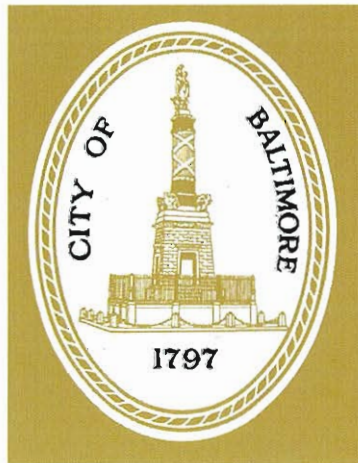

**CITY OF BALTIMORE
THE DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTE WATER**

**REVIEW OF ALLEGATIONS
REGARDING
WATER AND WASTE WATER BILLING PROCEDURES
TO
DETERMINE THE VALIDITY OF THOSE ALLEGATIONS
AND
IDENTIFY OPPORTUNITIES FOR IMPROVEMENT**

February 2012



**City of Baltimore
Department of Audits**

CITY OF BALTIMORE

STEPHANIE RAWLINGS-BLAKE, Mayor



DEPARTMENT OF AUDITS

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February 2, 2012

Honorable Joan M. Pratt, Comptroller
And Other Members of the Board of Estimates
City of Baltimore

The Baltimore City Comptroller's Office received allegations that some users of water supplied by Baltimore City have not been billed correctly for as much as three years or more. According to the allegations, many times, customers in both Baltimore City and Baltimore County have been billed incorrectly because of numerous, consecutive, estimated water billings that were not adjusted for actual usage, and those customers were not reimbursed for any over billings unless they filed complaints with the City. Also according to the allegations, some properties in Baltimore City were included for auction as part of the City's May 2010 Tax Sale because of unpaid water and sewer bills that were based on estimated, rather than actual, meter readings and/or mismanaged billings. Additionally according to the allegations, a majority of the customers occupying newly constructed properties in Baltimore County have not been billed for water usage for periods of as much as three years or more after those properties were initially occupied. The complainant identified 20 metered water accounts as examples to support the above allegations. Since the initial allegations, there have been similar complaints received by our Office regarding estimated meter readings and over billings.

We have reviewed various billing information and reports pertaining to the specific metered water accounts that were identified to us by the complainant to determine the validity of those allegations. We also performed additional tests to determine, if possible, the extent of any similar billing problems. As part of our review, we obtained a general understanding of the Department of Public Works, Bureau of Water and Waste Water's (W&WW) related billing policies and procedures to determine whether they were adequately designed and effectively operating to ensure that the applicable users of water supplied by Baltimore City were accurately billed in a timely manner and whether any adjustments, where necessary, were promptly processed. As a result of our review, we noted certain areas where the effectiveness of the control procedures over water and sewer billings could be improved, and we recommend that:

- W&WW perform actual meter readings and bill customers based on those actual meter readings in accordance with Article 24, § 1-2(b) of the Baltimore City Code and the established *Rules and Regulations Governing the Use of Water and the Installation of Mains, Services, and Meters (Rules and Regulations)*.
- W&WW change its procedures for calculating billed amounts to customers whenever a "True" reading is recorded as part of the customers' account history, either by not




considering the “True” reading in calculating the water usage and related billing amounts or by not including the “True” reading as part of a customer’s account history; for example, by recording the “True” reading only as a memo to the customer’s account.

- W&WW review the 70,103 accounts that included at least one “True” reading during the period from July 1, 2008 through June 6, 2011 to determine whether adjustments and refunds should be made because of billing errors caused by “True” readings that follow estimated readings, or whether additional billings should be generated for customers that may have been under billed.
- W&WW properly maintain documents, either actual forms, microfiche copies, or electronic files, to support all adjustments made by W&WW to customers’ accounts. Those documents should facilitate the subsequent verification of adjustments to determine the reasons for such adjustments and whether they have been appropriately approved.
- Before properties are scheduled to be included in the City’s Tax Sale solely because of unpaid water and sewer charges that have been based on estimated rather than actual water meter readings, W&WW should perform actual meter readings to determine whether any of those customers have been over or under billed because of those estimated billings.
- W&WW adhere to the established *Rules and Regulations*, which states that quarterly water charges for both Baltimore City and Baltimore County customers become effective on the installation date of the water service. W&WW should also review all newly established accounts where meters have been installed but no billings have been generated, beginning with those accounts that have not had any billings for two years or more from the meter installation dates, and bill those customers so that applicable collections of those charges can be made.
- W&WW develop written policies and procedures to guide its staff in performing their duties and clearly communicate those written procedures, as well as provide the necessary training, to all employees responsible for assessing, processing, reviewing, and recording water and sewer charges to its customers. Those written procedures, developed as part of a procedures manual or instructions to applicable staff, should contain sufficient detail to guide staff in performing duties related to the processing of water and sewer charges. Those procedures should, at a minimum, define the duties and responsibilities of applicable staff for assessing, billing, recording, reviewing, approving and reconciling water and sewer billing/revenue transactions, and should address the various concerns included in this report.

As part of its response in Appendix I of this report, W&WW's long-term plan is to reorganize the Revenue Measurement and Billing Division to ensure processes are streamlined and tasks are consolidated and made more efficient, enabling more effective and responsive customer service. Also, it is W&WW's intent to ensure that all customers are provided quality service in a timely manner that reflects accurate readings and billings for water usage. Further, W&WW is in the process of securing a new billing system as well as a new automated meter reading/infrastructure system that will enhance its ability to provide a more efficient process with greater effectiveness.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read "Robert L. McCarty, Jr.", is positioned above the printed name.

Robert L. McCarty, Jr., CPA
City Auditor

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Background Information

The City's Board of Estimates establishes, assesses, and changes water and sewer rates, based on the recommendations of the Director of Finance and the Director of Public Works. Residential users of water and sewer services provided by the City are generally billed quarterly, based on actual water meter readings computed at various rates (depending on the meter size). Under certain circumstances, however, the quarterly billings are based on estimated rather than actual meter readings; for example, when the meters are not accessible to the meter reader. If the actual metered consumption or estimated amounts do not exceed various minimum allowable amounts (based on the meter size), minimum quarterly charges are billed to the customers. The quarterly billings for City customers also include \$7.50 for the State of Maryland's Bay Restoration Fees. Sewer service charges for Baltimore County residential customers, however, as well as the State of Maryland's Bay Restoration Fees (\$30 annually) are not billed on a quarterly basis. Instead, those sewer service charges, which are based on usage during the preceding calendar year, and the Bay Restoration Fees are included as part of Baltimore County customers' annual property tax bills.

Under the provisions of Article 24, Baltimore City Code, the Director of Public Works is authorized to adopt and enforce rules and regulations governing the water supply. As such, the Baltimore City Department of Public Works' *Rules and Regulations Governing the Use of Water and the Installation of Mains, Services, and Meters (Rules and Regulations)* were adopted and approved on December 31, 2003. These Rules and Regulations have the same legal force and effect as a City Ordinance and are a compilation of applicable portions of the Rules adopted by the Water Board on September 17, 1919; rulings made from time to time by the Board of Estimates; decisions made by the Director(s) of Public Works; and policies and practices established by the Director(s) of Public Works during the period of September 17, 1919 to November 30, 2002.

According to those *Rules and Regulations*, quarterly water charges for both Baltimore City and Baltimore County customers become effective on the installation date of the water service. Also, according to Article 24, § 1-2(b) of the Baltimore City Code, the Director of Public Works is responsible for having every consumer's accessible water meter read and the reading accurately recorded four (4) times during each calendar year. In May of 2011, Article 24, § 1-2(b) of the Baltimore City Code was amended. The Director of Public Works must now ensure that every consumer's accessible water meter is actively read and the actual reading accurately recorded four times during each calendar year. The amendment also added that the Director of Public Works must ensure that no water bill based on an estimate rather than actual reading is sent to any residential consumer whose water meter is accessible to Department of Public Works' employees when they attempt to read the water meter.

Also according to the *Rules and Regulations*, upon proof furnished by a property owner that there has been an overcharge made on metered water billings on their property, correction and refund, where applicable, will be allowed for a period no longer than three years from the date of the complaint.

Scope, Objectives and Methodology

We have conducted a review of various Department of Public Works, Water and Waste Water (W&WW) billing information pertaining to allegations received through the City Comptroller's Office regarding inadequate billing procedures for certain metered water accounts. The initial purpose of our review was to determine the validity of those allegations. Based on our initial review, the allegations appeared to be valid; therefore, we performed additional tests to determine, if possible, the extent of any similar weaknesses in the billing procedures for water and sewer charges.

The objectives of our review were to determine whether:

- Users of water furnished by Baltimore City have been properly billed in a timely manner, and whether those billings were based on actual meter readings. If not, in those situations where there have been several consecutive estimated billings, to determine whether there have been any over or under billings as a result of those estimates and whether appropriate adjustments have been made in a timely manner.
- Properties in the City have been included in Tax Sales (particularly the 2010 Tax Sale) because of estimated W&WW billings and/or mismanaged billing errors.
- Any newly established accounts, particularly for new homes built in Baltimore County, have been properly billed for water usage in a timely manner.

In order to accomplish our objectives, we reviewed various W&WW billing information and related reports pertaining to the specific metered water accounts that were identified by the complainant. We also had discussions with various personnel from W&WW and the Mayor's Office of Information Technology (MOIT). Additionally, we obtained a general understanding of W&WW's related billing policies and procedures to determine whether they were adequately designed and effectively operating to ensure that the users of water supplied by Baltimore City were accurately billed in a timely manner and whether any adjustments, where necessary, were promptly processed. We also obtained W&WW reports generated by MOIT covering various periods from July 1, 2007 through June 6, 2011 and, where possible, performed tests as deemed necessary to achieve the objectives of our review. We could not perform tests of adjustments to determine whether they were made to correct any over or under billings caused by estimating water and related sewer usage because of the inability to locate specific adjustment records selected for testing; i.e., those records were not maintained in a readily retrievable manner.

Our findings and recommendations are detailed in the *Findings and Recommendations Based on Further Testing and Analyses* section of this report. The responses of the Bureau of Water and Waste Water and the Department of Audits' comments to the Bureau of Water and Waste Water's responses are included as an appendix to this report. We did not verify the information included in the Bureau of Water and Waste Water's responses. We will verify that information as part of our follow-up review.

Findings Based on Our Review of Specific Accounts Included As Part of the Allegations

We reviewed various information pertaining to the 20 accounts referred to by the complainant and found that the allegations raise valid concerns regarding Department of Public Works, Water and Waste Water (W&WW's) billing practices, which we believe require the attention of management. Based on our review of those accounts we found the following:

- Twelve of those accounts resulted in over billings to customers, totaling \$5,824, for water and sewer charges because of one or more estimated meter readings that were followed by what W&WW refers to as "True" readings for each of those accounts. A "True" reading, usually performed in response to a customer's complaint or a W&WW initiated investigation to determine whether a meter is working properly, does not result in the generation of a bill to the customer. One additional account contained a "True" reading following estimated readings that initially resulted in an over billing; however, that over billing was subsequently corrected by a billing adjustment. We could not determine whether two of the accounts included as part of the original allegations were over or under billed. For one of those accounts, there were no actual water meter readings during the period for comparative purposes. The other account contained a "True" reading and no estimated readings; however, the meter appeared to be running backwards. The actual reading on 4/16/09 was 129 units, and the actual reading on 6/15/07 (previous actual reading date) was 334 units. The remaining five accounts were neither over nor under billed due to estimated and/or "True" readings.
- The property for one of the 20 accounts in question went to Tax Sale in 2009 (not 2010 as had been alleged), but that resulted from the failure to pay water bills that were based on actual meter readings rather than estimates.
- Two of the accounts included as part of the allegations represented newly established accounts in Baltimore County. According to W&WW's records, for one of those accounts, the water meter was installed in January 2007 and the service order date was January 2008. However, the first actual meter reading and related billing was not done until June 2010, approximately 2½ years after the service order date and 3½ years after the meter installation date. At that time, however, the owner of the property was billed for the entire meter reading, and there were no estimated readings and billings in the interim. For the other account, the meter was installed in September 2007 and the service order date was also January 2008. Again, the first actual reading and related billing was not done until August 2010, more than 2½ years after the service order date and almost 3 years after the meter installation date. In this case, however, there were two estimated readings and related billings (March 2010 and May 2010) prior to the actual reading, and the owner was eventually billed for the balance based on the actual reading in August 2010. Therefore, for the two newly established Baltimore County water accounts that were included in the allegation, the property owners were eventually billed for the full amount of the water usage, but the billings were not done until 2½ years or more after the service order dates and 3 years or more after the meter installation dates.

Findings and Recommendations Based on Further Testing and Analyses

Conclusion

Numerous customers had received consecutive quarterly bills that were based on estimated usage rather than actual water meter readings. Many of those customers had received consecutive quarterly estimated billings for as much as 4½ years. Based on our review, we noted that billing errors occurred when “True” readings were taken (usually to determine whether the meter was properly working) and recorded as one of the accounts’ histories (usually quarterly readings). We also found that customers were over billed when “True” readings followed one or more estimated readings. During the period from July 1, 2008 through June 6, 2011, the account histories for 70,103 accounts contained at least one “True” reading, and 65,755 of those accounts also included estimated readings. Therefore, it is likely that those accounts also contain over billings. The account histories for 52,686 of those 65,755 accounts did not include any adjustments. The account histories for 13,069 of those accounts included adjustments that possibly corrected any over billings that may have occurred. Additionally, the account histories for 2,988 accounts included “True” readings and no estimated readings, and based on our review, those accounts may have been under billed. Since the documentation to support adjustments to customers’ accounts was not maintained in a readily retrievable manner, we could not perform tests to determine whether adjustments were made to correct any over or under billings caused by estimating water and related sewer usage or by including the “True” reading in the calculation to determine quarterly water usage.

There were 57 properties included in the City’s May 2010 Tax Sale solely because of unpaid water and sewer charges that were based on estimated usage rather than actual meter readings for consecutive periods ranging from four quarters (1 year) to eighteen quarters (4½ years). Since there were no actual meter readings prior to the 2010 Tax Sale for the three properties that we selected for testing, we could not determine whether those unpaid estimated billings resulted in any over or under billings to the applicable property owners at the time of the Tax Sale. Also, there were no actual or estimated meter readings and related billings for numerous accounts, in both Baltimore City and Baltimore County, for several years after water meters had been installed. Additionally, the Department of Public Works, Bureau of Water and Waste Water (W&WW) did not have written policies and procedures to guide its staff in performing their duties for assessing, billing, recording, and reviewing water and sewer charges to its customers, and for assigning responsibilities for performing and monitoring various related tasks.

Background

In order to determine the magnitude of estimated W&WW billings, we obtained a Billing Statistics Summary Report for fiscal year 2010, generated by the Mayor’s Office of Information Technology (MOIT). According to that report, \$31.7 million, or 25%, of the total adjusted water billings for fiscal year 2010 resulted from estimated billings. That summary report also included net water bill adjustment reductions of more than \$16.7 million (\$4.7 million in additions and \$21.4 million in reductions). Similarly, estimated sewer billings during fiscal year 2010 totaled \$23.8 million, or 22%, of the total adjusted sewer billings. Those sewer billings also included

net billing adjustment reductions of \$23.6 million (\$2.6 million in additions and \$26.2 million in reductions).

We also obtained a report, generated by MOIT for W&WW as of November 10, 2010, that included properties with estimated water billings for four (4), eight (8), twelve (12), and eighteen (18) consecutive histories (normally quarters). MOIT also provided us with an updated report as of February 16, 2011 of the accounts included in the November 10, 2010. Using that February 16, 2011 report, we identified 3,500 accounts (after deleting 24 accounts with meters that included multiple dials) from the 18,266 accounts included on the November 10, 2010 report of accounts with consecutive estimated meter readings of between 4 and 18 quarters that no longer had an estimated billing as of February 16, 2011. Consequently, the billings for 14,742 of the 18,266 accounts continued to be based on estimated meter readings. According to W&WW, many of the 14,742 accounts included meters classified as “ARBs” (Automated Remote Boxes) as part of a pilot program to automate the meter readings. However, W&WW encountered difficulties in reading those meters. We obtained a listing of W&WW’s accounts with ARBs and found that 6,356 of those ARB accounts were included in the 14,742 accounts for which the bills continued to be based on estimated meter readings. Therefore, the meters for the remaining 8,386 accounts presumably should have been available for actual readings by W&WW, but the billings continued to be based on estimated readings.

Finding #1

Numerous customers had received consecutive quarterly bills that were based on estimated usage rather than actual water meter readings. Many of those customers had received consecutive quarterly estimated billings for as much as 4½ years.

Analysis

Numerous customers had received consecutive quarterly bills that were based on estimated usage rather than actual water meter readings. Many of those customers had received consecutive quarterly estimated billings for as much as 4½ years. According to the report that we obtained from MOIT as of November 10, 2010, there were 18,266 metered water accounts, out of approximately 411,000 active accounts, with at least four consecutive estimated quarterly billings (8,480 with four consecutive estimated quarterly billings; 2,991 with eight consecutive estimated quarterly billings; 4,117 with twelve consecutive estimated quarterly billings; and 2,678 with eighteen consecutive estimated quarterly billings). We could not determine whether the 2,678 customers on that report who had received water bills for 4½ years were over or under billed as a result of estimating their water usage because there were no actual water meter readings during the 4 ½ year period to be used as a basis for comparison. There were also other cases for those customers that received consecutive quarterly bills for less than 4½ years where we could not determine whether the customers were over or under billed because there were no actual water meter readings either prior to or after a series of estimated readings. According to Article 24, § 1-2(b) of the Baltimore City Code in effect at the time of our testing, however, the Director of Public Works shall be responsible for having every consumer’s accessible water meter actively read and the reading accurately recorded four times during the calendar year.

Recommendation

We recommend that W&WW perform actual meter readings in accordance with Article 24, § 1-2(b) of the Baltimore City Code and the established Rules and Regulations Governing the Use of Water and the Installation of Mains, Services, and Meters (Rules and Regulations). According to Article 24, § 1-2(b) of the City Code as amended as of May 2011, the Director of Public Works must now ensure that every consumer's accessible water meter is actively read and the actual reading accurately recorded four (4) times during each calendar year. The Director of Public Works must also ensure that no water bill based on an estimate rather than actual reading is sent to any residential consumer whose water meter is accessible to Department of Public Works' employees when they attempt to read the water meter.

Finding #2

Billing errors occurred when "True" readings were taken (usually to determine whether the meter was properly working) and recorded as one of the accounts' histories (usually quarterly readings).

Analysis

Billing errors occurred when "True" readings were taken (usually to determine whether the meter was properly working) and recorded as one of the accounts' histories (usually quarterly readings). As reported earlier under *Findings Based on Our Review of Specific Accounts Included as Part of the Allegations*, customers were over billed in those cases where a "True" reading was taken and recorded as one of the accounts' histories following a series of estimated billings. We tested an additional 13 accounts with "True" readings following one or more estimated readings and found that seven of those accounts were over billed for water and sewer charges, totaling \$4,809. W&WW computed the water usage and related billings based on the difference between the actual meter reading and the previous "True" reading without adjusting for any estimated billings (above the minimum billable amounts) that had already been charged to the customers during the period between the current and previous actual readings. For our calculations, however, we determined the actual usage based on the difference between the current quarter's actual water meter reading and the previous actual water meter reading recorded, to compute actual usage (after adjusting for any minimum billings, where appropriate, that should have been charged) and then deducted the previous estimated billings recorded during the period between the two actual readings.

One of the 13 additional accounts that we tested was billed at the minimum usage amounts and was neither over nor under billed. We could not determine whether the remaining five accounts were over or under billed because either there were no actual readings to be used for comparisons or the meters appeared to be running backwards or not moving at all.

We also noted that, under certain circumstances, the customers appear to have been under billed; such as, when a "True" reading was recorded as one of the account histories and there were no estimated readings prior to an actual reading, or when a new meter was installed followed by a "True" reading and then an actual reading. We noted two examples of the latter scenario. In the first case, a new meter was installed, followed seven months later by a "True" reading of 22

units. Three months after the “True” reading, an actual reading was recorded as 32 units. The customer was then billed for 10 units of water consumption (32 minus 22), and the first 22 units of water usage were not billed. The second example revealed similar results.

According to a report generated for us by MOIT, 70,103 accounts contained at least one “True” reading during the period from July 1, 2008 through June 6, 2011. Based on our testing of accounts included in the initial allegations, as well as the results of our additional tests referred to above, it is possible that many of those accounts contain similar billing errors. For 65,755 of those accounts, the histories included “True” readings as well as estimated readings; and therefore, it is likely that those accounts also contain over billings. The account histories for 52,686 of the 65,755 accounts did not include any adjustments. The account histories for 13,069 of those accounts included adjustments that possibly corrected any over billings that may have occurred. The account histories for 2,988 accounts included “True” readings and no estimated readings, and therefore, may contain under billings. The account histories for 2,006 of those accounts did not include any adjustments. The account histories for 982 of those accounts included adjustments that possibly corrected any under billings that may have occurred. As stated below under Finding #3, however, we could not perform tests to determine whether the adjustments were made to correct any over or under billings that may have occurred.

Recommendation

We recommend that W&WW change its procedures for calculating billed amounts to customers whenever a “True” reading is recorded as part of the customers’ account history, either by not considering the “True” reading in calculating the water usage and related billing amounts or by not including the “True” reading as part of a customer’s account history; for example, by recording the “True” reading only as a memo to the customer’s account. We also recommend that W&WW review the 70,103 accounts that contained at least one “True” reading during the period from July 1, 2008 through June 6, 2011 to determine whether adjustments and refunds should be made because of billing errors caused by “True” readings that follow estimated readings, or whether additional billings should be generated for customers that may have been under billed.

Finding #3

Documentation to support adjustments to customers’ accounts was not maintained in a readily retrievable manner. Therefore, we could not perform tests to determine whether adjustments were made to correct any over or under billings caused by estimating water and related sewer usage.

Analysis

Documentation to support adjustments to customers’ accounts was not maintained in a readily retrievable manner. Many of the adjustment forms were stored in boxes in the W&WW office, but apparently not in any specific sequence, thereby making it difficult to locate the specific adjustment records selected for testing. It is our understanding that, until a few years ago, those adjustment forms were stored on microfiche; but more recently, the forms were electronically scanned, and the original documents were discarded for recycling. However, we were told that the equipment to scan those documents was not working at the time of our request for supporting documentation. Therefore, we could not perform tests to determine whether adjustments were

made to correct any over or under billings caused by estimating water and related sewer usage. According to W&WW's Billing Statistics Summary Report for fiscal year 2010, net water and sewer billing adjustment reductions totaled more than \$40 million.

Recommendation

We recommend that W&WW properly maintain documents, either actual forms, microfiche copies, or electronic files, to support all adjustments made to customers' accounts. Those documents should facilitate subsequent verification of adjustments to determine the reasons for such adjustments and whether they have been appropriately approved.

Finding #4

Properties were included in the City's May 2010 Tax Sale solely because of unpaid water and sewer charges that were based on estimated usage rather than actual meter readings. Since there were no actual meter readings for those properties prior to the 2010 Tax Sale, we could not determine whether those unpaid estimated billings resulted in any over or under billings to the applicable property owners at the time of the Tax Sale.

Analysis

Properties were included in the City's May 2010 Tax Sale solely because of unpaid water and sewer charges that were based on estimated usage rather than actual meter readings. According to a report that MOIT provided to us, 851 properties were included in the City's May 2010 Tax Sale solely because of unpaid water and sewer bills. For 57 of those properties, the bills were based on consecutive estimated usage for periods ranging from 4 quarters (1 year) to 18 quarters (4½ years). We selected three properties and found that the unpaid water, sewer, and related charges at the time of the Tax Sale for the three properties were \$646, \$2,029, and \$824, respectively. Since there were no actual meter readings for those properties prior to the 2010 Tax Sale, we could not determine whether the unpaid estimated billings resulted in any over or under billings to the applicable property owners at the time of the Tax Sale. However, for all three properties, the water and sewer charges remained unpaid at the time of the Tax Sale, and the applicable Tax Sale Certificates were purchased by investors/bidders at the May 2010 Tax Sale.

Recommendation

We recommend that before properties are scheduled to be included in the City's Tax Sale solely because of unpaid water and sewer charges that have been based on estimated rather than actual water meter readings, W&WW should perform actual meter readings to determine whether any of those customers have been over or under billed because of those estimated billings.

Finding #5

There were no actual or estimated meter readings and related billings for numerous new accounts, in both Baltimore City and Baltimore County, for several years after water meters had been installed.

Analysis

There were no actual or estimated meter readings and related billings for numerous new accounts, in both Baltimore City and Baltimore County, for several years after the meters had been installed. According to a report that we obtained from MOIT, there were 3,406 accounts for which new meters had been installed during fiscal years 2008, 2009, and 2010. As of May 5, 2011, however, there were no actual or estimated meter readings and corresponding billings for 1,066 of the regular customer accounts included therein. There were also no actual or estimated readings and related billings for 51 newly established Fire Service/Domestic Combination accounts (for private fire protection service) in Baltimore County during those three fiscal years.

According to the *Rules and Regulations* (Part I, Sections E & F), minimum quarterly water charges are the amounts billed against any property which has a water connection from W&WW's water mains and includes interest, depreciation, and operating charges applicable to the water plant, which is held in readiness to service the maximum demand of the consumer. These charges for both Baltimore City and Baltimore County customers become effective on the installation date of the water service, and are based on the size of the meter installed or to be installed on the supply, or the approved rate code. When the metered consumption exceeds the minimum allowable consumption, the metered rate is billed.

Therefore, using W&WW's daily average consumptions, the MCHN/M (a meter change code identified as a new connection) dates, and the applicable Baltimore City water and sewer rates and Baltimore County water rates for the various meter sizes, we determined that, as of May 5, 2011, the City should have billed and collected more than \$1.5 million for those 1,066 newly established regular accounts in Baltimore City and Baltimore County and approximately \$305,000 for the 51 newly established Fire Service/Domestic Combination accounts in Baltimore County. These amounts do not include the effects of the loss of revenues that could have been generated from minimum quarterly billings if the meters had been read timely by W&WW.

Based on our review of the initial allegations discussed earlier in this report regarding two newly established Baltimore County property accounts, we found that, at least in those two instances, the City eventually billed the property owners for the full amount of the metered water usage, but not until 2½ years or more after the service order dates and up to 3½ years after the MACH/M meter installation dates. Similarly, there were 1,990 meters that were installed in fiscal years 2008, 2009, 2010 for which there were late readings/billings. Those readings/billings occurred as much as three years or more after the MACH/M meter installation dates, after allowing 90 days for the first quarterly reading that should have been done.

Recommendation

We recommend that W&WW adhere to the established *Rules and Regulations* which states that quarterly water charges for both Baltimore City and Baltimore County customers become effective on the installation date of the water service. W&WW should also review all newly established accounts where meters have been installed but no billings have been

generated, beginning with those accounts that have not had any billings for two years or more from the meter installation dates, and bill those customers so that applicable collections of those charges can be made.

Finding #6

W&WW did not have written policies and procedures to guide its staff in performing their duties for assessing, billing, recording, and reviewing water and sewer charges to its customers, and for assigning responsibilities for performing and monitoring various related tasks.

Analysis

W&WW did not have written policies and procedures to guide its staff in performing their duties for assessing, billing, recording, and reviewing water and sewer charges to its customers, and for assigning responsibilities for performing and monitoring various related tasks. The establishment of adequate written procedures would help to ensure consistency of application and adherence to W&WW's authorized policies, including those contained in W&WW's *Rules and Regulations* and the applicable sections of the Baltimore City Code, and would also serve as a valuable aid in training employees. In addition, well-defined, promulgated procedures enhance flexibility of staff assignments.

Recommendation

We recommend that W&WW develop written policies and procedures to guide its staff in performing their duties and clearly communicate those written procedures, as well as provide the necessary training, to all employees responsible for assessing, processing, reviewing, and recording water and sewer charges to its customers. Those written procedures, developed as part of a procedures manual or instructions to applicable staff, should contain sufficient detail to guide staff in performing duties related to the processing of water and sewer charges. Those procedures should, at a minimum, define the duties and responsibilities of applicable staff for assessing, billing, recording, reviewing, approving, and reconciling water and sewer billing/revenue transactions, and should address the various concerns included in this report.


Appendix I

**The Department of Public Works
Bureau of Water and Waste Water's Response to the**

**Review of Allegations Regarding
Water and Waste Water Billing Procedures**

and

Auditor's Comments on Response

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| FROM | NAME & TITLE | Rudolph S. Chow, P.E., Bureau Head | CITY of BALTIMORE MEMO |  |
| | AGENCY NAME & ADDRESS | Bureau of Water & Wastewater 300 Abel Wolman Municipal Building | | |
| | SUBJECT | Response to the Audit Review | | |

TO

Robert McCarty, City Auditor
Department of Audits
City Hall, Room 321

DATE:

December 9, 2011

Attached please find a copy of the Bureau's response to the findings outlined in the auditor's review. This supersedes the previous report dated November 21, 2011.


 Rudolph S. Chow, P.E.
 Bureau Head

RSC:evb

Attachment

cc: Mr. Alfred H. Foxx
Mr. Benjamin I. Meli
Ms. Shaaron Phillips

Introduction

The Baltimore City Comptroller's Office initiated a review of the Department of Public Works' (DPW) Bureau of Water and Wastewater's (Bureau) billing and meter operations as a result of complaints from customers about the incorrect billing for water usage, the lack of billing for water service for an extended period of time; and the inclusion of some properties in the City's May 2010 Tax sale based on unpaid water and sewer charges resulting from estimated rather than actual bills.

The audit report issued six findings, which Bureau staff reviewed and offered an analysis of each finding and the corrective action that will be taken to either remedy the problem and/or improve the process that caused the situation.

Finding #1

Numerous customers had received consecutive quarterly bills that were based on estimated usage rather than actual water meter readings. Many of those customers had received consecutive quarterly estimated billings for as much as 4½ years.

Analysis

The auditor's review is based on a MOIT report from November 10, 2010, that found 18,266 accounts with consecutive quarterly estimated bills for some four to 18 quarters. Staff's investigation revealed an error in the calculations used in the auditor's reporting. Some of the calculations were redundant as accounts were counted repeatedly and included in various billing cycles denoted by the auditor; for example, accounts reflecting 18 consecutive estimated quarterly bills were also included in the list of accounts that reflected 12 consecutive estimated quarterly bills. These same accounts appear in the group of accounts that reflect eight and four consecutive estimated quarterly bills. When the redundancy is eliminated, the actual number of accounts with consecutive estimated bills from the 18,266 identified would be reduced to approximately 10,232, or 2.5 percent of all accounts. Further analysis is required to determine the validity of the 10,232. Of the 10,232 accounts, the report indicated that 2,678 or 0.65 percent of all accounts had received estimated bills for 18 consecutive quarters. These accounts are located in both Baltimore City (1,973) and Baltimore County (705).

The Bureau identified some issues where the meters were not readily accessible and actual reads could not be obtained. Some of the accounts have ARB meters (inside

meters) with inoperable outside remote read boxes; and in some cases meters could not be located or were buried. Those accounts were consistently estimated based on the daily average consumption (DAC) from the last actual reading obtained.

The Bureau recognizes the limitations of the ARB meters and has a process in place to identify and convert ARB meters to outside meters to allow for easy access for reading by the meter reader. As of September 15, 2011, there were 16,877 ARBs remaining in the system. We understand the urgency to remove these meters and have escalated our activities to locate and replace those remaining in order to ensure customer receive bills based on actual meter readings. On June 11, 2011, there were 5,330 accounts identified as cannot locate; to date a total of 1,229 have been rectified by locating the meter and obtaining a reading, or by consolidation of the meter code. The majority of accounts coded as cannot locate are within the Baltimore County jurisdiction. We will continue to work with Baltimore County staff to locate, uncover and mark these water meters. An actual reading is required to determine if customers were over charged or under billed for water usage.

The Bureau's goal is to accurately bill and collect for all metered water use; which requires that all meter readings are recorded and reported accurately. The following chart reflects the percentage of actual meter readings obtained during the previous fiscal years, including the 92.80% improvement from April to September 2011.

Outcome Measures of Actual Reads

| Objective | Outcome Measure | FY 2009 Actual | *FY 2010 Actual | **FY 2011 Actual | Actual Read % 4/1/11-9/30/11 |
|---|-------------------------------------|-----------------------|------------------------|-------------------------|-------------------------------------|
| Actually read and recorded meter readings | Percentage of actual meter readings | 88.40% | 81.10% | 76.90% | 92.80% |

*Weather event occurred, blizzard.

**Mass estimation from 2/1/11-3/31/11

Also note the following account activity during the period of April 1, 2011, through September 30, 2011:

- 822,000 total accounts were billed during this period.
- 56,268 of the total number of accounts billed were estimated during this period.
- 7.2% of all accounts billed were estimated.

Corrective Action:

As of November 10, 2011, we have increased the number of dedicated employees from two to six who are tasked with locating, uncovering and marking water meters. The Department will continue working with Baltimore County representatives to locate and uncover the meters located in Baltimore County.

The Department of Public Works also is developing a meter card that will be mailed on a quarterly basis to customers with inside meters requesting that they provide an actual reading from the meter. The card will enable the Bureau to use actual readings submitted by customers to generate bills that reflect actual water usage.

Finding #2

We believe that billing errors occurred whenever a “True” reading was taken (usually to determine whether the meter was properly working) and recorded as one of the accounts’ histories (usually quarterly readings).

Analysis

True readings are an integral component of the water billing system. When an incorrect reading, either actual or estimated, is recorded on the metered water account, the corrective action, after the adjustment is processed, is the inputting of a true read. This true reading registers actual water consumption and aligns the account for future billing.

The Revenue Measurement and Billing Division personnel reviewed 9,515 of the 70,103 true readings, which were obtained from July 2008 to June 2011 as identified in Auditor’s review. A total of 5,396 or 57% of those accounts were in Baltimore City and 4,119 or 43% were in Baltimore County

The results of analysis are below:

| TOTAL | JURISDICTION | ADJUSTMENTS REQUIRED | TOTAL ACCOUNTS OVERBILLED | AMOUNT OVERBILLED | TOTAL ACCOUNTS UNDERBILLED | AMOUNT UNDERBILLED | TOTAL AMOUNT (NET) | NO ADJ. REQUIRED | ALREADY ADJUSTED |
|-------|--------------|-------------------------|---------------------------------|----------------------|----------------------------------|-----------------------|--------------------------|---------------------|---------------------|
| 5396 | CITY | 2385 (44%) | 2222 | \$657,508 | 163 | \$127,511 | \$529,997 | 2533 (47%) | 478 (9%) |
| 4119 | COUNTY | 2887 (70%) | 2747 | \$215,087 | 140 | \$38,181 | \$176,906 | 944 (23%) | 288 (7%) |

The accounts reflected in the chart were taken from a residential reading sector (02), which contained accounts from both Baltimore City and Baltimore County. The entire sector was reviewed.

The average adjustment in Baltimore City was approximately \$222.22; and in Baltimore County, the average adjustment was \$61.28.

The remaining 60,588 account will be reviewed to determine if an adjustment is required. The projected timeline for completion of the review is mid-January 2012.

Corrective Action

All 70,103 accounts will be reviewed to determine if an adjustment is required. The Bureau has met with MOIT to discuss preparing a report reflecting total consumption billed compared to total consumption that should have been billed, based on the true reading recorded from the last actual billed reading. Staff will immediately adjust accounts with incorrect meter readings, either actual or estimated.

In the short term, the Bureau is proceeding with the hiring of temporary employees to assist with handling the backlog. The long-term plan is to reorganize the Revenue Measurement and Billing Division to ensure processes are streamlined, and that tasks are consolidated and made more efficient enabling more effective and responsive customer service. A true reading will only be recorded after an adjustment is applied to the account when over or under billing has been determined; and if minimum usage is applied based on the size of the meter at the location. In cases of minimum usage the account would not warrant a review for an adjustment.

Finding #3

Supporting documentation was not maintained in a readily retrievable manner. Therefore, test could not be performed to determine whether adjustments were made to correct any over or under billing caused by estimating water and related sewer usage because of the inability to locate specific adjustment records selected for testing.

Analysis

Supporting adjustment documentation is maintained by transaction date. The transaction date is the actual date the adjustment was processed. Currently documents

are maintained in file cabinets and storage boxes by transaction date at two locations: 200 N. Holliday Street, Room 404, Baltimore, Maryland 21202; and at the Meter Operations Unit at 200 N. Franklintown Road, Baltimore, Maryland 21223.

In 2009 the Department began an electronic process of scanning and archiving documents. The documents maintained are the official transaction forms approved by the supervisor; and all other pertinent documents, such as receipts, work orders and account history, necessary for adjustment to be processed. The Bureau recognized the need to centralize the documents to ensure better accessibility. The Bureau maintains supporting documents for adjustments processed in multiple-labeled storage boxes filed by the transaction date of the processed adjustments.

Corrective Action

The Bureau is in the process of reviewing our current tracking and monitoring process, and documentation controls to ensure that we are employing best practices; and to ensure that documents are being maintained in a user-friendly manner.

Finding #4

Properties were included in the City's May, 2010 Tax Sale solely because of unpaid water and sewer charges that were based on estimated usage rather than actual meter readings. Since there were no actual readings for those properties prior to the 2010 Tax Sale, we could not determine whether those unpaid estimated billings resulted in any over or under billing to the applicable property owners at the time of the Tax Sale.

Analysis

The Bureau has verified with the Department of Revenue Collections that for the upcoming 2012 Tax Sale in order for a property to become eligible for a tax lien solely for water, there has to be an outstanding balance of \$350 with 3 or more delinquent water bills.

A property becomes eligible for inclusion in a tax sale because of nonpayment of any amount toward water usage for an extended period of time. It's possible that the owners of the properties included for tax sale apparently made no attempt to render payment or inquire about the charges, estimated or otherwise, which would have alerted both the Bureau and the owner to the fact that the meter may have been inaccessible for

reading. The estimated bill is one mechanism the Bureau employs to ensure that an active account is accountable for water usage. Nonpayment of an estimated or actual bill can make any property eligible for a tax sale.

The audit review identified accounts for properties included in the City's May 2010 Tax Sale, which reflected estimated rather than actual meter readings. The Bureau of Water and Wastewater has identified many issues where the meters for these properties were not accessible and actual reads could not be obtained. Some of the issues found were: ARB meters (inside meters) with inoperable outside remote read boxes, meters which could not be located, and meters that were buried. Those accounts were estimated based on a daily average usage from the last actual reading obtained.

We reviewed the 57 properties that were included in the 2010 Tax Sale and determined that 15 of those accounts were estimated using the minimum rate, which generated no over or under billing. These 15 accounts would not have been eligible for an adjustment review. The minimum charges were based on the size of the meter at the location. Further review of the remaining 42 properties found that the accounts for 22 of them had delinquency issues; or at some period, they were in a delinquent status for nonpayment. There were no payments received on some accounts for periods as long as three (3) years.

As mentioned previously, there were several properties with an ARB (inside meter), which had an inoperable remote, and the meter reader could not obtain a reading. There were 21 locations included in the tax sale that fell under this scenario. One of the properties where an ARB meter existed also was in a delinquent status for nonpayment during this period.

The Bureau will attempt to schedule with the customer to gain entry inside the property to determine if the meter is functioning properly, and to obtain an actual reading. Once a reading is obtained, the account can then be reviewed to determine if the account was over or under billed, which may not have an impact on the property's inclusion in a tax sale if it is demonstrated that the required payments were not made. These locations will also be submitted for conversion to outside meter settings for future reads.

Corrective Action

We will work with MOIT to identify accounts with estimated quarters that fit the 2012 Tax Sale criteria. A daily report will be generated, which will enable the Bureau to identify, investigate, analyze and rectify accounts prior to the properties becoming eligible for a tax sale. We will record and bill customer accounts based on actual reads of all accessible meters. A physical investigation will be conducted along with verification from the Department of Housing to determine if properties are occupied or deemed

vacant structures. If the property is vacant, we will code the account as such to prevent estimation. The Bureau also will ensure that the mailing information on each account is accurate to ensure that customers are receiving all notifications including regular water bills.

Please look at the information below and make certain it states what you wanted it to state and is accurate. Also are some of these numbers supposed to add up to 57 or is overlap factored into each category?

A further analysis of the 57 properties submitted for the 2010 Tax Sale found the following:

- There were 21 locations identified in the audit review as having ARB meters that have been submitted for conversion to an outside meter as part of the existing urgent needs contract.
- Of the 57 accounts we determined that 24 properties included information (true read or actual read) that could be used to process an adjustment for the estimated quarters;
- 13 of the 24 accounts containing an actual read were previously adjusted; and
- As of December 7, 2011, 11 accounts were approved for an adjustment using the true reading recorded.
- All of these properties with the exception of one would remain eligible for tax sale because of the outstanding balances and issues of nonpayment.

Further field investigation to obtain a reading is required for 17 locations to determine if there was any over or under billing. One account was under billed based on the true reading. The remaining 15 locations were those mentioned earlier that had bills based on minimum usage requiring no adjustment.

Finding #5

There were no actual or estimated meter readings and related billings for numerous new accounts, in both Baltimore city and Baltimore County, for several years after water meters had been installed.

Analysis

When a new account is added to the metered water system several steps must occur before the account can be billed:

1. An application is received from either Baltimore City or Baltimore County;
2. Application processed, an account is established to the metered water billing system;
3. A service order work order is created; and
4. Meter Reading unit assigns a routing number in order for account to be read and billed.

The breakdown outlined in the auditor's review occurred in Step 4; the accounts were not assigned a routing number. If an account does not have a routing number, it will not be read or billed because it is not placed in the handheld device for the meter reader to obtain the reading.

New accounts are assigned a status of inactive-new. This status means that the property has not been inspected to determine if the infrastructure including the water supply service has been completed. The prospect of assigning a route number to these accounts would inflate the route with inactive services. Consequently, the account would not be routed even though the service and meter had been installed and the status updated to active until after an inspection had been completed.

Currently, all active accounts have been routed and are being billed for all metered water consumption from the date of the meter installation. Also, all inactive-new accounts are being routed. This will ensure that even if the inspection is not completed the meter reader will visit the location quarterly.

It is important to note that the City did not lose revenue as a result of the delayed billing. Once the accounts are identified, they are billed for all the water consumption registered on the meter from the date of installation. Since the billing for these accounts may be higher than normal, customers who inquire, may be offered payment plans, senior citizen discounts and/or low income discounts.

Corrective Action

MOIT will provide Meter Operations with a biweekly report of all new accounts that have been added to the metered water billing system that requires a route number. Office support staff and meter reading supervisors are tasked with ensuring that each new account is routed timely in order to capture all readings during the period in which the water is consumed and billed accordingly. This task will be monitored by the Meter Reading Superintendent.

Finding #6

Water and Wastewater did not have written policies and procedures to guide its staff in performing their duties for assessing, billing, recording, and reviewing water and sewer charges to its customers, and for assigning responsibilities for performing and monitoring various related tasks.

Analysis

The Bureau of Water and Wastewater staff processes adjustments in accordance with the rules and regulations and the applicable sections of the Baltimore City Code. The Bureau has determined that there are written procedures to guide its staff, and the applicable procedures were submitted to the Audits Department. These procedures will be routinely reviewed for clarity and intent with assistance from the Bureau Head's Office and the Law Department.

Corrective Action

The Bureau will review the current policies and procedures and update and/or modify as necessary to ensure that we have stringent guidelines enabling staff to appropriately perform its duties. These procedures shall be written, communicated and reviewed periodically to ensure all staff is knowledgeable about what is required and consistent in application of the policies and procedure set forth by the Bureau.

Conclusion

It is DPW's Bureau of Water and Wastewater's intent to ensure that all customers are provided quality service in a timely manner. This timely service is underscored by the accurate reading and billing for water usage. We will make every effort to appropriately bill accounts in the future. To this end, the Bureau is in the process of securing a new billing system; as well as a new automated meter reading/infrastructure system that will enhance the agency's ability to provide a more efficient process, with greater effectiveness, which will lead to better customer service and satisfaction.

While the Bureau is not waiting to make improvements within the current system, the costly replacement of metering and billing systems would be mapped out and implemented over a three to five year time period. Baltimore City Public Works wants to engage the community in its plans for updated systems and will be hosting community

forums and, even customer focus groups, to review and provide input as plans for these significant changes develop.

**AUDITOR'S COMMENTS ON
THE DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTE WATER'S RESPONSE
TO THE REVIEW OF ALLEGATIONS
REGARDING WATER AND WASTE WATER BILLING PROCEDURES**

The response of the Department of Public Works Bureau of Water and Waste Water (W&WW) to our review is included in this Appendix. According to W&WW's response, W&WW concurs with our recommendations, except where otherwise noted, and W&WW intends to properly implement the suggested practices. The corrective action outlined in W&WW's response addresses many of our findings and recommendations. However, there are several statements in W&WW's response that we believe require further comments or clarification.

Finding #1

Numerous customers had received consecutive quarterly bills that were based on estimated usage rather than actual water meter readings. Many of those customers had received consecutive quarterly estimated billings for as much as 4½ years.

According to W&WW's response, its staff's investigation revealed an error in the calculations used in the auditor's reporting; i.e., some of the calculations were redundant as accounts were counted repeatedly and included in various billing cycles denoted by the auditor. We disagree with that comment. The initial reports that we received from the Mayor's Office of Information Technology (MOIT) included 37,525 accounts with at least four, eight, twelve, and eighteen consecutive estimated billings. We removed 19,259 accounts that were reported in more than one category. For example, the number of accounts that received eighteen consecutive quarterly billings was removed from the accounts that received twelve, eight, and four consecutive quarterly billings, because the initial reports from MOIT included those accounts in more than one category. Therefore, the 18,266 accounts included in our finding represent unduplicated accounts.

Finding #5

There were no actual or estimated meter readings and related billings for numerous new accounts, in both Baltimore City and Baltimore County, for several years after water meters had been installed.

As part of its response dated December 9, 2011, W&WW stated that currently, all active accounts have been routed and are being billed for all metered water consumption from the date of the meter installation, and all inactive-new accounts are being routed. According to W&WW, this will ensure that even though the inspection is not completed, the meter reader will visit the location quarterly. However, one of the properties included in the 1,066 accounts (refer to

Finding #5 on page 11 of this report) for which there were no actual or estimated meter readings and corresponding billings as of May 5, 2011 was located on a street consisting of fifty properties within a particular development in Baltimore County. Based on our review, we noted that as of January 10, 2012, the meters had not been read and property owners had not billed for 25 of those properties. According to the Maryland Department of Assessment and Taxation records, the deeds for the sale of those 25 properties covered a range of dates from 2008 to 2011. Furthermore, according to W&WW's records, on August 5, 2011, the owner of one of those properties inquired about not receiving a water bill. According to the W&WW billing records, as of February 2, 2012, the meter for that property had not yet been read and the property owner had not been billed for any water service.

Finding #6

W&WW did not have written policies and procedures to guide its staff in performing their duties for assessing, billing, recording, and reviewing water and sewer charges to its customers, and for assigning responsibilities for performing and monitoring various related tasks.

In its response, W&WW stated that there are written procedures to guide its staff, and the applicable procedures were submitted to the Department of Audits. We began asking for those procedures on May 31, 2011. We received some related information regarding W&WW's policies in a "piece-meal" manner through various emails from June 8, 2011 through July 11, 2011. However, we believe that enhancements can be made if W&WW develops a complete procedures manual for the W&WW Revenue Measurement and Billing Division. The manual should, at a minimum, contain sufficient details that define the duties and responsibilities of W&WW's applicable staff and provide them with guidance to perform their specific duties associated with assessing, billing, recording, reviewing, approving, and reconciling water and sewer billing/revenue transactions. We agree that the corrective action included in W&WW's response would resolve this finding.