CITY AUDITOR'S OFFICE

Meter Reading Program

July 20, 2011 **AUDIT REPORT NO. 1111**

July 20, 2011

Honorable Mayor and Members of the City Council:

Enclosed is the audit report, *Meter Reading Program*, Audit No. 1111, which was part of the Council-approved fiscal year 2010/11 audit plan. The Meter Reading Program (Program) was within the Finance & Accounting Division, but moved to the Water Resources Division effective July 1, 2011.

Overall, we found controls to be generally adequate to ensure timely and accurate meter reading. However, management of meter replacements, conversion to automated technology, and equipment inventory controls can be improved. Additionally, available management reports are not consistently used to address potential water leaks or defective meters, and efficiencies may be gained by reconfiguring meter routes, automating manual reports, and estimating water usage in limited situations. As well, the Program's fees should be updated, and customers who may benefit should be informed about the City's utility bill suspension program.

We would like to thank staff from the Finance & Accounting Division, particularly the Meter Reading Program, and the Water Resources Division for their cooperation throughout the audit.

If you need additional information or have any questions, please contact me at (480) 312-7867.

Sincerely,

Sharron Walker

Sharron Walker, CPA, CFE
City Auditor

Audit Team:

Lisa Gurtler, Assistant City Auditor
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EXECUTIVE SUMMARY

This audit of the *Meter Reading Program* was included on the Council-approved FY 2010/11 Audit Plan to assess internal controls and cost efficiency of the program, as well as estimate the impact of new electronic meters on workload. We reviewed fiscal years 2008/09 through the first nine months of FY 2010/11.

The City's Meter Reading Program (Program) has been part of the Customer Service department within the Finance & Accounting Division, but moved to the Water Resources Division effective July 1, 2011. Budgeted at $1.1 million from the Enterprise Fund, the Program consists of 15 staff members responsible for reading approximately 87,600 residential and commercial water meters per month. Approximately 89% of these meters are read manually and 11% have been converted to mobile Automated Meter Reading (AMR) technology. In addition to regularly reading meters, Program staff completes about 3,100 related work orders per month.

We determined that generally there are sufficient controls to ensure timely and accurate meter reading. However, management of meter replacements, conversions to AMR technology, and equipment inventory controls can be improved. Currently more than 17,000 meters are past due for replacement, 258 meters conversions did not follow policy guidelines, and more than 265 years of warranty coverage have been lost on equipment not yet placed in service.

Available management reports are not consistently used to evaluate potential water leaks and defective meters. These reports identify potential issues, such as zero water usage and continuous water flow, but have not been given priority to resolve. Limited testing during the audit identified more than $20,000 in lost revenues associated with defective meters that were found using these reports. As well, there is limited customer awareness of the City's Base Fee Billing Suspension Program. This program allows a customer with valid zero usage for more than six consecutive months to suspend the monthly base fee billing. Based on the April 2011 zero usage reports, there were 328 meters with zero water use reported for periods of seven months to more than seven years. Only one customer suspended the meter billing; the remaining customers have paid avoidable fees totaling more than $156,000. However, customers may not ask for retroactive suspension of their bills.

Further, efficiencies may be gained through reconfiguring meter routes, estimating water usage in limited situations, and automating manual reports. Also, Program fees should be regularly updated to recover the cost of service.

BACKGROUND

The Meter Reading Program was part of the Customer Service department within the Finance & Accounting Division, but moved to the Water Resources Division effective July 1, 2011. On a monthly basis, the program is responsible for reading approximately 87,600 residential and commercial water meters located throughout the City's 184 square miles.

A resident or business is billed for water and sewer services within one of the City's 19 billing cycles based on their metered usage. The residential and commercial meters assigned to each billing cycle are divided into routes that Meter Readers read, either manually or with mobile automated technology.

The majority of meters are read manually by Meter Readers using an electronic handheld device that has preprogrammed route addresses and customer information. However, between 2007 and March 2011, about 9,600 of the City's 87,600 meters have been converted to mobile Automated Meter Reading (AMR) technology. The AMR meters use radio frequencies that allow the meters to be read electronically as a receiver-equipped vehicle drives through the route.

After the day's routes are completed, meter readings are downloaded into MVRS, the City's meter reading system, and then usage data is transferred to the City's utility billing system. On page 4, the manual meter reading process is depicted in Figure 1; the AMR process in Figure 2.

Figure 1. Manual Meter Reading

Sometimes the meter register must be located

Manually read data is keyed into a handheld device

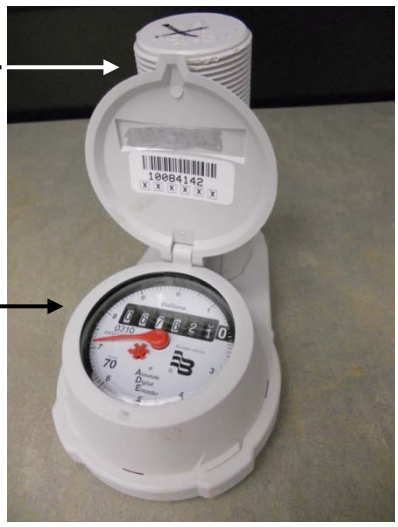
Data is downloaded daily from the handheld device into the MVRS meter reading system

Source: Auditor photographs of meter reading process.

Figure 2. Automated Meter Reading

Antenna (behind register cap) transmits meter reading

Register meters water usage



Receiver-equipped Vehicle automatically reads meters using radio frequencies

SOURCE: Auditor photographs of AMR meter and vehicle.

As shown in Table 1, the number of active meters has remained relatively consistent during the last three fiscal years. As of March 2011, there were about 87,600 meters, of which 89% were manual meters and 11% mobile AMR.

Table 1. Estimated Active Meters

Meters	FY 2008/09		FY 2009/10		9 months FY 2010/11[a]	
Manual	82,800	95%	80,100	92%	78,000	89%
Mobile AMR	4,700	5%	7,400	8%	9,600	11%
Total	**87,500**	**100%**	**87,500**	**100%**	**87,600**	**100%**

(a) Water Resources management estimated that 12,300 mobile AMR meters would be installed by June 30, 2011.

SOURCE: Auditor analysis of management provided statistics and NorthStar utility billing system data.

While manually read routes average between 100 and 125 reads per hour, the mobile AMR routes average between 200 and 600 reads per hour. Currently, the City plans to continue installing approximately 4,500 mobile AMR meters each year and will continue to assess the potential for converting to Fixed Network as the technology evolves. With Fixed Network technology, the meter readings are transmitted through fixed receivers (antennas) that are located in the area rather than using a vehicle-mounted receiver.

Program Overview

The Meter Reading Program, budgeted at $1.1 million from the Enterprise Fund, includes 15 full time positions: 1 Manager, 1 Lead Meter Reader, 11 Meter Readers and 2 Water Audit Technicians. As shown in Table 2, on average, the Meter Reader group consistently exceeds the management-established performance standard of reading 98 meters per hour and maintains a very high accuracy rate of 99.95%. In addition, the number of meters skipped has continually declined from .18% in FY 2008/09 to .09% in the current fiscal year.[1]

Table 2. Program Performance

Performance Category	FY 2008/09	FY 2009/10	9 months FY 2010/11
Manual Reads Per Hour	112	114	115
Accuracy	99.95%	99.95%	99.95%
Meters Skipped	0.18%	0.13%	0.09%

SOURCE: Auditor analysis of management provided statistics and MVRS (meter reading system) data.

Besides their regular routes, Meter Readers also complete about 3,100 work orders per

[1] Generally, a skipped meter results from accessibility issues, such as a car parked over the meter or a bee hive in the meter box. When a meter has been skipped during a regular route, a work order is created to return to read within the same billing cycle. If a reading is not obtained, the customer is billed base fees and the next month's bill will include two months of actual water usage.

month. These include tasks such as turning meters on or off for new or discontinued services or rechecking a questioned meter reading. While the 11 Meter Readers spend about 45% of their time completing work orders, the primary responsibility of the 2 Water Audit Technicians is to complete work orders responding to customer high bill concerns or disconnecting delinquent accounts.

As shown in Table 3, move in/out work orders account for approximately half of all work orders, with disconnects for nonpayment and subsequent reconnects representing another 26%. In contrast, customer high bill concerns, which result in the meter being read again, account for only about 7% of work orders.

Table 3. Work Order Activity

Work Order Type	9 months* FY 2008/09		FY 2009/10		9 months FY 2010/11		Monthly Average	
Move In/Out	13,041	48%	20,543	51%	14,890	52%	1,564	50%
Disconnect/ Reconnect	7,588	28%	10,022	25%	7,039	24%	795	26%
Re-read Meter (not customer initiated)	4,486	17%	6,276	16%	4,435	15%	490	16%
Customer High Bill Concerns	1,809	7%	2,981	7%	2,183	8%	225	7%
Other	108	0%	455	1%	316	1%	28	1%
Total	**27,032**	**100%**	**40,277**	**100%**	**28,863**	**100%**	**3,102**	**100%**

* Work order data is not available prior to October 2008.

SOURCE: MCare work order system data provided by the Financial Services Technology Director.

Most work orders were completed within one day, with the exception of moves, which averaged between 2.6 and 2.8 days.

Staffing Adjustments

As the City transitions from manual to AMR meters, staffing levels are affected. Based on workload data analysis, including the number of installed AMRs, the program appears appropriately staffed at 11 Meter Readers in the current year. As shown in Table 4 on page 7, the program appeared overstaffed in FY 2008/09, then two Meter Readers were laid off in FY 2009/10 reductions. In that fiscal year, however, all work orders increased, with move in/out work orders increasing by almost 18%. Therefore, workload per meter reader hit a peak.

Without considering other potential efficiencies, it appears that AMR installations will allow a projected reduction of one full time equivalent Meter Reader position in FY 2012/13.

Table 4. Actual/Projected Workload

	FY 2008/09	FY 2009/10	FY 2010/11	FY 2011/12	FY 2012/13
Manual Meters	82,846	80,127	75,288	70,788	66,288
Mobile AMR Meters [a]	4,652	7,403	12,300	16,800	21,300
Total Meters	87,498	87,530	87,588	87,588	87,588
Work Orders [b]	36,043	40,277	38,484	37,224	37,224
Full Time Equivalents (FTEs)	13	11	11	11	11
Manual Meters Per FTE	6,373	7,284	6,844	6,435	6,026
Mobile AMR Meters Per FTE	358	673	1,118	1,527	1,936
Work Orders Per FTE	2,773	3,662	3,499	3,384	3,384
Actual/Projected FTE Adjustment [c]	(2)	-	-	-	(1)

(a) Water Resources management estimated that 12,300 mobile AMR meters would be installed by June 30, 2011. The City plans to install approximately 4,500 AMR meters each year.

(b) Work orders for fiscal years 2008/09 and 2010/11 are estimated using 9 months of available actual data. Fiscal years 2011/12 and 2012/13 are estimated based on 3,102 average work orders per month.

(c) The projected FTE adjustment in FY 2012/13 reflects the effect of AMR installations without factoring in efficiencies that may be gained through route adjustments or other means.

SOURCE: Auditor analysis of actual and projected meters and related work orders.

OBJECTIVES, SCOPE AND METHODOLOGY

This audit was conducted in accordance with the Council-approved FY 2010/11 audit plan. The objective was to assess internal controls and cost efficiency of the program, as well as to estimate the impact of new electronic meters on workload. The audit scope included FY 2008/09 through the first nine months of FY 2010/11 (period ended March 2011).

To gain an understanding of the Meter Reading Program, we interviewed the Meter Reading Manager, Customer Service Director, Water Services Director, Water Resources Administrator and Water Distribution Manager. We also reviewed:

- The program's policies and procedures, including meter replacement criteria.
- AMR-related Council Report dated May 3, 2011, and related Return on Investment (ROI) analyses.
- Budget Books and Council-adopted Financial Policies for FY 2008/09 through FY 2010/11.
- City Code Sec. 49, *Water, Sewers, and Sewage Disposal*.
- *Meter Reading Profiles & Best Practices Report,* by Ascent Group dated August 2010.
- City of Phoenix Automatic Meter Reading (AMR) project website.
- Audit reports by other entities related to manual and AMR meter reading.

To understand the meter reading, utility billing, and work order systems, we interviewed the Financial Services Technology Director and Customer Service Systems Integrator.

To evaluate the program's processes and efficiency, we:

- Observed staff functions, including manual and AMR meter reading, completion of work orders and customer phone calls.
- Examined manual and system generated meter reading and work order related data.
- Analyzed inventory data related to meter replacements and meter conversions.
- Analyzed meter reading exception reports, such as zero usage, potential leaks and water backflow warnings.
- Analyzed staff workloads and the impact of AMR technology on staffing.

Based on these audit procedures, we determined that generally there are sufficient controls to ensure accurate and timely meter reading. However, management of meter replacements, AMR conversions, and inventory controls can be improved. Also, available management reports are not consistently used to identify potential water leaks and defective meters, and efficiencies can be gained by reconfiguring meter routes, automating manual reports, and estimating water usage in limited situations. As well, administrative oversight can be improved, such as updating meter related fees and informing customers

who may benefit from the City's utility bill Suspension Program.

We conducted this audit in accordance with generally accepted government auditing standards as required by Article III, Scottsdale Revised Code, §2-117 et seq. 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. Audit work took place from March through June 2011, with Lisa Gurtler, Lee Pettit and Erika Keel conducting the work.

FINDINGS AND ANALYSIS

1. Management of meter replacements, conversions and inventory can be improved.

Of the City's 87,600 active meters, approximately 17,000 are overdue for replacement and 258 were inappropriately converted to AMR. The current backlog together with inadequate inventory controls has resulted in more than 265 years of lost equipment warranty value.

A. Approximately 17,000 meters are overdue for replacement.

Water Resources management's policy is to replace water meters, whether manual or automated meter reading (AMR) technology, after 12 to 15 years from the manufacture date or when the maximum water flow capacity for the particular meter size has been exceeded. This replacement policy, which is based on manufacturer recommendations, does not apply to water meters that are 3 inches or larger; these large sized meters are tested annually and, as needed, are rebuilt or replaced.

Of the 87,000 meters to which this policy applies, however, 17,161 exceeded the 15 year maximum age and/or maximum flow capacity, as shown in Table 5.

Table 5. Meters Needing Replacement, by Age and Volume

Criteria	No. of Meters	%
Exceeds 15 Years of Age	7,499	44%
Exceeds Maximum Volume Capacity	6,358	37%
Exceeds Both Age & Volume	3,304	19%
Total	**17,161**	**100%**

SOURCE: Meter Inventory Report dated April 2011.

According to the Water Services Director, the division plans to replace approximately 6,500 meters every year, including about 4,500 AMR conversions. However, lack of available staff has resulted in the current backlog of meters needing replacement. Timely replacement of meters is important because accuracy diminishes as the meter ages and less accurate meter readings could negatively impact revenue. Currently, the City's estimated 7.5% unaccounted-for water rate compares favorably to the industry standard, the American Water Works Association's benchmark of 10%.

B. Approximately $17,000 could have been saved by making appropriate meter replacement or AMR conversion decisions.

To implement AMR technology, an AMR register is affixed to an existing meter (a retrofit/conversion) or a new meter (replacement). As shown in Figure 2 on page 4, the AMR register transmits meter readings through its antenna on a radio frequency that can be collected as the specially-equipped meter reading vehicle drives by.

The decision of whether to retrofit or replace an existing meter is based on the same age and flow capacity criteria previously described. Based on available inventory data, 3,278 AMR meters were installed from October 18, 2010 through May 5, 2011. Of these, 173 meters, or 5%, should have been retrofitted with an AMR register rather than replaced. Conversely, 85 meters, or 3%, that were retrofitted should have been replaced based on age or capacity. New meters cost between $137 and $369 depending on size; the AMR registers cost about $100 each. The cost of these errors totaled approximately $17,640 as shown in Table 6.

Table 6. Conversion of Manual Meters to AMR

Criteria	Meters Tested	%	Estimated Cost of Error
Correctly Replaced or Retrofitted	3,020	92%	-
Incorrectly Replaced	173	5%	$ 16,679
Incorrectly Retrofitted	85	3%	962
Total	**3,278**	**100%**	**$ 17,641**

SOURCE: Auditor analysis of AMR meter inventory data, available for meters installed from October 18, 2010 through May 5, 2011.

In part, these decisions resulted because the criteria that created the work orders did not match management's stated policy. The Customer Services system support staff programmed AMR replacement work orders to be created based on a meter age of 10 years or older while management's stated criteria is 12 to 15 years and various maximum flow capacities. The Water Services Director also noted that some of these meters may have been replaced to coincide with other meters on the same route to facilitate maintenance and replacement efforts.

C. Lack of sufficient inventory controls

As of May 2011, 19 water meters and 62 AMR registers were located in various areas of the Meter Reading offices. These unsecured inventory locations were easily accessible to City staff. In addition, some items have been on hand for more than two years.

According to the Meter Reader Manager, the water meters and registers generally have a 15 year warranty, with the first 10 years having full replacement value and the last 5 years having a prorated declining value. As shown in Table 7 on page 13, more than 100 years of warranty valued at approximately $1,000 has expired on this equipment although it has not yet been placed into service.

Table 7. Years of Lost Warranty

	AMR Registers		Water Meters		Total	
Age	**No. On Hand**	**Warranty Years Lost**	**No. On Hand**	**Warranty Years Lost**	**No. on Hand**	**Warranty Years Lost**
More than 2 Years	27	61	5	11	32	72
1 - 2 Years	8	15	7	10	15	25
0 - 1 Year	27	5	7	3	34	8
Total	**62**	**81**	**19**	**24**	**81**	**105**

SOURCE: Auditor review of inventory on hand in Meter Reading Program offices and manufacture date on the equipment.

Meter Reading management has not established an inventory policy to require the oldest equipment to be used first to minimize loss of the warranty period. Additionally, inventory records are not maintained and limited safeguards have been implemented to reduce potential loss of equipment.

In addition to the Meter Reading inventory, the Water Resources Division and the Purchasing warehouse also maintain meter equipment inventories. They have approximately 80 meters that are 2 years or older. These meters represent as much as 160 years of warranty loss, with an estimated value of approximately $3,600.

The Meter Reading Program has been in Finance & Accounting's Customer Services department, but moved to the Water Resources Division effective July 1, 2011.

Recommendations:
Water Resources management should:

A. Develop a written meter replacement policy addressing criteria such as maximum age and capacity goals. The policy should also address likely exceptions, such as potential replacement of all meters in a given vicinity when most are eligible for replacement. Management should assign responsibility for monitoring inventory reports on a periodic basis to facilitate timely replacements. Also, with limited resources available, priority should be assigned to those meters meeting both age and capacity specifications.

B. Work with the appropriate technology staff to update criteria used in generating meter replacement and conversion work orders to ensure they match management policies. In addition, ensure Meter Reading staff is familiar with the criteria so they can evaluate appropriateness of the work orders they receive.

C. Develop a written inventory policy and procedures to guide inventory levels, safeguard equipment, and minimize loss of warranty.

2. The Meter Reading Program can make better use of available reports to follow up on potential water leaks or defective meters.

Weekly and monthly reports are available to alert staff of possible meter defects such as broken registers no longer reflecting usage, or continuous water flow indicative of possible leaks. Although some of these meters could be tested as a normal part of the monthly meter read, limited follow up has occurred. Additionally, customers with no water usage are not aware of the City's utility billing Suspension Program which allows them to avoid monthly fees.

A. Meter readers are not required to investigate zero usage meters listed on a monthly report.

Monthly Zero Usage reports identify meters that reflect no water use for the month.[2] Also, when a Meter Reader is entering manual readings, the electronic handheld device beeps to alert the Meter Reader of a potential error if the reading results in a calculated zero water use. According to department policy, Meter Readers are to test all meters with a zero usage reading and report any required meter maintenance. However, the Meter Reader Manager indicated his staff does not have sufficient time to test the zero use meters.[3]

1. The April 2011 Zero Usage report listed 576 potentially defective meters. Working in conjunction with Meter Reading staff, 82 meters were tested (67 residential and 15 commercial), of which 44 meters, or 54%, were defective. We estimated the lost revenue for these defective meters to be approximately $20,150, as shown in Table 8 below.

Table 8. Estimated Lost Revenue – Defective Meters

Zero Usage for:	No. of Meters	Meters Tested	Defective Meters	Estimated Lost Revenue *
4 years or more	41	13	-	-
3-4 years	21	4	1	$ 6,845
2-3 years	31	4	2	2,538
1-2 years	55	7	6	5,820
7-12 months	57	16	8	4,092
1-6 months	371	38	27	855
Total	**576**	**82**	**44**	**$20,150**

* Estimated using 12-months or available billing account information prior to zero usage.

SOURCE: Analysis of auditor-selected tests from April and May 2011 Zero Usage reports and additional Meter Reading management-selected tests from April 2011 report. Testing excluded meters 3 inches and larger which Water Operations staff are responsible for testing annually.

[2] Separate reports list zero usage for residential meters and commercial meters; both reports include manual and AMR meters.

[3] A field test consists of turning on a faucet and checking to see if the meter registers the water flow.

To allow more focused investigation, the Zero Usage reports could be improved by including additional information such as the following:

- All meter sizes. Currently the reports for both residential and commercial meters exclude 2 inch meters, apparently due to oversight.
- The most recent date the meter was tested.
- Route number, to easily identify if zero usage meters are occurring within the same area.
- Relevant physical information, such as hose bib location and identification as primary and secondary meters.[4]

At least in part, these reports have not been investigated because other requirements, such as reading 98 meters per hour, have been given higher priority.

2. Although information about the City's Base Fee Billing Suspension Program is available on the City's website, customers do not appear to be aware of this program.[5] City Code Sec. 49-23, *Requesting temporary service suspension; resuming service,* allows property owners to temporarily suspend water utility services and avoid monthly base fees if there will be 6 consecutive months or more of no usage.[6]

   Our analysis of Zero Usage reports indentified 218 residential meters and 110 commercial meters with no water usage for at least 7 consecutive months. For these 328 meters, only one residential customer has elected to suspend service. Table 9, on page 16, summarizes the estimated base fees and taxes totaling more than $156,000 that were charged to 327 accounts but could have been avoided. However, customers cannot request a retroactive suspension.

   On an ongoing basis, full use of the Suspension Program might result in as much as $91,000 in lost revenues annually. However, promoting this customer cost-saving program aligns with the City's value of quality customer service.

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[4] Some customers maintain two or more meters, with the primary meter being used for the residence or business, and the secondary meter(s) typically used for landscaping or backup purposes. Secondary meters are more likely to have zero usage than are primary meters.

[5] Suspension Program information is available at: http://www.scottsdaleaz.gov/utilities/suspension.

[6] The Code does not distinguish between residential and commercial accounts although the associated June 2002 City Council Report referred to "seasonal customers" who reside "in other locations for a portion of the year."

Table 9. Zero Use Customers' Estimated Avoidable Costs, Cumulative

Zero Usage Period	No. of Meters*	Base Fees**	Taxes**	Estimated Avoidable Costs
5 years or more	30	$30,291	$2,711	$33,002
4 - 5 years	25	26,358	2,359	28,717
3 - 4 years	37	26,915	2,409	29,324
2 - 3 years	48	27,588	2,469	30,057
1 - 2 years	89	24,082	2,155	26,238
7 - 12 months	98	8,138	728	8,866
Total	**327**	**$143,371**	**$12,832**	**$156,203**

* Assumes that the meter is functioning properly.

** Base fees vary based on meter size, and range from the lowest residential fee of $11 per month to the highest commercial fee of $473 per month. Taxes are added at 8.95% of the base fees.

SOURCE: Auditor analysis of NorthStar utility billing system account data provided by the Customer Service System Integrator.

B. AMR reports noting potential leaks and other defects are not investigated timely.

The City's AMR technology came with certain vendor-defined monthly exception reports. These reports list AMR meters with possible problems, such as leaks, reverse water flow, and zero usage.[7]

As shown in Table 10, the May 2011 reports listed 114 possible problems, most of which were noted as possible leaks. Of the 114 warnings, 81 were for various meters within the same golf community. The Meter Reader Manager explained that he has been reluctant to investigate potential AMR leaks and reverse flow warnings based on his experience that some customers become offended if City staff inquires about their water usage.

Table 10. AMR Exception Report

Warning Type	No. of Warnings
Leak	87
Reverse Flow	17
Zero Usage	10
Total	**114**

SOURCE: Auditor analysis of May 2011 AMR Exception Reports provided by Meter Reading management.

[7] Potential leak warnings are defined as continuous water flow over 7 days or a 24 hour period, depending on the vendor.

Auditors reviewed 15 of the 87 reported potential leaks; 3 of these showed usage increases ranging from 86% to 357% compared to the previous month.

Not following up on vendor-defined meter warnings can result in missed opportunities to repair malfunctioning meter equipment, ensure water use is properly recorded and billed, and promote water conservation. Further, City Code Sec. 49-249, *Leakage, escape of water prohibited*, states that users cannot permit excess loss or escape of water after it should have been reasonably discovered and corrected.

Recommendations:
Water Resources management should:

A. Review existing meter exception reports to determine when follow up is required and update the Meter Reading policies and procedures accordingly.
   1. Reevaluate the current performance measure of 98 meters read per hour to allow time for follow up on exception reports.
   2. Promote awareness of the City's Billing Suspension Program by including program information on monthly utility bills for accounts with zero use meters.

B. Work with technology staff to enhance the Zero Usage exception reports to include all appropriate meter sizes and relevant information such as the date the meter was last tested, route number, identification of whether the meter is primary or secondary, and hose bib location.

3. Efficiencies can be gained by reconfiguring routes, estimating water usage in limited situations, and automating manual reports.

Reconfiguration of existing meter routes and work order assignments can reduce staff travel times. Additional efficiencies, estimated to save 538 staff hours, can be gained by estimating water usage in limited situations and automating manual reports.

A. Meter reading routes can be reconfigured to minimize travel time for work orders.

Reconfiguring routes would provide an opportunity to minimize work order travel time and combine some routes, which could also increase efficiency. Historically, on a daily basis, meter reading routes are concentrated in a single section of the City. For example, as part of billing cycle 5, Meter Readers are generally in the southern section of the City (between Pima Road to Scottsdale Road - east to west, and from Indian Bend Road to Chaparral Road - north to south).

Currently, there are more than 210 meter reading routes, requiring about four hours each to read, on average. After completing a route, a Meter Reader may be assigned to help read a second route or complete work orders. Since they are largely customer-driven, work orders may be located anywhere in the City. As a result, Meter Readers spend about 45% of their work hours traveling and completing work orders throughout the City. Based on limited testing, 40% of Meter Readers traveled from 2 to 4 hours of an 8-hour day, with one Meter Reader estimated to have traveled more than 100 miles in a single day.

Water Audit Technicians, who primarily handle office-based customer contacts, also perform work orders to follow up on high bill concerns or to disconnect meters for delinquent accounts. Disconnect work assignments result in approximately 15% of their day including travel. While the two Water Audit Technicians can also read meters if staffing issues arise, they have not performed this function in the last two years.

Reconfiguring meter reading routes to distribute Meter Readers throughout the City each day could allow work orders to be completed more efficiently. Work orders, including disconnect for delinquent accounts, could then become part of or coordinated with the regular routes thereby minimizing additional travel time.

B. Allowing estimated water usage in defined situations would improve efficiency.

During the course of a regular route, some meters may be skipped due to inaccessibility, such as a car parked over the meter or a beehive in the meter box, or be accidentally overlooked. Current practice is to require the original meter reader to return to read any skipped meters the next day regardless of where the Meter Reader has been assigned that day. If the meter cannot be re-read in time to coincide with its billing cycle deadline, the customer is only billed the base fees and will be billed for 2 months' usage the following month. Instead, the monthly water usage could be estimated using the previous month and the same month of the previous year. Estimating water usage, particularly in limited situations, is a common practice in other municipalities, including the City of Phoenix.

Based on the first nine months of FY 2010/11, there may be approximately 1,200 skipped meters this year. In total, approximately 1 million meter readings are recorded each year. Allowing estimated water usage in such limited circumstances could save approximately 250 staff hours a year, or 0.12 full time equivalent staff position.

C. Certain management reports are prepared manually, but could be automated.

On a daily or weekly basis, the Lead Meter Reader and Manager manually enter certain performance-related information from the MVRS (meter reading) and work order systems into various Excel spreadsheets. This information includes department and individual performance statistics, such as total number of meters read, meters read per hour and work orders completed. Because the data is re-entered manually, errors are more likely. Our review found some instances of data entry errors, such as the number of manual reads and the total work orders completed.

Additionally, Water Audit Technicians maintain daily work logs, noting discussions with customers related to high bill concerns and other account information that is already in the NorthStar utility billing system. Based on their estimates, maintaining these manual reports and work logs require more than 24 hours of staff time each month. The Financial Services Technology Director estimated this information can be automated in 20 to 40 hours of staff time, therefore paying for itself within one to two months.

Automating the management reports and technician work logs will save an estimated 288 staff hours per year, eliminate data entry errors and provide a more timely summary of department activities.

Recommendations:
Water Resources management should:

A. Consider reconfiguration of meter reading routes and, in conjunction with Finance & Accounting Division, update billing cycles and notify customers accordingly. The existing routes should distribute Meter Readers throughout the City each day and be condensed into fewer routes where possible. Work orders can then be assigned to the closest Meter Reader to more efficiently minimize travel time. In addition, management should evaluate whether one Water Audit Technician position could transition to meter reading to cover work load peaks and absences, as necessary.

B. Consider implementing a policy allowing water usage to be estimated in limited situations, such as an inaccessible meter when it is inefficient to return to the location during the current billing cycle. When an estimate is used, it should be identified on the bill along with an explanation that the next month's bill will be based on an actual reading.

C. Automate manually maintained reports and work logs as needed to facilitate productivity.

4. Administrative oversight can be improved.

Program fees have not been updated to ensure they recover the cost of service, and some records have been kept more than 13 years, well past their records retention period.

A. Program fees have not been updated in several years.

The Meter Reading Program has three user fees associated with its services, as shown in Table 11 on page 20. The $35 onsite water use assessment and leak detection fee has not been updated for 13 years. To perform this service, a Water Audit Technician drives to the customer's location and generally spends an average of 30 to 60 minutes onsite. Therefore, this service costs about $53, which is $18 more than the existing fee.

Additionally, the meter tampering and testing fees have not been updated in four years or more. Meter testing services cost approximately $73, or $23 more than the current fee. And while the meter tampering fee is meant to be a deterrent from illegal water usage rather than a cost-recovery fee, it should be periodically reviewed for reasonableness.

Table 11. Meter Reading Program Fees

Last Updated	City Code	Purpose of Fee	Current Fee	Estimated Cost of Service*
Oct. 1998	§49-24 (d)	Water Use Assessment and Leak Detection	$35	$53
May 2005	§49-30	Meter Tampering	$100	N/A**
May 2007	§49-24 (b)	Meter Testing	$50	$73

* Includes salary, benefits, vehicle costs and gas.

** Customers are assessed a $100 Meter Tampering fee as a penalty and therefore the fee is not based on actual costs.

SOURCE: Scottsdale City Code, Chapter 49 – Water, Sewer and Sewage Disposal.

Council-adopted Financial Policy #10 requires that Enterprise Fund user fees be examined annually to ensure they recover all direct and indirect costs of service. Although the Meter Reading Program is funded through the Water and Sewer Funds, meter readers have been part of the Customer Services department for organizational purposes. As a result, meter reading fees may not have been considered to be an Enterprise Fund user fee and, therefore, not included in the annual review and approval process.

B. Reports and logs have been retained for multiple years beyond their retention periods.

Various daily logs, statistical reports and electronic files containing department and employee information back to at least 1998 have been retained. Management was unaware that some of these records should have been destroyed based on the applicable records retention schedule.

According to the City's records retention General Schedule, reports containing statistics that are carried forward to subsequent reports should be destroyed after about two years.[8]

Recommendations:

Water Resources management should:

A. As part of the annual rates and fees review, analyze Meter Reading Program fees to determine if they recover the cost of service and include these fees in the Division's annual rates and fees request for City Council approval.

B. Require the Meter Reading Program to periodically review applicable records for compliance with the City's records retention schedule.

[8]Specifically, the record should be destroyed one year after the fiscal year in which the report was created or compiled.

MANAGEMENT ACTION PLAN

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1. Management of meter replacements, conversions and inventory can be improved.

RECOMMENDATIONS: Water Resources management should:

A. Develop a written meter replacement policy addressing criteria such as maximum age and capacity goals. The policy should also address likely exceptions, such as potential replacement of all meters in a given vicinity when most are eligible for replacement. Management should assign responsibility for monitoring inventory reports on a periodic basis to facilitate timely replacements. Also, with limited resources available, priority should be assigned to those meters meeting both age and capacity specifications.

B. Work with the appropriate technology staff to update criteria used in generating meter replacement and conversion work orders to ensure they match management policies. In addition, ensure Meter Reading staff is familiar with the criteria so they can evaluate appropriateness of the work orders they receive.

C. Develop a written inventory policy and procedures to guide inventory levels, safeguard equipment, and minimize loss of warranty.

MANAGEMENT RESPONSE:

A. The Water Resources Division concurs with this recommendation and will develop a written policy to address this issue.

B. Water Resources concurs with this recommendation and will work with appropriate staff to address this issue.

C. Water Resources concurs with this recommendation and will develop a written policy and procedures to address this issue.

PROPOSED RESOLUTION:

A. Water Resources will formalize in a written policy the current verbal policy addressing criteria for meter replacements. Management will assign personnel the responsibility for monitoring inventory and prioritizing replacements.

B. Management and technology staff will work to update the criteria used to generate the work orders for meter replacements. These criteria will be shared with meter reading staff in order to facilitate the replacement of appropriate meters.

C. Management will develop a written policy and procedures to guide inventory levels, safeguard equipment and minimize loss of warranty.

RESPONSIBLE PARTY: Dave Petty, Water Resources Administrator

COMPLETED BY: DECEMBER 31, 2011

2. The Meter Reading Program can make better use of available reports to follow up on potential water leaks or defective meters.

RECOMMENDATIONS: Water Resources management should:

A. Review existing meter exception reports to determine when follow up is required and update the Meter Reading policies and procedures accordingly.

   1. Reevaluate the current performance measure of 98 meters read per hour to allow time for follow up on exception reports.

   2. Promote awareness of the City's Billing Suspension Program by including program information on monthly utility bills for accounts with zero use meters.

B. Work with technology staff to enhance the Zero Usage exception reports to include all appropriate meter sizes and relevant information such as the date the meter was last tested, route number, identification of whether the meter is primary or secondary, and hose bib location.

MANAGEMENT RESPONSE:

A. Water Resources concurs with the recommendation to review the meter exception report to determine when follow up is required.

   1. Water Resources will evaluate the current performance measure of 98 meter reads per hour in order to determine if this is appropriate.

   2. Water Resources concurs with this recommendation and will work with Utility Billing to address the issue.

B. Water Resources concurs with this recommendation and will work with technology staff to address the issue.

PROPOSED RESOLUTION:

A. Water Resources will continue to review the existing meter exception reports and will update the Meter Reading policies and procedures accordingly.

   1. Water Resources will evaluate the current performance measure of 98 meter reads per hour in order to determine if this is appropriate.

   2. Water Resources will continue to promote awareness of the City`s Billing Suspension Program by enhancing the message on the monthly bills for accounts with zero use meters.

B. Water Resources technology staff will enhance the Zero Usage exception reports to include all appropriate sizes and relevant information required to assist staff in prioritizing replacements.

RESPONSIBLE PARTY: Dave Petty, Water Resources Administrator

COMPLETED BY: JUNE 30, 2012

3. Efficiencies can be gained by reconfiguring routes, estimating water usage in limited situations, and automating manual reports.

RECOMMENDATIONS: Water Resources management should:

A. Consider reconfiguration of meter reading routes and, in conjunction with Finance & Accounting Division, update billing cycles and notify customers accordingly. The existing routes should distribute Meter Readers throughout the City each day and be condensed into fewer routes where possible. Work orders can then be assigned to the closest Meter Reader to more efficiently minimize travel time. In addition, management should evaluate whether one Water Audit Technician position could transition to meter reading to cover work load peaks and absences, as necessary.

B. Consider implementing a policy allowing water usage to be estimated in limited situations, such as an inaccessible meter when it is inefficient to return to the location during the current billing cycle. When an estimate is used, it should be identified on the bill along with an explanation that the next month's bill will be based on an actual reading.

C. Automate manually maintained reports and work logs as needed to facilitate productivity.

MANAGEMENT RESPONSE:

A. Water Resources concurs with this recommendation to evaluate the existing meter reading routes in order to determine if a reconfiguration of the routes would be more efficient. Management will also evaluate how best to utilize the Meter Audit Technicians.

B. Water Resources concurs with this recommendation and will consider a policy to address this issue.

C. Water Resources concurs with this recommendation and will automate the manual reports and work logs.

PROPOSED RESOLUTION:

A. Water Resources will evaluate the existing meter reading routes to determine if a reconfiguration of the routes would be more efficient. In addition management will evaluate the most effective and efficient use of the two Meter Audit Technicians time and efforts.

B. Management will consider implementing a policy allowing water usage to be estimated in limited situations, such as an inaccessible meter when it is inefficient to return to the location during the current billing cycle.

C. Management will work with technology staff to automate the manual reports and work logs.

RESPONSIBLE PARTY: Dave Petty, Water Resources Administrator

COMPLETED BY: JUNE 30, 2012

4. Administrative oversight can be improved.

RECOMMENDATIONS: Water Resources management should:

A. As part of the annual rates and fees review, analyze Meter Reading Program fees to determine if they recover the cost of service and include these fees in the Division's annual rates and fees request for City Council approval.

B. Require the Meter Reading Program to periodically review applicable records for compliance with the City's records retention schedule.

MANAGEMENT RESPONSE:

A. Water Resources concurs with this recommendation and will review the meter reading program fees annually to determine if they are appropriate.

B. Water Resources concurs with this recommendation and will review the applicable records to ensure compliance.

PROPOSED RESOLUTION:

A. Management will work with finance staff to review meter reading program fees to determine if they recover the cost of service and include these fees in the annual rates and fees request to Council for approval.

B. Management will periodically review applicable records for compliance with the City`s records retention policy.

RESPONSIBLE PARTY: Dave Petty, Water Resources Administrator

COMPLETED BY: JUNE 30, 2012

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The City Auditor's Office provides independent research, analysis, consultation, and educational services to promote operational efficiency, effectiveness, accountability, and integrity in response to City needs.