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COMPTROLLER**



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**OFFICE OF THE  
NEW YORK STATE COMPTROLLER**

**DIVISION OF STATE  
GOVERNMENT ACCOUNTABILITY**

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**NEW YORK CITY  
DEPARTMENT OF  
ENVIRONMENTAL  
PROTECTION**

**UNIVERSAL WATER  
METERING PROGRAM**

**Report 2006-N-2**

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## AUDIT OBJECTIVES

Our objectives were to determine whether the New York City Department of Environmental Protection (DEP) has taken all appropriate steps to complete its Universal Water Metering Program; is systematically replacing aging water meters; and is repairing or replacing malfunctioning water meters in a timely manner.

## AUDIT RESULTS - SUMMARY

DEP is responsible for the operation and maintenance of New York City's municipal water system. In 1988, DEP initiated its Universal Water Metering Program. The purpose of the program was to charge customers for actual water usage (customers were previously charged a flat rate not based on usage). The program's goals were to promote water conservation, water supply system management, and rate equity.

We found that DEP has installed water meters for most of its customers and converted most of these customers to usage-based billing. However, DEP is well behind schedule in its efforts to systematically replace thousands of meters that are at, or near the end of, their useful lives. Since such meters typically fail to record some or all water usage, the goals of water conservation and rate equity are at risk of being undermined if these meters are not soon replaced. Using revenue forecasts prepared by DEP, we concluded that the City could have realized an estimated \$32 million of additional revenue during fiscal years 2006 and 2007 if water meters were replaced on schedule. To preserve the gains that were made when the meters were first installed, we recommend certain improvements be made in DEP's meter replacement efforts.

DEP is also responsible for the repair or replacement of malfunctioning water meters. We examined the timeliness of some of this work and found that it often was not completed within the expected time frames. For example, priority repairs should be completed within seven days, but the priority jobs in our sample took an average of 58 days, and as long as 129 days, to complete.

Under DEP's Transition Program, certain customers did not have to immediately convert from the old flat-rate billing system when their meters were installed. Instead, they were given time to review their water usage and prepare for metered billing. Their transition billing status was supposed to be temporary, but 49 of the 51 transition accounts in our random sample of such accounts had been in the Transition Program for two to 15 years. The program was originally scheduled to end in 1997, but has been extended annually and is currently set to expire on June 30, 2009. We question whether accounts are truly transitional when they have remained in this status for as many years.

At the time of our audit, meters had reportedly been installed for more than 96 percent of the approximately 825,000 customer accounts in the New York City water system. DEP was not actively attempting to install meters for the remaining 28,993 unmetered accounts, but we determined that additional installation efforts may be warranted for some of these accounts. For example, DEP could work more actively with the New York City Housing Authority, which has been slow to fulfill its agreement to install meters at its housing units.

Our report contains 9 recommendations for improving DEP's administration of its Universal Water Metering Program. DEP officials agreed with these recommendations.

This report, dated September 30, 2008, is available on our website at: <http://www.osc.state.ny.us>. Add or update your mailing list address by contacting us at: (518) 474-3271 or  
Office of the State Comptroller  
Division of State Government Accountability  
State Audit Bureau  
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Albany, NY 12236

## BACKGROUND

New York City's municipal water system provides drinking water and sewer services to City residents and businesses. The system is managed by three entities: the New York City Municipal Water Finance Authority (Water Finance Authority), the New York City Water Board (Water Board), and the New York City Department of Environmental Protection (DEP).

The Water Finance Authority is a public benefit corporation. It was established in 1984 to finance capital renovations and improvements to the City's water system. The Water Board is also a public benefit corporation. It was established in 1984 to lease the water system from the City until provision is made for the repayment of all outstanding bonds or other indebtedness of the Water Finance Authority.

DEP is a City agency. It is responsible for the operation and maintenance of the water system. It is also responsible for maintaining information about customer accounts, installing meters to measure the amount of water used by each account, reading the meters, billing the accounts, and providing customer services. At the time of our audit, there were approximately 825,000 customer accounts in the City.

In 1988, DEP initiated its Universal Water Metering Program. The purpose of the program was to charge customers for actual water usage (customers were previously charged a flat rate not based on usage). The program's goals were to promote water conservation, water supply system management, and rate equity.

The Universal Water Metering Program was also expected to help DEP comply with three consent decrees issued by the New York State Department of Environmental Conservation (a consent decree is a binding legal agreement resulting from a court order). Generally, the consent decrees were intended to reduce water pollution, improve water quality, and promote water conservation in New York City's municipal water system.

To encourage cooperation with the Universal Water Metering Program, DEP imposes a 100-percent surcharge on customers' accounts if they refuse to permit the installation of a water meter. According to the Water Finance Authority's May 2006 Due Diligence Report, more than 96 percent of the customer accounts in the City (795,901 accounts) were metered by 2006, while the remaining 28,993 accounts were still unmetered.

Water meters generally have useful lives of between 15 and 18 years. Since the Universal Water Metering Program was initiated in 1988, many of DEP's meters are at or near the end of their useful lives. Accordingly, DEP has implemented a systematic replacement program for these meters. DEP is also responsible for repairing or replacing any water meters that are not functioning properly.

Under DEP's Transition Program, certain customers did not have to convert from the old flat-rate billing system when their meters were installed. Instead, they were to be given

about a year after the installation to review their water usage, repair leaky plumbing, and take other actions to prepare for metered billing. The Transition Program was originally scheduled to end on June 30, 1997, but the deadline has been extended annually by the Water Board and the Program is currently scheduled to end on June 30, 2009. According to the May 2006 Due Diligence Report, more than 31,000 metered accounts were still in the Transition Program.

## **AUDIT FINDINGS AND RECOMMENDATIONS**

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### *Systematic Replacement of Meters*

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As a water meter approaches the end of its useful life, it tends to become less accurate and understate the amount of water used by the customer. When this happens, the customer is underbilled and the water system loses revenue.

To prevent revenue losses from old and inaccurate meters, DEP initiated a systematic replacement program for its meters. The purpose of the program is to replace aging meters before they begin to fail. DEP drafted a proposal for the program in August 2000. The proposal stated that the program would begin between 2000 and 2002, when the initial installation of meters under the Universal Water Metering Program was winding down.

According to the proposal, in the first phase of the program, DEP was to systematically test and replace 5,000 of its oldest (16 years or older), larger (2-inch) meters. This phase was to be implemented at an estimated one-time cost of \$18 million over a three-year period. Starting in the fourth year, once the installations are complete, DEP estimated it would recover recurring lost revenue of \$16 million per year. We estimated that for two

fiscal years, 2006 and 2007, the City would have realized \$32 million in water revenues. To test the accuracy of these initial cost and revenue projections, DEP was to perform a study to track the replacement costs and revenue increases of each customer account.

In the second phase of the program, DEP was to test and, as necessary, replace its remaining large meters, which could have been in service for as long as 15 years. The proposal did not specify how many of these meters there were or how long the replacement process was expected to take, but it did indicate that the process was expected to cost between \$7 million and \$12 million a year with an estimated increase of between \$10 million and \$15 million a year in new billing revenue once the installations were complete.

In the third phase of the program, which was to begin sometime between 2002 and 2005, DEP was to start replacing as many as 200,000 smaller meters that would be between 15 and 18 years old. Cost and revenue estimates were not provided for the third phase of the program.

We examined DEP's implementation of its systematic meter replacement program and found that DEP was well behind schedule. As of October 2006, it had completed only about 25 percent of the program's first phase, as it had replaced 1,232 of the 5,000 oldest meters. It had yet to begin tracking the revenue from the replacement meters and had yet to initiate the second or third phase of the program.

In its proposal for the program, DEP stated that the initial 5,000 meters to be replaced represented just 1 percent of New York City's total meter population, but could represent as much as 10 percent of the City's total revenue for water services. It is thus important that DEP act without further delay to complete phase one of the program and move on to

phases two and three. It is also important that DEP complete the revenue tracking study to confirm its expectations for the program.

DEP officials indicated that phase one was stalled at 1,232 replacement meters because the contractors doing the installations had expended all the available funding under the contracts. However, an internal DEP report indicated that one of the contractors still had more than \$621,000 in available funding at the end of the contract period.

DEP officials also noted that the start of the program was delayed for three reasons. First, the staff who were to be assigned to the replacement program were still working on initial meter installations in the Universal Water Metering Program, which was taking longer than expected to wind down. Second, DEP wanted to implement the meter replacement program at the same time that its new automated meter reading system was implemented, but the implementation of the meter reading system was delayed. Third, funding for the replacement installation contracts was delayed because of concerns expressed by the City Comptroller about the terms of the contracts. As a result of these three factors, the meter replacement program did not begin until 2004, two to four years later than scheduled.

We determined that staff were hired to perform the revenue tracking study but, as of September 30, 2007, the study had not been completed. DEP officials also stated that the program's proposal was modified and the originally-planned phases were not followed. However, they provided no documentation showing that the proposal had, in fact, been modified, or that a different approach to systematic meter replacement had been developed.

We asked DEP officials for a listing of the meters that were to be replaced in the systematic meter replacement program. However, the officials were unable to provide us with a complete listing, because the list for the Bronx was "lost." They provided us with lists for Manhattan, Brooklyn, and Queens (Staten Island is not included in the program), and these lists indicate that a total of 83,995 meters were to be replaced in these three boroughs.

The longer the meter replacement program is delayed, the greater the risk these meters will fail. At the same time, other meters are getting older and they will soon need to be replaced as well. DEP already has a backlog of uninstalled replacement meters, and that backlog will only grow unless prompt action is taken to expedite the meter replacement process. We recommend DEP take such action.

In particular, to ensure all meters needing replacement are replaced in a timely manner, we recommend DEP develop a formal work plan for the replacement of aging meters, monitor the implementation of the work plan, and take correction action if the replacements fall behind schedule. We further recommend DEP maintain complete and accurate listings of the meters to be replaced, adding additional meters as they become old enough to require replacement.

DEP officials told us that they wanted to implement the meter replacement program at the same time that their new automated meter reading system was implemented. In this system, an automated device would be attached to the water meter. This device enables the meter to be read remotely and thus eliminates the need for a person to gain access to the meter. According to DEP, automated meter reading systems are being used by at least four large municipalities, all

of which have seen a net increase in revenue as a result of the systems.

DEP officials told us that their implementation of an automated meter reading system has been delayed because they have yet to decide whether to use a fixed receiver system or a mobile receiver system. They said they have informally agreed to use a fixed system because the New York City Department of Information Technology and Telecommunication has received approval to install a communications network that would support such a system (the network would be used by various City agencies for various purposes). However, DEP's automated Customer Information System would have to be modified to enable it to accept data from this network. DEP has not made a final decision on this matter. We recommend DEP formally assess the costs and benefits of the two options for an automated meter reading system and select the option that appears to be most cost-effective.

### Recommendations

1. Complete the revenue tracking study.

(In reply to our draft audit report, DEP officials agreed with our recommendation and provided a report dated November 29, 2007.)

Auditor's Comments: DEP provided an interim report that covered only the boroughs of Brooklyn and Queens. They estimated that an increase in revenue of approximately \$2 million per year has been realized from this portion of the contract. The report indicates an analysis of the data from the Bronx and Manhattan is in process and will be combined with the data from the interim report.

2. Develop a formal work plan for the replacement of aging meters. Monitor the

implementation of the work plan and take corrective action if the replacements fall behind schedule. Maintain complete and accurate listings of the meters to be replaced, adding additional meters as they become old enough to require replacement.

(In reply to our draft audit report, DEP officials replied that they explained that the existing billing system made tracking difficult or impractical. They added that the recommendation will be partially implemented through the Automated Meter Reading project and the more comprehensive solution will occur in the next few years with the new billing system.)

3. Improve the management of contract funds in the systematic meter replacement program so that all available contract funds are used during the contract period.

(Responding to the draft audit report, DEP officials disagreed with the recommendation on the basis they have taken appropriate steps to manage the performance on these contracts. They added that five of the six contracts have expended 83 percent of the encumbered funds. One contractor has not performed as expected and was evaluated as "Needs improvement.")

Auditor's Comments: The response reflects the current status of the amounts expended for the contracts. For one of the five vendors this is a substantial amount of money. Since the end of our field work, the contract expenditures for this vendor went from \$495,314 to \$6,053,976. The amounts for the other four contractors also increased, but not to the same extent. The amount expended for the sixth contractor is still only 17.9 percent of contract funds. This indicates

that there is still opportunity to improve further.

4. Formally assess the costs and benefits of the two options for an automated meter reading system and select the option that appears to be most cost-effective.

(DEP officials replied to the draft audit report that they agree and have implemented the recommendation.)

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#### *Meter Repair/Replacement Contracts*

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DEP is responsible for repairing or replacing water meters that are not functioning properly. Such meters may be identified by customers and reported to DEP, or they may be identified by DEP staff or contractors when the meters are read or other work is performed on water and sewer lines. When a malfunctioning meter is identified, DEP issues a work order for its repair/replacement. The work order may be issued in-house or it may be issued to a contractor. We examined the work orders issued to contractors.

At the time of our audit, DEP had two such contractors. Both of the contracts were awarded in 2005. One (contract 0434) totaled \$10.5 million and the other (contract 0412) totaled \$6.5 million. Both contracts covered two-year periods, and the contract amounts represented the expected value of the work to be performed during those periods.

The contractors were to receive their work orders from DEP weekly. Priority work orders were to be completed within 7 days, while non-priority work orders were to be completed within 30 days. If there were any problems with a work order, such as a wrong address, the contractor was to refer the work order back to DEP. DEP was to resolve the problem and, if necessary, reissue the work order.

We reviewed a sample of completed work orders to determine whether the malfunctioning meters were repaired or replaced in a timely manner (i.e., within 7 days for priority work orders and within 30 days for non-priority work orders). We selected our sample from the 722 work orders that had been completed by the two contractors as of May 31, 2006, randomly selecting 25 work orders for each contractor. Our sample contained 7 priority and 43 non-priority work orders.

We found that 13 of the 50 work orders in our sample (26 percent) were completed in a timely manner (all 13 were non-priority work orders). However, the remaining 37 work orders (7 priority and 30 non-priority) were not completed in a timely manner. The 7 priority work orders took between 12 and 129 days, and an average of 58 days, to complete. The 30 non-priority work orders took between 31 and 204 days, and an average of 73 days, to complete.

Malfunctioning meters may fail to record some or all of the water flowing past their readers. As a result, DEP may have lost revenue because of these delays in repairing or replacing malfunctioning meters.

For the 37 work orders that were not completed in a timely manner, we analyzed documentation relating to the work orders to determine why they were delayed. We found they were delayed for the following reasons:

- Ten work orders were delayed because the customer did not initially provide access to the meter.
- Seven work orders were delayed because the work order had to be referred back to DEP for the resolution of a problem.

- Three work orders were delayed for other reasons, such as a difficult-to-access meter.
- For the remaining 17 work orders, no particular reason was given for the delay.

To provide better assurance that work orders will be completed in a timely manner, we recommend DEP develop a tracking tool for monitoring work order completion. In particular, DEP needs to ensure that work orders returned by contractors for the resolution of a problem are re-issued in a timely manner. The seven work orders that were referred back to DEP for the resolution of a problem had the longest delays in our sample, as they took an average of 133 days to complete (it took DEP 62 days, on average, to resolve the problem and inform the contractor).

In most instances, the contractor should not be paid until the job has been completed and approved by a DEP inspector. However, in two of the work orders in our sample, the contractors were paid for work that had been rejected by an inspector. We recommend DEP verify that contractors are not paid until work previously rejected has been approved by an inspector.

We also noted that inspections had been performed for just 23 of the 50 work orders in our sample. DEP has not established a suggested time frame for its inspections, and we determined that the inspections in our sample were completed an average of 79 days after the job was completed. To better promote timeliness in this part of the repair process and ensure that inspections are, in fact, performed as required, we recommend DEP establish a suggested inspection time frame and monitor the performance of its inspectors against this time frame.

Under the two contracts for meter repair and replacement, it was expected that a certain number of meter repairs would have to be done during the two-year contract period. A total of 9,707 work orders were budgeted for contract 0434, and 5,520 work orders were budgeted for contract 0412. However, as of May 2006 (about 11 months into contract 0434 and about 9 months into contract 0412), just 722 work orders had been completed and only \$934,059 of the \$17 million budgeted for the two contracts (less than 6 percent) had been expended. We spoke with representatives of the two contractors, and they told us they were incurring financial losses because of the unexpectedly-low level of contract activity.

When we asked DEP officials about the low level of activity on these contracts, the responsible DEP manager told us that almost all large meter repairs were being done in-house. We recommend DEP improve its management of meter repair and replacement contracts. If DEP is going to award such contracts, the amount of work budgeted for the contracts should be realistic and the available contract funds should be used as intended.

### **Recommendations**

5. Develop a tracking tool for monitoring work order completion and use the tool to ensure that work orders are completed within the required time frames.

(DEP officials replied they agree and the recommendation has been partially implemented with the new billing system.)

6. The recommendation has been deleted.

(The original recommendation was "Ensure that work orders are promptly reissued to contractors when they are



returned to DEP for resolution of a problem.” In replying to our draft audit report, DEP officials disagreed with the recommendation and stated that the contract does not mention “reissuing” of work orders. They added that DEP has never withdrawn a work order. They also explain the contractor’s responsibility under the contract.

Auditor’s Comments: We have revised the report to delete reference to “reissuing” work orders. However, the amount of time to resolve problems when contractors returned work orders to DEP (i.e., average 62 days) still has to be reduced and DEP should provide contractors with a response in a timely manner.

7. The recommendation has been deleted.

(The original recommendation was “Ensure that contractors are not paid until their work has been approved by an inspector.” DEP officials replied to our draft audit report that they disagree that all work should be inspected before the contractors are paid. They indicated that this is unnecessary and not cost-effective.)

Auditor’s Comments: The report has been revised based on the DEP response. However, the completion of previously rejected work should be inspected before the contractor is paid.

8. Establish a suggested time frame for the inspections of contracted meter repairs and replacements. Monitor the inspectors’ performance against this time frame, and ensure that all required inspections are performed.

(DEP officials replied to our draft audit report that they agree and will implement it within the constraints of their union contracts.)

9. Ensure that the amount of work budgeted for meter repair and replacement contracts is realistic and the available contract funds are used as intended.

(DEP officials replied to our draft audit report that they agree with the recommendation as worded.)

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### *Transition Accounts*

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The Water Board is authorized to establish rates and fees for New York City’s water system. In 1992, the Water Board established a Transition Program that allows certain residential premises metered on or after July 1, 1992, to continue being billed at the flat rate that was in effect before the implementation of the Universal Water Metering Program. The Transition Program was designed to give the owners time to review their metered water usage, repair leaky plumbing, educate tenants about water conservation, and install low-flow fixtures before metered billing began.

To be eligible for the Transition Program, a residence must have been constructed before July 1, 1992. In addition, prior to July 1, 1997, the residence’s service line had to measure at least one and one-half inches in diameter. After that date, the residence had to have six or more dwelling units.

According to the initial eligibility criteria developed by the Water Board, eligible residences could remain in transition status for a period of a little more than one year. However, this was changed as the program was extended. The Transition Program was originally scheduled to end in June 1997, but this end date has been extended annually by the Water Board; and the program is currently set to expire on June 30, 2009.

We asked DEP officials for a listing of the customer accounts in the Transition Program.

They provided us with a listing consisting of 32,913 accounts. We randomly selected 55 of these accounts and reviewed account information to determine whether the accounts met the requirements for program eligibility.

When we reviewed the account information, we noticed that four of the accounts were not actually in the Transition Program. The remaining 51 accounts were actual transition accounts, and we determined that all 51 properties associated with the accounts met the requirements for Transition Program eligibility.

We noted that 49 of the accounts had been in the Transition Program for at least two years and as long as 15 years. However, we found no indication DEP was routinely transferring accounts from the Transition Program to metered billing. The responsible DEP manager told us that accounts were transferred from the Transition Program to metered billing, but we were provided with no documentation of such transfers. DEP management also informed us that accounts have been transferred from the Transition Program when owners requested a transfer to metered billing or it was determined during account maintenance that an account no longer qualified for the program. We were also told that delinquent transition accounts had been targeted for transfer if past due amounts were not paid. However, we were provided with no documentation of these or any other transfers, and the 49 accounts in our sample had not been transferred.

In allowing these 49 accounts to avoid metered billing, in some cases for years, when most other accounts had to convert to metered billing, DEP is not realizing the rate equity that was supposed to be achieved through the Universal Water Metering Program. In allowing the accounts to remain in transition

status for so long, DEP is also not realizing the program goal of water conservation.

### **Recommendation**

10. The recommendation has been deleted.

(The original recommendation was “Identify all accounts that have been in the Transition Program for more than the year-plus period allowed by the Water Board and refer these accounts to the Water Board for conversion to metered billing.” DEP officials disagreed stating that the Water Board has extended the transition period for all buildings regardless of when they entered the program. They added that this is a matter of policy and public rule.)

Auditor’s Comments: The Transition Program was designed to give the owners time to review their metered water usage, repair leaky plumbing, educate tenants about water conservation, and install low-flow fixtures before metered billing began. However, it is questionable whether 17 years for some of the accounts can be viewed as “transitional.”

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### *Unmetered Accounts*

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The Universal Water Metering Program was expected to help DEP comply with three consent decrees issued by the New York State Department of Environmental Conservation. One of the consent decrees mandated that DEP install water meters throughout New York City by July 1, 1998.

DEP did not complete the meter installation process by that date, and about 4 percent of the customer accounts still lacked meters at the time of our audit. Nonetheless, DEP considers the initial water metering program to be, for all practical purposes, substantially complete. DEP officials believe New York

City will never be strictly 100-percent metered because some customers refuse to have a meter installed on their property, some properties are vacant, and some properties are too costly or too difficult to meter for technical reasons until their service lines are replaced. Consequently, DEP is not actively attempting to install meters on the remaining unmetered accounts.

We acknowledge the difficulties cited by DEP officials and recognize the significant progress that has been made in installing meters. However, we also determined that additional installation efforts may be warranted for some of the remaining unmetered accounts. In particular, DEP needs to apply the required surcharge penalty to some of the unmetered accounts and improve its monitoring of the New York City Housing Authority, which has been slow to fulfill its agreement to install meters at its housing units.

We randomly selected 50 unmetered accounts from a listing provided by DEP and reviewed documentation relating to the meter installation efforts made after July 1, 2002, for each account. We found that, at some of the properties, DEP had not applied the surcharge penalty when a meter could not be installed. Generally, in such instances, a 100-percent surcharge was to be applied to the customer's future water bills unless the customer contacted DEP within 45 days of being notified about the unsuccessful installation attempt and arranged for another attempt.

However, in 25 of the 50 accounts in our sample, the required surcharge penalty had not been applied. DEP officials stated that, in some instances, the surcharge had not been applied because of a backlog in work caused by a lack of staff. The officials also stated that the surcharge was not needed for six of

the accounts because the accounts were actually metered. According to the officials, the six accounts were sub-accounts whose metered water usage was billed through other master accounts; the sub-accounts themselves were not billed (such arrangements are sometimes used for multiple units within the same building). However, DEP officials could provide no written procedures for such arrangements and the arrangements were not documented on DEP's automated Customer Information System.

The New York City Housing Authority (NYCHA) is responsible for 373 public housing developments. In March 2000, NYCHA, in a formal agreement with the Water Board, agreed to install water meters in its housing developments by August 2004. The meters were to be installed by contractors, and DEP was to provide assistance to NYCHA in the contractor bidding process. The Water Board agreed to charge NYCHA's newly-metered properties under its unmetered rate schedule through August 31, 2011, with an option to convert to metered charges prior to the set date.

However, we found that NYCHA did not complete the meter installation process by August 2004. In fact, as of October 2006, the process was still ongoing. For example, we noted that three of the accounts in our sample of unmetered accounts belonged to NYCHA. Together, the three accounts represented a total of 124 housing units.

According to DEP officials, the NYCHA installations were delayed because of problems with installation contractors. However, when we reviewed DEP's documentation of its correspondence with NYCHA about the progress of the meter installations at its housing developments, we found that DEP had not been notified of NYCHA's progress for more than one year.

We recommend DEP monitor NYCHA's progress more closely and actively work with NYCHA to expedite its meter installation process.

### **Recommendations**

11. Ensure that the surcharge penalty is applied to unmetered accounts in all required instances.

(DEP officials replied to our draft audit report that they agree with the recommendation.)

12. Work actively with the New York City Housing Authority to complete the installation of water meters at its housing developments as expeditiously as possible, and monitor the Authority's progress.

(DEP officials replied to our draft audit report that they agree with the recommendation.)

### **AUDIT SCOPE AND METHODOLOGY**

We conducted our audit in accordance with generally accepted government auditing standards. We audited DEP's installation, replacement, and repair of water meters under its Universal Water Metering Program for the period July 1, 2002, through October 31, 2006.

To accomplish our audit objectives, we interviewed officials and staff at DEP and the Water Board, and reviewed relevant policies, procedures, and regulations. We also reviewed various reports and records that were created and maintained by DEP. The records included account information maintained on DEP's automated Customer Information System. In addition, we reviewed two contracts for the repair or replacement of water meters.

We randomly selected 50 unmetered accounts from a list of 60,194 unmetered and metered accounts provided by DEP and reviewed the documentation on hand relating to the installation efforts for each account. This documentation included the installation work orders, entries about the accounts on the Customer Information System, and any other relevant records provided by DEP. We also selected a random sample of 55 accounts from a DEP listing that reportedly contained 32,913 transition accounts, and reviewed documentation relating to the accounts. We also selected a random sample of 50 completed work orders from the two contracts for water meter repair or replacement, and reviewed documentation relating to the work orders.

In addition to being the State Auditor, the Comptroller performs certain other constitutionally and statutorily mandated duties as the chief fiscal officer of New York State. These include operating the State's accounting system; preparing the State's financial statements; and approving State contracts, refunds, and other payments. In addition, the Comptroller appoints members to certain boards, commissions and public authorities, some of whom have minority voting rights. These duties may be considered management functions for purposes of evaluating organizational independence under generally accepted government auditing standards. In our opinion, these functions do not affect our ability to conduct independent audits of program performance.

### **AUTHORITY**

The audit was performed pursuant to the State Comptroller's authority as set forth in Article V, Section 1, of the State Constitution and Article III of the General Municipal Law.

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## **REPORTING REQUIREMENTS**

A draft copy of this report was provided to DEP officials for their review and comment. Their comments were considered in preparing this draft report, and are included as Appendix A.

Within 90 days after final release of this report, we request that the Commissioner of the New York City Department of Environmental Protection report to the State Comptroller advising what steps were taken to implement the recommendations contained herein, and where recommendations were not implemented, the reasons why.

## **CONTRIBUTORS TO THE REPORT**

Major contributors to this report include Carmen Maldonado, Gerald Tysiak, Allen Cohen, Erica J. Zawrotniak, Joseph Smith, Clyde Bynoe, Jenny Varghese, Rita Verma, Nancy Zgaljardic, Huanan Zhang, Artie Bipat, and Dana Newhouse.



**Replies and comments on the specific recommendations of OSC's Draft Audit Report on the Universal Metering Program**

**Systematic Replacement of Meters – Recommendations**

1. *Complete the revenue tracking study*

Agree

An interim report was created in November 2007; a copy is attached.

2. *Develop a formal work plan for the replacement of aging meters. Monitor the implementation of the work plan and take correction (sic) action if the replacements fall behind schedule. Maintain complete and accurate listings of the meters to be replaced, adding additional meters as they become old enough to require replacement.*

Agree

During the course of the audit we discussed with OSC, in some depth, the many reasons why the existing billing system's work order module and its lack of an asset management system currently make comprehensive tracking difficult or impractical. The recommendation will be partially implemented through the Automated Meter Reading (AMR) project; the AMR system software is being enhanced to include a meter database. The more comprehensive solution will occur in the next few years as DEP implements a new billing system with modern work order and asset management functions.

3. *Improve the management of contract funds in the systematic meter replacement program so that all available contract funds are used during the contract period.*

Contract	Total Contract Value	Amount Remaining in Contract	Number of Work Orders Remaining	% Funds Used
BCS-R03MX	\$2,080,238.95	\$236,757.80	282	88.7%
BCS-R03KQ	\$2,342,535.71	\$162,445.19	1,025	93.1%
BCS-R03KQ-R	\$1,171,268.00	\$320,086.84		72.7%
BCS-0412	\$7,122,595.00	\$1,069,619.86	582	85%
BCS-0412R	\$3,237,622.00	\$975,616.92		70%
BCS-0434	\$10,498,840.00	\$8,625,024.50	1,624	17.9%

Disagree

DEP has taken appropriate steps to manage the performance of these contracts. As shown in the table above, with the exception of contract BCS-0434, DEP expended 83% of the encumbered funds on average for each contract. The remaining work orders for these contracts largely reflect instances where the customer would not allow the work to be performed. In the case of BCS-0434 DEP determined that the contractor completed work only on those work orders where access and cooperation could be readily obtained. As a result DEP evaluated this contractor as "Needs Improvement"

4. *Formally assess the costs and benefits of the two options for an automated meter reading system and select the option that appears to be most cost-effective.*

Agree (already implemented)

The business plan for the AMR project was reviewed and approved by the Mayor and OMB in 2006. The procurement solicitation was issued in May 2007, a field test of the two finalists occurred during July-August 2007, the selection of the system occurred during late 2007, a contract was awarded in May 2008 and registered in July 2008. The installation contracts were bid during spring 2008 and will commence work during fall 2008. The first rooftop receivers will be installed in September 2008 and continue through the end of the calendar year and into early 2009.

**Meter Repair/Replacement Contracts – Recommendations**

5. *Develop a tracking tool for monitoring work order completion and use the tool to ensure that work orders are completed within the required time frames.*

Agree

This is a variation on Recommendation No. 2 and our response is the same.

6. *Ensure that work orders are promptly reissued to contractors when they are returned to DEP for the resolution of a problem.*

Disagree

Under the contracts a work order is only to be returned to DEP when the state of the plumbing in the premises is such that the contractor cannot safely perform the meter replacement. In fact, the contractors are responsible to research customer information and contact the customers, have sole responsibility for making and keeping appointments and performing the work. If there is a serious technical problem (leaking service line) then the Contractor has the responsibility to document the problem and report it back to DEP, whose only recourse is to inform the customer that they need to have plumbing repairs performed. The contracts make no mention of "reissuing" such work orders since the work orders have never been withdrawn by DEP.

The contracts instruct the contractor to do the following upon issuance of a work order:

- a. Maintain a customer contact database to record all contacts with the customers and all attempts to contact each customer
- b. Incorporate customer mailing and contact information into a database within 72 hours

*
<b>Comment</b>

\* See State Comptroller's Comment, page 18.



- c. Research customer phone numbers through publicly available resources such as the Coles Directory, Win2Data and Phone Disk and to research multifamily owner and managing agent information through access to HPD's Premisys database at DEP's office
- d. Make ten documented attempts to contact each customer at different hours and times
- e. Visit the building and posting a notice if telephone and mail contact are not successful.

Simply put, there are very few circumstances where a contractor has a valid basis for returning a work order to DEP for some form of action. However, an individual contractor may want to avoid repeating customer contacts beyond an initial phone call, spending money to maintain customer contact records and maintaining survey data. This was the case with the contractor who inappropriately returned the most work orders to DEP. For this reason, among others, DEP gave the contractor a "Needs Improvement" evaluation.

OSC's specific example of a Contractor finding a different, alternative address for a building is specifically identified in the contracts as a responsibility of the Contractor, not DEP:

*Address discrepancies on work orders If the Contractor finds that the actual service address for the meter repair/replacement is different than the street address printed on the work order, the contractor shall note the correct or "AKA" address on the work order. The Contractor shall not cover or obliterate information on a work order. (Section 6.4.4 of all recent DEP meter replacement specifications)*

- 7. *Ensure that contractors are not paid until their work has been approved by an inspector*

Disagree

The contracts do not, and should not, require the physical inspection of all work. Virtually all of the meter replacements involve no plumbing or piping work but the relatively simple shutdown of the water supply, unbolting or uncoupling the existing meter, bolting or coupling a new meter in the same place, connection of remote receptacle wires and testing of the installation. Proper completion of most jobs, and particularly those involving positive displacement meters, can be confirmed through obtaining a remote reading. Physical inspection of each and every replacement, again particularly positive displacement meters, is unnecessary and is not a cost-effective use of inspection resources or public funds.

- 8. *Establish a suggested time frame for the inspections of contracted meter repairs and replacements. Monitor the inspectors' performance against this time frame, and ensure that all required inspections are performed.*

Agree

We have no disagreement with this recommendation, within the constraints of our union contracts.

* Comment
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\* See State Comptroller's Comment, page 18.

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9. *Ensure that the amount of work budgeted for meter repair and replacement contracts is realistic and the available contract funds are used as intended.*

Agree

DEP agrees with the recommendation as worded. However, to the extent that this recommendation is in the context of recommendation No. 3, please see our response to recommendation 3 above.

**Transition Accounts – Recommendation**

10. *Identify all the accounts that have been in the Transition Program for more than the year-plus period allowed by the Water Board and refer these accounts to the Water Board for conversion to metered billing.*

Disagree

The Water Board has extended the transition period for all buildings in the Transition Program, regardless of the year they entered the program, every year since 1992. Buildings that have been on transitional flat-rate billing since 1992 or later, assuming they qualify under the program's requirements as OSC found, have been retained in that status as a matter of policy and public rule.

**Unmetered Properties – Recommendations**

11. *Ensure that the surcharge penalty is applied to unmetered accounts in all required instances.*

Agree

12. *Actively work with the New York City Housing Authority to complete the installation of water meters at its housing developments as expeditiously as possible, and monitor the Authority's progress.*

Agree

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**Comment**

\* State Comptroller's Comment

We have revised our report and recommendations to reflect information in DEP's response.

*Increases in Registration Following Replacement of Large Water Meters  
(Interim Report)*

*Daniel Cunningham  
Warren Liebold  
Dionne Rocke*

**Bureau of Customer Services  
New York City Department of Environmental Protection**

**November 29, 2007**

**Executive Summary**

The replacement of compound type water meters more than 15 years old generated per meter annual increases in revenue ranging from \$0 to \$11,222.. If all of the older meters replaced in a recent meter replacement contract provide revenue benefits similar to those in the sample analyzed, an increase in revenue of approximately \$2 million per year has been realized from this portion of the project. Compound meters exhibited greater improvements in registration than turbine meters and positive displacement meters less than turbines.

This is an analysis of data from a meter replacement contract covering the boroughs of Brooklyn and Queens, New York. Analysis of data from an identical contract for Manhattan and the Bronx is underway and when complete, will be combined with the data from this contract for a final report.

**Background**

In 2000 BCS submitted a proposal to the New York City Office of Management and Budget ("OMB") arguing for funds to support contracts directed primarily at the replacement of the largest, oldest meters in the system, using existing DEP field meter accuracy data to show that significant revenues were being lost due to significant under registration by these meters. The meters under consideration were defined as pre-1990 vintage, lacking encoder registers, 2" and larger in size. That report estimated that replacing the approximately 5,000 compound and turbine meters in this category would produce \$16 million annually in revenues, based on rates in effect in 2000.

These meters are replaced in several ways; including demolition and renovation of old buildings and replacement of water services, but DEP's Bureau of Customer Services ("BCS") bid two contracts to begin this task, BCS-R03KQ and BCS-R03MX. These contracts ran from 2004 – 2006.

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An analysis of the data from these contracts was planned but since DEP understood that the project was cost-effective on a qualitative level the analysis was not considered a high priority. An audit by the Office of the State Comptroller in 2006 – 2007 urged BCS to expedite completion of the analysis and the completion of this report is a work product of that effort.

**Methodology**

Principal Administrative Associates Daniel Cunningham and Dionne Rocke reviewed each account subject to a meter replacement during Contract BCS-R03KQ to record actual meter readings wherever available and determine consumption rates (“ADF” or average daily flow) for the old meter and the new meter to determine billable consumption in each case. In cases where the old meter, the new meter, or both did not have actual readings, the account was not used for the analysis.

The results were sorted by meter size and type and by manufacturer and meter type for the old meter. This was done to determine whether “old” versus “new” registration varied more for some types of meters rather than others (compounds showed greater variation than turbines), whether newer but still ten-year-old meters fared as well as meters 30+ years old and whether particular meter types should be prioritized.

COMPOUND METERS									
METER SIZE	NUMBER OF METERS	MEAN ADF (OLD METER)	MEAN ADF (NEW METER)	CHANGE IN MEAN ADF	STANDARD DEVIATION (OLD METER)	STANDARD DEVIATION (NEW METER)	CHANGE IN STANDARD DEVIATION	STANDARD DEVIATION ADF	
051 (2x5/8")	23	3.27	3.03	(0.24)	4.76	2.79	(1.97)		
052 (2x3/4")	2	0.38	0.76	0.38	#DIV/0!	#DIV/0!	#DIV/0!		
055 (2")	1								
061 (3x5/8")	85	4.56	9.13	4.57	4.73	12.08	7.35		
062 (3x3/4")	40	6.86	8.84	1.99	11.75	5.60	(6.15)		
071 (4.63")	1								
072 (4.75")	65	12.21	17.25	5.05	13.22	14.38	1.16		
073 (4 x 1")	3	13.21	15.64	2.43	17.31	9.81	(7.50)		
082 (6.75")	5	8.45	11.80	3.34	10.57	11.51	0.94		
083 (6" X 1")	8	69.86	70.25	0.39	89.37	90.03	0.66		

**Results**

DISPLACEMENT METERS									
METER SIZE	NUMBER OF METERS	MEAN ADF (OLD METER)	MEAN ADF (NEW METER)	CHANGE IN MEAN ADF	STANDARD DEVIATION (OLD METER)	STANDARD DEVIATION (NEW METER)	CHANGE IN STANDARD DEVIATION	STANDARD DEVIATION (NEW METER)	CHANGE IN STANDARD DEVIATION ADF
022 (.75")	4	0.34	0.38	0.05	0.23	0.21	(0.02)	0.21	(0.02)
033 (1")	4	0.25	0.36	0.11	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
044 (1.5")	9	2.16	2.36	0.21	2.82	1.99	(0.83)	1.99	(0.83)
055 (2")	182	3.94	4.79	0.85	6.77	5.22	(1.55)	5.22	(1.55)

  

TURBINE METERS									
METER SIZE	NUMBER OF METERS	MEAN ADF (OLD METER)	MEAN ADF (NEW METER)	CHANGE IN MEAN ADF	STANDARD DEVIATION (OLD METER)	STANDARD DEVIATION (NEW METER)	CHANGE IN STANDARD DEVIATION	STANDARD DEVIATION (NEW METER)	CHANGE IN STANDARD DEVIATION ADF
066 (3")	2	1.37	1.82	0.46	1.86	0.30	(1.56)	0.30	(1.56)
077 (4")	7	44.97	44.84	(0.13)	37.01	23.74	(13.27)	23.74	(13.27)
088 (6")	2	23.91	54.39	30.48	22.78	62.90	40.12	62.90	40.12