the root causes (meter setup, organization, and identification in Finding 1 and data completeness and reliability in Finding 2), rather than the narrow isolated causes. We wanted to address the concerns that would rectify many of the downstream inaccuracies and inefficiencies. The response does not value and take ownership for this, but rather delays the need for data redesign and clean up, resting it upon a comprehensive assessment of the City's SAP-based financial and utilities billing system and business needs. Data will migrate to a system, regardless of the data being good or bad. Whether the City continues with SAP or migrates to a new system, we suggest taking a preventive and proactive approach in addressing these concerns immediately and cleansing the data to ensure consistency and accuracy and to assure customers of correct customer billing.

Policy and Services Committee
DRAFT MINUTES

Regular Meeting
Tuesday, March 10, 2015

Chairperson Burt called the meeting to order at 7:03 P.M. in the Council Chambers, 250 Hamilton Avenue, Palo Alto, California.

Present: Berman, Burt (Chair) DuBois, Wolbach

Absent:

Oral Communications

None

Agenda Items

1.   Utility Meter Audit: Procurement, Inventory, and Retirement.

Harriet Richardson, City Auditor, provided a presentation describing the findings and recommendations of the Utility Meter Audit performed. She described the steps that should be taken by the Utilities Department and the Administrative Services Department (ASD) to properly purchase, track, inventory, and retire the meters. She identified the following findings and recommendations: 1) the Utilities Department has not established adequate processes and procedures for organizing and setting up meters in SAP, causing data discrepancies and errors; there were 4 recommendations, 2) the Utilities Department has incomplete, incorrect, and inconsistent meter records, which caused data reliability concerns and increases the risk of incorrect customer billing; there were 8 recommendations, and 3) the Utilities Department inaccurately reported the retirement of meters, which affected the value in the City's accounting records; there were 3 recommendations. The actions taken to date include the ASD and Utilities Staff meeting to achieve a better understanding of the individual department needs for a more accurate procurement, inventory, asset tracking, and retirement process.

James Keene, City Manager, stated in the audit process there was a formal response process from the subjects of the audit. Tomm Marshall, the Assistance Director of Utilities and David Ramberg, the Assistant Director of ASD were available to answer questions.

Chair Burt conferred with the Policy & Services Committee (Committee) members to hear from Staff prior to Committee questions and comments.

Tomm Marshall, Assistance Director of Utilities, concurred there was merit in the findings and recommendations. Staff was taking actions to correct the errors but he noted a number of the errors dated back many years. There were 76,000 meters installed with an average life span of 20 years.

Mr. Keene asked Staff to add context to the discussion for a clearer understanding for the Council. He asked for an explanation of the "average moving price" that was applied to the meters.

Mr. Marshall acknowledged the majority of the meters throughout the City were residential with a procurement cost of $15 to $100 each. The customer was not charged the cost of the meter. The customer billing rate was based on the market and set at a rate schedule.

Mr. Keene asked Staff to specify why Utilities used the average moving price for meters rather than tracking and accounting for absolutely every meter in the system.

Mr. Marshall stated the pricing of meters was a warehouse function; Utilities did not establish the method for pricing in SAP. The decision when SAP was implemented was to do average moving price for products as they came in. Essentially you buy a new meter and when it was entered into the system, the price was averaged with the existing meters.

Council Member DuBois asked how SAP was maintained.

Mr. Marshall stated SAP had systems maintenance which was partially the responsibility of IT Business Analysts, and Utilities had four Staff members that maintained the Utility Billing System within SAP. Administrative Services Department (ASD) had Staff performing the material management portion. Data entry was performed by a meter person.

Council Member DuBois asked if any of the recommendations involved changes within the software itself.

Mr. Marshall explained the SAP System was complicated; especially on the retirement side of the meters. He believed one of the recommendations was to review the SAP retirement side of the software for a more integrated and efficient process.

Council Member DuBois was uncertain if the capability to make those changes was within the City Staff or if there were outside consultants required.

Mr. Marshall noted making any changes to SAP was expensive and the City was looking at what amount would be spent to fix the problem while they were looking into a new billing system.

Council Member DuBois asked if there was a metric for database consistency of error rate for large database systems.

Ms. Richardson noted one of the recommendations was for Utilities to establish what an acceptable error rate was. The Audit Staff attempted to identify what was an industry standard.

Council Member DuBois recalled Staff mentioned the value of the inventory was understated. He asked whether the remark was regarding materials. He asked what the life of the meter was and how long it was in the asset inventory.

Ms. Richardson stated the meters were depreciated on a 40-year basis but they were looked at as having a 20-year lifespan.

Mr. Marshall clarified the life of the meter was dependent upon how long they were on the books. There was a depreciated life and each one was reviewed individually. With depreciated materials they were brought in for review and calibration testing. If the calibration was good they were re-deployed.

Ms. Richardson stated the amount was not material in reference to the financial statements.

Council Member DuBois said the report referred to two steps for retiring a meter; the physical and the technological. He asked why there were two and if there could be a combination into one.

Ms. Richardson explained the physical retirement was when the meter was physically being disposed of and was no longer in use or on the asset inventory. The technological retirement was when it was retired from the SAP and accounting systems.

Council Member DuBois asked if the person physically removing the meter was not retiring it at the time of removal.

Mr. Marshall stated yes, that was correct. Part of the process was once it was removed from the residence it was brought in to the shop for testing for accurate readings. The shop held the meter for 45-days because the customer had 30-days to contest the readings. Once the customer was satisfied, the meter would be technologically retired.

Council Member DuBois asked if customers were billed incorrectly and had it been fixed.

Mr. Marshall stated there was a Southgate neighborhood error which was found prior to the Meter Audit. During a physical inspection it was noticed there were 1 inch meters but the neighborhood rate was at 5/8 inch. That material mishap was from a Capital Improvement Project (CIP).

Council Member DuBois asked if the matter had been corrected.

Mr. Marshall stated the customers had been back billed.

Council Member DuBois clarified the customers had been under billed.

Mr. Marshall stated the meters only measure the cubic feet of water used. In the past few years there had been fixed charges added to the water utility meter rate which escalated the rate which created a significant gap between the rate of the 5/8 and the 1 inch meters. Those customers had been back billed to correct the billing error.

Council Member DuBois asked given the size of the Utilities Department did the Auditor feel there was ample staff in her department.

Ms. Richardson stated there was one auditor dedicated to the Utilities Department. She announced the reason the findings showed the Southgate error was to reflect the length of time an error could go before being detected.

Council Member Berman asked how the Utilities Department came to have an audit.

Ms. Richardson stated before she came to the City there was an inventory audit performed. That audit identified some issues with the meters inventories.

Council Member Berman asked for clarification to the Utilities Department response to the audit findings.

Mr. Marshall explained for Finding Number 1, Staff was continuing to use the same specifications although Staff was working with the Purchasing Department to make sure they had the correct materials number assigned to the correct meter.

Council Member Berman asked how the issue of the incorrect badge number was resolved.

Mr. Marshall stated electric meters came with serial numbers but once they were purchased by the City they were assigned an individual badge number.

Council Member Berman noted the audit recommended better and more efficient ways to place badge numbers.

Mr. Marshall stated Staff had agreed to allow the SAP System to assign the badge number as the meter was entered into service.

Council Member Berman asked if having SAP assign the badge numbers alleviated the concerns from the Auditor's office.

Ms. Richardson stated yes, that was the recommendation.

Council Member Berman asked why the format of the audit changed. He recalled the prior audits were more easily readable with findings, recommendations and response in an order.

Mr. Keene clarified there was a matrix type format which was an attachment to the cover letter. He noted Auditor Recommendation 1.2 that the Utilities Department partially agreed.

Council Member Berman asked what the partial disagreement was regarding.

Ms. Richardson stated the Utilities Staff had addressed the issue. She believed in the beginning, Staff was unclear of what was needed from the Purchasing Staff. Her understanding was since the initial response, Staff from both departments had met and the issue had been clarified.

Mr. Marshall stated initially when the specifications were written there needed to be one for each type of meter. He acknowledged that was not practical for the number of meters throughout the City. They resolved the issue by writing a specification and sat with the Purchasing Staff to provide them with a better understanding of what was needed to be ordered with any particular material number.

Council Member Berman noted Finding Number 2 consisted of re-reading meters. He asked how time and cost intensive was that process.

Mr. Marshall stated prior to the billing being sent out there were parameters reviewed and compared for accuracy. There were a number of items that may cause a misread; vacation where the usage was noticeably lower than the previous month or guests where the usage was noticeably higher than the previous month.

Dave Yuan, Senior Management Analyst, explained during his time in customer service the exception reports were mostly from zero consumption readings. The investigations on meters were done when a read was too high or too low and the reason for the re-read was to verify the meter was reading accurately. There were three dedicated Staff members assigned to read meter readings daily.

Council Member Berman asked if a 20 percent spike either direction was an industry standard.

Mr. Yuan stated the three Staff members also handled the billing, invoicing, and adjustments to either item. They were not dedicated to re-readings.

Council Member Berman asked if the billing invoices were strictly for the exceptions or all.

Mr. Yuan stated all of the billing and invoicing including the exceptions.

Council Member Wolbach noticed there were two Findings that had partial Staff agreement; Numbers 1.2 and 2.3. He asked for the City Auditor's impression of the status of the partial agreements. He understood there had been meetings and changes since the information had been released.

Ms. Richardson said Utilities Staff had met with ASD Staff and had reached an agreement regarding Number 1.2. She felt they would be changing their response from partially agree to agree. She believed on Number 2.3 there was a misunderstanding on what the audit expected of Staff. The SAP system had capabilities the audit was requesting Staff to perform; it would not take additional Staff time or increase cost.

Council Member Wolbach asked if the City Manager or Assistant Director Marshall had additional information.

David Ramberg, Assistant Director for Administrative Services Department, explained ASD Staff had reviewed the capability of the SAP System and concurred with the City Auditor of the system's ability to comply with the

recommendations. Once the Purchasing Department received the information from the Utilities Department they would input into SAP and generate a badge number. That badge number would follow the order to the vendor. The vendor would mark the unit with the generated badge number prior to the meter being released to the City.

Mr. Marshall mentioned one of the issues in the meter retirement process was there were a lot of pieces that should be tied together but were not. That allowed the person entering the data to input incorrect or inaccurate data. Correcting the errors was not insignificant or inexpensive.

Ms. Richardson agreed that SAP was a complicated system. She did not believe when the system was first deployed Staff had an understanding of those complexities. She was aware the Chief Information Officer (CIO) was looking into a new or different type of system. She expressed the importance of the new system being implemented correctly in the beginning and that the City was taking full advantage of the capabilities. SAP had the capability to connect tables so when information was entered once it was connected to the other tables necessary to follow the materials. That was not set-up initially which was how errors occurred because multiple data was entered at different times for the same item.

Council Member Wolbach stated given the status of the audit, the responses and the response to the responses, he asked if there was a hesitation from the City Auditor, the City Manager or the Utilities Department not to move forward sending the recommendation to Council.

Ms. Richardson felt the actions being taken were positive and she was comfortable requesting Council approval. She noted there was a follow-up process which required audited departments to report back to the Committee every 6 months after Council approval.

Council Member Wolbach understood not wanting to implement modifications and changes to the existing SAP System with the knowledge of a new system being implemented.

Mr. Keene stated given the new process of a 6 month follow-up that timeframe set the tempo of what was expected. He said if SAP was to migrate to a new Electronic Reporting Program (ERP) it would be a multi-year process.

Mr. Marshall mentioned the Utilities Department was looking into initiatives for Smart Meters for gas, water and electric meters. Once that system was implemented there would be a full scale replacement of meters. At that time it would be more efficient to complete the discussed processes. The new

meters were self-reporting so a number of the issues in the audit would no longer be valid.

Council Member DuBois understood there was a 6-month check-in but most of the corrections were targeted for June. He noted the current members were only seated for a twelve-month term so as a practical matter most of the follow-up would be with a different group of members.

Ms. Richardson encouraged departments to return to the Committee once implementations had occurred. She explained the 6-month return was for the benefit of the Staff because some recommendations may take longer to implement.

Chair Burt asked whether there should be any effort to align the audits and the responses so that a given Committee would be able to go through a full cycle. The theory would be to have the audit presented in the first half of the year and the responses in the second; the same Committee would have continuity in the process.

Ms. Richardson stated the Ordinance would need to be changed to accommodate the timeframe but Staff could reconsider the process. She was open to discussing the possibility.

Chair Burt asked the City Auditor to work with the City Manager to view the cycle going forward.

Ms. Richardson agreed.

Chair Burt asked for more clarification from Staff regarding Recommendation 1.2 engineering specs and other descriptions as the basis for why it would not be practical to have an engineering spec for each meter.

Ms. Richardson clarified the recommendation was not to write a unique spec for each item, but rather continue with the performance based specification. If there was a need to add more specific information to assist ASD, Purchasing Staff needed to understand what was needed to be purchased.

Chair Burt stated the term engineering spec meant a greater detail to the Utilities Staff than what was intended in the findings. He asked Staff with the clarification from the Auditor as to what was acceptable to achieve the end result, did the Utilities Department agree with the clarified request.

Mr. Marshall stated yes.

Chair Burt stated under Finding 2.3, it spoke to ensuring the meter description carried through the meter procurement process to retirement. Utilities Staff's comments were regarding the inefficiencies of the retirement process under SAP. He asked how the SAP inefficiencies effected the meter descriptions carrying through from procurement to retirement.

Mr. Marshall noted there were multiple locations within the SAP System where there was a meter description; the meter material number, the utility billing section. Because those areas were entered separately and by different Staff, those descriptions for the same items did not always match.

Chair Burt asked if there was an item or part number that tracked with a description.

Mr. Marshall stated yes, in the materials module.

Chair Burt understood there was not an issue with material numbers maintaining their consistency from procurement to retirement but the issue was the description varying.

Mr. Marshall stated yes with a caveat. The retirement process alone had multiple modules in SAP.

Ms. Richardson shared an example for the Committee. In the report there was a master material number: 0280000. The device category description was different from the material description in two separate places. Further below in the process it showed another input where Staff attempted to correct the error and that correction itself was different from both of the previously entered descriptions.

Chair Burt asked what level of consequence occurred as a result of the mis-entry of descriptions for the same item. He understood with the current SAP System it was a difficult situation to resolve.

Ms. Richardson said basically it made it difficult to know what types of meters were in the field when the descriptions did not match. The uncertainty caused inaccurate accounting.

Chair Burt asked when a meter was replaced, was it replaced based on description or material number.

Mr. Marshall stated the badge numbers were in sequential order and Staff could look back and see when the meter was replaced last. The SAP System was not used to determine which meters were to be replaced.

Chair Burt asked what remaining problems were seen by the Auditor given the replacement description by the Utilities Staff.

Ms. Richardson stated if the description information in SAP was not utilized it was not as significant as initially thought.

Chair Burt understood Staff's description of when the meters were retired was when they stopped working correctly. He felt that manner was problematic; it meant that after failures became apparent it triggered a replacement.

Mr. Marshall stated some meters were replaced based on their badge number and date. He understood in the audit there were discrepancies found because some of the meters were placed prior to computers storing all of the information.

Chair Burt asked if the meters did not have the ability to have calibration checks.

Mr. Marshall stated that test could be performed; however, it could not be performed in the field. The meter needed to be removed from the field and brought to the shop.

Dean Batchelor, Assistant Director for Utilities, explained the Utilities Department followed standards set by the American Water Works Association (AWWA). There was an association for gas as well. The typical timeframe was 17-20 years. Staff would remove the meters from the field and verify their ability prior to them becoming problematic for the customer. At the time of removal, a new meter was installed with a new badge number.

Chair Burt clarified as a preventative basis the meters were being taken off line prior to the anticipated effective retirement date. He asked if there was a sampling of reliability of the meters removed at the 17 year mark.

Mr. Batchelor stated each meter removed was tested.

Chair Burt asked for statistics for the frequency the meters were out of spec at the time of removal.

Mr. Batchelor stated yes they maintained all of those records on a yearly basis.

Chair Burt asked if Staff had an approximate percentage of reliability.

Mr. Batchelor noted on the water meter side they ran at approximately 91 percent accuracy. On the gas meter side they were closer to 86 percent.

Chair Burt asked, based on those percentages, what would be the cost and benefit to the rate payer or the City to pull the meters at 15 years rather than 17.

Mr. Batchelor stated the benefit would be to the City.

Chair Burt asked if Staff felt it would be beneficial to perform a pilot sampling, enough to be statistically accurate.

Mr. Batchelor stated it was possible but his concern was as the City moved forward with the meter exchange for water the average cost would rise from $50 up to $270 per meter.

Chair Burt asked if the cost increase was because of the change to Smart Meters.

Mr. Batchelor stated that was correct.

Mr. Marshall noted the City already moved to electronic Smart Meters for water. The electronic meters had a different life cycle from the ones being discussed. It was anticipated between 15 to 17 years based on the battery life.

Chair Burt believed there was value in knowing the value of accuracy at the time of removal. He felt 91 and 86 percent were low performance numbers.

Mr. Marshall stated no meter had 100 percent accuracy across the range of all aspects. He agreed it was worth the effort to complete a pilot sampling analysis.

Chair Burt stated water being the side of utilities with the commodity having the increase; with what may have been a cost benefit five years ago would be changed in recent years.

Mr. Marshall agreed.

Chair Burt asked if there were other issues with the audit that ASD played a role where Utilities Staff would like to see additional changes or were the responses from ASD fully accepted.

Mr. Ramberg stated yes he felt the responses from ASD divisions were accurate and acceptable. He felt the audit was beneficial and ASD had

agreed with the recommendations. Recommendations 3.2 and 3.3 had to do with steps that had not been discussed in detail during the meeting but it was relating to the retirement of meters. ASD agreed with the finding of the processes needing to be more in sync. They were putting steps and processes into place to sync with Utilities more thoroughly. He explained a new technology solution called DocuSign which was a web-based workflow tool. Paper documents were now flowing through DocuSign and they were tracked, DocuSign was the ultimate repository with unlimited space.

Chair Burt asked when DocuSign was implemented.

Mr. Ramberg said implementation began in the Purchasing Division in 2013 and it had begun to filter through other departments. In late 2014, the system began to be used for items such as in the audit recommendations.

Chair Burt understood the South Gate matter was 20 years ago and the audit did not detect the issue.

Mr. Marshall stated that was correct, the matter was detected by Utilities Staff prior to the audit.

Chair Burt mentioned the audit brought forth several examples of issues. He wanted to understand if the South Gate issue example was a single exception. The audit only reviewed 15 percent of the meters.

Mr. Marshall explained what happened in the South Gate area was a one off situation, having to do with a CIP project. That did not mean there were not other errors in the records. There was a Staff member assigned to track the discrepancies between the records and in the field.

Ms. Richardson stated the Auditor's Office would be using the current errors to quantify during the next audit. The next audit would include a statistically valid sample which would include actual field work for the Audit Staff.

Chair Burt asked if the audit report would be updated to reflect the additional Staff work and completed responses prior to going to Council.

Mr. Marshall stated yes.

MOTION: Council Member Burt moved, seconded by Council Member Berman that the Policy & Services Committee recommend the City Council accept the Utility Meter Audit.

MOTION PASSED: 4-0

<u>Adjournment</u>: Meeting was adjourned at 10:21 P.M.