CITY OF NEW YORK
OFFICE OF THE COMPTROLLER

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MANAGEMENT AUDIT

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Audit Report on the Department of Environmental Protection's Fire Hydrant Repair Efforts

ME10-082A

January 6, 2011

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To the Residents of the City of New York

My office has audited the timeliness of the Department of Environmental Protection's (DEP's) repairs of fire hydrants. We audit efforts such as this to determine whether City agencies handle their responsibilities in a timely manner.

The audit concluded that the timeliness of DEP's handling of fire hydrant service requests needs improvement. DEP did not establish time standards for resolving such requests, even those considered to be of a high priority, and presented insufficient evidence to show that it effectively tracked the overall timeliness of repairs. As a result, greater assurance is needed that DEP is ensuring that service requests are generally being resolved in as timely a manner as possible. In addition, DEP included only Fire Department-designated high-priority repairs in its analysis and reporting of the timeliness of repairs to high-priority broken or inoperative hydrants. DEP did not measure its timeliness in completing repairs that the agency itself deemed to be high priority. As a result, DEP did not have a complete picture of its efficiency in completing high-priority repairs.

This audit makes eight recommendations to DEP, including that it develop written time standards for handling fire hydrant complaints, especially those that are deemed to be high-priority; improve its tracking of pending service requests; and develop a performance indicator that tracks its timeliness in completing hydrant repairs it designates to be a high priority.

The results of the audit have been discussed with DEP officials, and their comments have been considered in preparing this report. Their complete written responses are attached to this report.

If you have any questions concerning this report, please e-mail my audit bureau at audit@Comptroller.nyc.gov.

Sincerely,

John C. Liu

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The City of New York
Office of the Comptroller
Management Audit

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ME10-082A

AUDIT REPORT IN BRIEF

This audit determined whether the New York City Department of Environmental Protection (DEP) performs fire hydrant repairs in a timely manner. The primary scope period covered by this audit was Fiscal Year 2009 (July 1, 2008 through June 30, 2009).

DEP's Bureau of Water and Sewer Operations (BWSO) operates and maintains the City's water and sewer systems. As part of its responsibilities, BWSO maintains and repairs the City's 109,217 fire hydrants. The fire hydrant repair process begins when a service request is received by BWSO. BWSO receives service requests related to fire hydrants from two primary sources: the New York City Fire Department (FDNY) and the City's 311 Customer Service Center. In Fiscal Year 2009, DEP received a total of 44,269 service requests and initiated 21,695 hydrant-repair work orders. DEP reported in the Mayor's Management Report that high-priority hydrants were repaired in an average of 15.2 days in Fiscal Year 2009, slightly longer than the average of 14.8 days in the previous year.

Audit Findings and Conclusions

The timeliness of DEP's handling of fire hydrant service requests needs improvement. DEP has not established time standards for resolving such requests, even those considered to be of a high priority, and has presented insufficient evidence to show that it effectively tracks the overall timeliness of repairs. As a result, greater assurance is needed that DEP is ensuring that service requests are generally being resolved in as timely a manner as possible.

In addition, DEP includes only FDNY-designated high-priority repairs in its analysis and reporting of the timeliness of repairs to high-priority broken or inoperative hydrants. DEP does not currently measure its timeliness in completing repairs the agency itself deems to be high priority. As a result, DEP does not have a complete picture of its efficiency in completing high priority repairs. Furthermore, although DEP was able to provide us with data on its fire hydrant

repair efforts for Fiscal Year 2009 that were sufficiently reliable for audit testing purposes, some concerns exist about the accuracy and completeness of these data. Finally, DEP needs to institute a supervisory verification of the inspections and repairs performed by work crews to provide greater assurance that work is completed as reported.

Audit Recommendations

To address the issues, the audit recommends, among other things, that DEP:

- Develop written time standards for handling fire hydrant complaints, especially those that are deemed to be high-priority.
- Improve its tracking of pending requests so that it can identify all requests that have been open for an extended period of time, determine why they remain open, and take the necessary actions to resolve them.
- Develop a performance indicator that tracks its timeliness in resolving hydrant service requests that the agency itself designates as high-priority.
- Require its crew supervisors to check a sample of the inspections and repairs completed in response to 311 requests.

Agency Response

In its response, DEP generally agreed with six of the audit's eight recommendations, disagreed with one, and did not respond to one.

INTRODUCTION

Background

The DEP is responsible for protecting the City's environmental health and natural resources. DEP enforces air and water quality regulations, the noise code, and standards relating to the handling and disposal of hazardous materials. It also manages the City's water supply.

DEP's Bureau of Water and Sewer Operations operates and maintains the City's water and sewer systems. As part of its responsibilities, BWSO maintains and repairs the City's 109,217 fire hydrants. The fire hydrant repair process begins when a service request is received by BWSO. BWSO receives service requests related to fire hydrants from two primary sources: the FDNY and the City's 311 Customer Service Center. In Fiscal Year 2009, DEP received a total of 44,269 service requests.

In the course of inspecting all fire hydrants twice a year, FDNY notifies DEP of any hydrants that need repair. The FDNY faxes its requests to BWSO, which manually enters the requests into its Hansen computer system. Requests received through 311 are entered directly into Hansen. All service requests are forwarded electronically to the BWSO Maintenance Yards in the boroughs where the hydrants are located. Maintenance Yard supervisors then assign investigators to inspect the hydrants and to determine what work is needed to repair them. If a repair is necessary, the Maintenance Yard generates a work order and assigns it to a BWSO Repair Yard. After the repair is completed, a Repair Yard employee updates Hansen. The BWSO Analysis Unit sends the FDNY a monthly report on the actions taken by DEP to address FDNY's service requests. The results of completed repairs for 311 service requests are transferred on a daily basis into the 311 system.

FDNY designates some hydrant repairs as "high priority." High-priority repairs include those of defective hydrants located near hospitals, schools, or senior-citizen housing or that had been the only operative hydrant on a block.

According to DEP, during Fiscal Year 2009, BWSO initiated 21,695 hydrant-repair work orders. DEP also reported in the Mayor's Management Report that high-priority hydrants were repaired in an average of 15.2 days, slightly longer than the average of 14.8 days in the previous year.

Objective

The objective of this audit was to determine whether DEP performs fire hydrant repairs in a timely manner.

Scope and Methodology

We conducted this performance audit in accordance with generally accepted government auditing standards. These standards require that we plan and perform the audit to obtain

sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. This audit was conducted in accordance with the audit responsibilities of the City Comptroller as set forth in Chapter 5, §93, of the New York City Charter.

The primary scope period covered by this audit was Fiscal Year 2009 (July 1, 2008 through June 30, 2009).

To gain an understanding of BWSO policies, procedures, and practices, we interviewed the Director of Operations, the Chief of Maintenance and Repairs, the Chief of the Analysis Unit, and the Deputy Chief Information Officer. We visited the Manhattan Maintenance and Repair Yards and interviewed the District Superintendent and the District Supervisor. We also accompanied Maintenance and Repair Yard crews in Queens and Brooklyn to observe fire hydrant inspections and repairs. We interviewed DEP officials to evaluate DEP's supervisory controls for ensuring that inspections and repairs are conducted satisfactorily.

To determine how long DEP took to resolve fire hydrant-related service requests, we reviewed DEP lists of Fiscal Year 2009 service requests and work orders and another DEP list of service requests pending as of the close of business on June 30, 2008. We compared the dates that the service requests were made and the work orders were initiated to the dates that the service requests were resolved and the work orders were completed.

We reviewed DEP's supporting documentation for its Fiscal Year 2009 performance indicator in the Mayor's Management Report on the average number of days the agency took to repair or replace high-priority broken or inoperative hydrants. In addition, we reviewed DEP's performance indicator showing that less than one percent of the hydrants in the City needed repair as of June 30, 2009.

As part of our review of controls, we assessed the reliability of Hansen data obtained from DEP. These data included Hansen lists of Fiscal Year 2009 service requests and work orders and another list of service requests that were still pending as of the close of business on June 30, 2008. We examined the lists for consistency, accuracy, and completeness.

To determine the internal consistency of Hansen data, we sorted and matched the service request and work order lists to identify anomalies such as resolution dates after the date of the list or before the date of the request, work order completion dates prior to work order initiation dates, and work orders for requests already resolved by inspection.

To determine whether the information on the Fiscal Year 2009 service request list was consistent with the information on the Hansen database, we selected a sample of 20 of the 44,056 service requests that had resolution dates and compared these dates to the dates in Hansen. We also randomly selected a sample of 15 service requests that did not have resolution dates on the list and compared this information to the information in Hansen.

To determine whether completion dates listed on the Fiscal Year 2009 work order list had actually been completed as per Hansen, we selected a random sample of 20 of the 21,695 work orders and compared the completion dates on the list to those in Hansen. We also randomly selected a sample of 15 work orders that did not have completion dates on the list and compared this information to the information in Hansen.

To determine the completeness and accuracy of Hansen data, we compared key service dates on 59 randomly selected Maintenance Yard hydrant-inspection reports and 49 randomly selected Repair Yard hydrant-service reports to the service dates reported in Hansen. We also compared FDNY service request fax dates to service request dates in Hansen. In addition, we reviewed the program language that was used to generate the service request and work order lists from Hansen.

Discussion of Audit Results

The matters in this report were discussed with DEP officials during and at the conclusion of this audit. A preliminary draft report was sent to DEP officials on August 10, 2010 and discussed at an exit conference held on September 21, 2010. On November 12, 2010, we submitted a draft report to DEP officials with a request for comments. We received a written response from DEP officials on November 29, 2010. In its response, DEP generally agreed with six of the audit's eight recommendations, disagreed with one, and did not respond to one.

DEP expressed concern in its response that the report notes a few instances in which DEP did not provide requested information. In these instances, we gave DEP many opportunities to provide explanations concerning service requests that had been unresolved for a long time and for an incomplete DEP service request list that it had given to us. DEP chose not to provide such explanations even though we provided more than ample time for it to do so. Nonetheless, DEP was generally cooperative during the audit and provided sufficient information and data for us to complete the audit.

The full text of the DEP response is included as addendum to this report.

FINDINGS AND RECOMMENDATIONS

The timeliness of DEP's handling of fire hydrant service requests needs improvement. DEP has not established time standards for resolving such requests, even those considered to be of a high priority, and has presented insufficient evidence to show that it effectively tracks the overall timeliness of repairs. As a result, greater assurance is needed that DEP is making sure that service requests are generally being resolved in as timely a manner as possible.

In addition, DEP includes only FDNY-designated high-priority repairs in its analysis and reporting of the timeliness of repairs to high-priority broken or inoperative hydrants. DEP does not currently measure its timeliness in completing repairs the agency itself deems to be high priority. As a result, DEP does not have a complete picture of its efficiency in completing high priority repairs. Furthermore, although DEP was able to provide us with Hansen data on its fire hydrant repair efforts for Fiscal Year 2009 that were sufficiently reliable for audit testing purposes, some concerns exist about the accuracy and completeness of these data. Finally, DEP needs to institute a supervisory verification of the inspections and repairs performed by work crews to provide greater assurance that work is completed as reported.

DEP Does Not Measure Timeliness for Resolving Hydrant Service Requests

Our review of DEP procedures for handling fire hydrant service requests revealed that DEP does not have written time standards for resolving these requests. Without time standards, DEP is unable to evaluate BWSO's effectiveness in ensuring that repairs are being completed as quickly as possible. Time standards are a useful management tool because they facilitate the measurement of operational efficiency. Without measurements of each major step in the service request resolution process, DEP is less able to effectively track and manage the timeliness of its hydrant repair operations.

DEP provided us with a March 4, 2010 list of 44,269 Fiscal Year 2009 service requests. By eliminating 11,211 duplicate requests,[1] we arrived at a total of 33,058 unique Fiscal Year 2009 service requests. By eliminating 66 (0.2%) requests that had obvious resolution date errors, we arrived at a total of 32,992 service requests for which we reviewed the timeliness of their resolution. By matching DEP's March 4, 2010 service request list with DEP's April 21, 2010 work order list, we determined that there were 17,125 unique work orders initiated in Fiscal Year 2009 as a result of these Fiscal Year 2009 service requests. Service requests that were resolved without work orders were generally done so through the Maintenance Yards' inspection process by which it was determined that the hydrant either did not need to be repaired or that it only needed a minor repair that was done by the inspectors.

Our review of the 32,992 Fiscal Year 2009 service requests revealed that 213 of these requests had not been resolved as of March 4, 2010. (Three of these requests had resolution dates but were classified under the no resolution/pending resolution category. Even though these three requests represent an extremely small portion of the total number of requests, we are

[1] Duplicate requests occur when DEP receives multiple service requests on the same fire hydrant.

concerned that the service request for a hydrant could be lost in the Hansen system as a result of a resolution date having been entered for a request that has not been resolved. One of these three hydrants was identified in Hansen as being inoperative.) The 213 requests had been open between 246 to 519 days. Although requested, DEP did not provide us with an explanation as to why these 213 requests remained unresolved for so long.

For the remaining 32,779 requests, BWSO took an average of 14 days to resolve (either by inspection or repair). However, as shown in Table I, below, 3,778 (11.5%) of the 32,779 requests were resolved in more than 30 days, and 1,691 (5.1%) were resolved in more than 60 days. BWSO took more than one year to resolve 47 of these requests. Although requested, DEP did not provide us with an explanation as to why it took so long to resolve these 47 requests.

Table I
Time Periods from Service Request to Request Resolution
Resolved Fiscal Year 2009 Service Requests

Time Period	Number of Service Requests Resolved	Percentage of Service Requests Resolved within Range
Resolved in 30 Days or less	29,001	88.5%
Resolved between 31 and 60 Days	2,087	6.4%
Resolved between 61 and 90 Days	715	2.2%
Resolved between 91 and 365 Days	929	2.8%
Resolved in more than 1 Year	47	0.1%
Totals	**32,779**	**100%**

Approximately half (16,264) of the service requests did not result in work orders and thus were resolved by the Maintenance Yards. To determine how long the Maintenance Yards' inspectors took to resolve these requests, we reviewed the length of time from the date that the service request was generated to the date that the service request was resolved. Our analysis revealed that the Maintenance Yards took an average of 6.6 days[2] to resolve service requests; the amount of days taken ranged from 0 to 483 days. Approximately 88 percent of these service requests were resolved within 10 days. Nevertheless, for 169 (1%) of the requests, it took more than 90 days to resolve the request.

[2] We did not consider 10 service requests for which the dates indicated that they were resolved prior to the date of the request; therefore, this calculation was based on 16,254 service requests (16,264 minus 10).

At the exit conference, BWSO officials stated that in reviewing their performance, it is important to recognize that fire hydrant inspections and repairs represent only about 38 percent of the overall workload of the Bureau. Other responsibilities include dealing with water main breaks, leaks from water and sewer mains, sewer backups, and catch basin problems.

The absence of time standards results in no benchmark for Maintenance Yards to use in gauging their performance in this area. As a result, the likelihood of significant differences in timeliness among the boroughs is increased. Our analysis found considerable variances in the average amounts of time it took in the different boroughs to resolve fire hydrant service requests that did not result in work orders, as shown in Table II, below.

Table II
Average Resolution Times by Borough for Fiscal Year 2009
Service Requests Resolved without Work Orders

Borough	# of Service Requests Resolved Without Work Orders	Average # of Days to Resolve Requests
Brooklyn	5,064	2.9
Staten Island	778	4.7
Manhattan	3,812	5.2
Queens	3,119	9.0
Bronx	3,479	11.6
	16,252*	**6.6**

* For two service requests, we could not identify the borough in which the fire hydrant was located.

As shown in Table II, service requests that did not involve work orders were completed more quickly in Manhattan, Staten Island, and Brooklyn than in Queens and the Bronx. It took almost four times as long for the Bronx Maintenance Yards to resolve service requests than it did for Brooklyn Maintenance Yards.

With regard to work orders, there were 17,125 unique work orders[3] initiated as a result of Fiscal Year 2009 service requests. To determine the time taken to effect these repairs, we reviewed the work order initiation and resolution dates related to these requests that were contained in an April 21, 2010 work order list provided by BWSO. Our analysis revealed that

[3] The difference of 4,570 work orders between the 21,695 work orders on DEP's list of orders initiated in Fiscal Year 2009 and the 17,125 unique work orders we identified stemmed from orders that (1) did not come from 311 or FDNY service requests but rather from DEP observations; (2) resulted from Fiscal Year 2008 service requests; (3) resulted from duplicate service requests; or (4) resulted from Fiscal Year 2009 service requests that were on the work order list but not on the Fiscal Year 2009 service request list.

the BWSO Repair Yards took an average of 18.3 days to resolve the service requests associated with 16,433 of these 17,125 work orders. (Of the remaining 692, 81 were still outstanding as of April 21, 2010,[4] 605 had resolution dates that were either prior to the request date or prior to the date that the work order was initiated, and 6 had resolution dates that were after the date of the list.) A breakdown of the time taken to resolve the service requests is shown in Table III, below.

Table III
Time Periods from Work Order Initiation to Service Request Resolution
Fiscal Year 2009 Work Orders

Time Period	Number of Work Orders	Percentage Of Work Orders Within Range
Resolved in 30 Days or less	14,119	85.9%
Resolved between 31 and 60 Days	1,052	6.4%
Resolved between 61 and 90 Days	431	2.6%
Resolved between 91 and 365 Days	788	4.8%
Resolved in more than 1 Year	43	0.3%
Totals	**16,433**	**100%**

As shown in Table III, 86 percent of the requests were reportedly resolved by the Repair Yards within 30 days of the initiation of the corresponding work order.

As also shown in Table III, the service requests associated with 2,314 work orders were not resolved within 30 days; this includes 43 that BWSO took more than one year to resolve. The service requests associated with an additional 81 work orders were not resolved as of April 21, 2010. The requests associated with these 81 work orders had been open for a period ranging from 295 to 559 days. Although requested, DEP did not provide an explanation as to why the service requests associated with these orders remained open for such a long period of time.[5]

As we found with service requests resolved by the Maintenance Yards, the use of time standards could help decrease significant differences among the boroughs for the time taken to complete fire hydrant work orders. Our analysis found significant differences as shown in Table IV, below.

[4] Of the 81 outstanding work orders on the April 21, 2010 list, the work orders for two of them were associated with one service request that had a resolution date. However, the list indicates that the associated service request was resolved by having been placed in the no resolution/pending resolution category.
[5] These work orders were included in the list of 213 unresolved service requests we provided to DEP seeking an explanation.

Table IV
Average Resolution Times by Borough
For Fiscal Year 2009 Work Order Initiation to Service Request Resolution

Borough	# of Work Orders	Average # of Days to Resolve Associated Requests
Queens	3,208	10.1
Manhattan	4,514	10.3
Bronx	2,726	19.5
Brooklyn	4,675	26.6
Staten Island	1,310	33.4
	16,433	**18.3**

As shown in the table above, the service requests associated with work orders were resolved more quickly in Queens and Manhattan than in the Bronx, Brooklyn, and Staten Island. It took the Staten Island Repair Yard more than three times longer to resolve service requests associated with work orders than it did for the Queens Repair Yard.

To ascertain whether our concerns about the timeliness of inspections and repairs in Fiscal Year 2009 were relevant to prior years, we reviewed a January 23, 2010 DEP list of service requests that were still pending as of June 30, 2008, the last day of the preceding fiscal year. The list did not contain obvious resolution date errors. There were 1,714 service requests that were still pending as of June 30, 2008. Of this total, 108 were still unresolved as of January 23, 2010. These 108 had been open for an average of 32 months or more than 2 ½ years. For the remaining 1,606 service requests that were pending as of the close of business on June 30, 2008, BWSO took an average of 91 days to resolve the requests. Table V, below, shows the range of days from the dates these service requests were received to the dates the service requests were resolved.

Table V
Time Periods from Service Request to Request Resolution
Resolved Requests That Were Pending as of June 30, 2008

Time Period	Number of Service Requests Resolved	Percentage of Service Requests Resolved Within Range
Resolved in 30 Days or less	544	34%
Resolved between 31 and 60 Days	537	33%
Resolved between 61 and 90 Days	202	13%
Resolved between 90 and 365 Days	218	13%
Resolved between 1 Year and 2 Years	78	5%
Resolved in more than 2 Years	27	2%
Totals	**1,606**	**100%**

As shown in Table V, 66 percent of these 1,606 service requests were resolved in more than 30 days, and 33 percent were resolved in more than 60 days. BWSO took more than one year to resolve 105 of these service requests.

The lack of time standards is especially disturbing for repairs that are deemed to be high-priority. Without such a standard, DEP cannot gauge how well BWSO is doing in this critical indicator. According to the April 21, 2010 DEP list of Fiscal Year 2009 work orders, there were 149 emergency or high-priority work orders initiated by BWSO in Fiscal Year 2009. While 131 (88%) of these work orders were completed in 30 days or less, five of these work orders took more than 90 days to complete, ranging from 96 to 366 days. In view of the fact that a functioning fire hydrant can mean the difference between life and death, DEP must do what it can to ensure that fire hydrant inspections and repairs are completed in a timely manner. However, in the absence of any time standards established by DEP, the agency is unable to evaluate the efficiency of its Repair Yards' efforts in that regard. By setting time standards for fire hydrant repairs, especially for high-priority repairs, DEP can clearly communicate its repair expectations to BWSO employees and improve its ability to track inspection and repair performance.

Recommendations

DEP should:

1. Develop written time standards for handling fire hydrant complaints, especially those that are deemed to be high-priority.

***DEP Response*:** "DEP implemented internal standards in December 2009 aimed at improving overall performance. These standards require immediate notification to Repair crews of Maintenance's inspections which deem a hydrant to be a priority. The goal of the agency is to repair high priority fire hydrants within 10 days."

***Auditor Comment*:** We find it commendable that DEP implemented standards for high-priority fire hydrant repairs. We urge DEP to implement standards for all hydrant-related service requests, however. This would help DEP to better gauge the overall performance of its Maintenance and Repair crews.

2. Improve its tracking of pending requests so that it can identify all requests that have been open for an extended period of time, determine why they remain open, and take the necessary actions to resolve them.

***DEP Response*:** "DEP's Bureau of Water & Sewer Operations (BWSO) has implemented a new report to all Borough Managers as part of our reorganization of field operations. The report flags unresolved repair work orders related to complaints by highlighting the increasing age of open work. This detailed reporting assists in the management of the backlog of outstanding work, including hydrant repairs."

3. Ensure that service request resolution dates are not entered into Hansen when requests have been placed in the no resolution/pending resolution category.

***DEP Response*:** "The no resolution/pending resolution code is only used to identify a service request that was resolved in error. HANSEN restrictions prevent the removal of a resolution date and/or resolution code once they are entered and null values are not allowed. For quality control purposes the no resolution/pending resolution code allows these service requests to be monitored until they are resolved correctly."

***Auditor Comment*:** DEP did not provide any evidence to support its assertion that this code is only used to identify and monitor service requests that were resolved in error. The March and April 2010 Hansen lists provided to us by DEP show that these three requests were "resolved" in May and July of 2009. The lists do not indicate that any further monitoring or work was done on these three requests between the dates that DEP claims they were resolved in error and the dates of the two lists. Accordingly, in the absence of evidence to the contrary, we are unable to affirm DEP's explanation.

DEP Does Not Analyze the Timeliness of All Repairs to Broken Or Inoperative Hydrants That It Designates as High Priority

DEP currently measures its timeliness in completing FDNY-identified high-priority repairs of broken or inoperative hydrants, and its performance is presented as a critical indicator in the Mayor's Management Report (MMR). DEP does not currently measure its timeliness in completing DEP-identified high-priority repairs, however. As a result, DEP does not have a complete picture of its efficiency in completing this type of repair.

According to DEP officials, high-priority repairs include those of defective hydrants that are located near hospitals, schools, or senior-citizen housing or that had been the only operative hydrant on a block. For Fiscal Year 2009, the agency reported that it took an average of 15.2 days to inspect and fix high-priority broken or inoperative hydrants. For this indicator, DEP

included repairs that were designated by FDNY as being high priority and that were completed by DEP in Fiscal Year 2009. DEP calculated the average time it took to resolve these requests from the date DEP entered the request into Hansen to the date that the request was resolved. However, DEP excluded service requests that DEP Maintenance Yards identified as high-priority repairs. As a result, DEP does not provide a complete picture of its performance in this area.

DEP-designated high-priority work orders are identified in Hansen by priority codes 1 (emergency) and 2 (high priority). We sorted the April 21, 2010 DEP list of Fiscal Year 2009 work orders and determined that there were 149 work orders designated as high priority by BWSO Maintenance Yards. Forty-three of the 149 high-priority work orders in Fiscal Year 2009 resulted from 311 service requests; the remaining 106 resulted from FDNY service requests.[6] DEP, however, does not currently measure the overall timeliness of all high-priority repairs, including those identified as such by DEP. DEP stated that it did not include in its MMR performance indicator those hydrant repairs that were designated as being high priorities by DEP Maintenance Yards because DEP was not aware that these repairs were high priorities until the inspections were done. The fact that DEP is unaware of the priority level of a repair until an inspection is performed further highlights the importance of conducting the initial inspections and resolving hydrant service requests in a timely manner.

For the 43 service requests from 311 that led to DEP-designated high-priority work orders, it took DEP an average of 16.8 days to complete repairs from the date that a Maintenance Yard initiated a work order to the date that the work order was completed. For the 106 FDNY requests that led to DEP-designated high-priority work orders, DEP took an average of 18.1 days to complete these repairs from the date that a Maintenance Yard initiated a work order to the date that the work order was completed.

As supporting documentation for the DEP-reported average of 15.2 days to repair or replace high-priority broken or inoperative hydrants in Fiscal Year 2009,[7] on April 8, 2010, the agency provided a list of 169 work orders that resulted from FDNY-designated high-priority service requests and that were completed by DEP in Fiscal Year 2009. The 169 work orders were identified in Hansen by priority code P (priority), rather than as priority codes 1 (emergency) and 2 (high priority).

In addition, when we randomly selected 34 FDNY service requests, we found that the Analysis Unit took an average of 2 days—ranging from 0 to 12 days from the date of the FDNY fax—to enter the service requests into Hansen. Thus, if we add these 2 days to the MMR-reported average of 15.2 days to complete the repairs after the service requests were entered in

[6] The FDNY did not designate most of these 106 requests as being high priorities. When we reviewed 46 of the 106 FDNY requests, we noted that the FDNY had only designated 9 of the 46 requests as being high priorities.

[7] DEP's supporting documentation for this average, which was provided on April 8, 2010, showed an updated average for Fiscal Year 2009 of 16.4 days. According to DEP, the information provided in the MMR is a snapshot in time. Due to the constant updating of the backlog, the reported numbers and averages are not the same when calculated at a later date.

Hansen, we arrive at an average of 17.2 days to inspect and repair FDNY-designated high-priority repairs.

In order to present a more accurate picture of its performance in this area, DEP needs to include in the current performance indicator on FDNY-designated high-priority repairs the time between the date of the FDNY fax and BWSO's entry of the request in Hansen. DEP also needs to develop a performance indicator that tracks its timeliness in resolving hydrant service requests that it designates as high-priority.

Recommendations

DEP should:

4. Include in the average repair time for FDNY-designated high-priority repairs the time between the date of the FDNY fax and BWSO's entry of the request in Hansen.

   ***DEP Response*:** "To improve efficiency and implement better quality control thus eliminating any delay between receiving faxes from FDNY and entry of the request into the Hansen system, we plan to provide FDNY with direct access to Hansen, beginning in April 2011. The system will track all FDNY inspections and requests including the automatic generation of a work order for the repair of high priority hydrants. In addition, FDNY will have the ability to receive, complete and track the progress of hydrant inspections."

5. Develop a performance indicator that tracks its timeliness in resolving hydrant service requests that the agency itself designates as high-priority.

   ***DEP Response*:** "The draft audit report combines two data sets: those received as high priority from FDNY, which the Mayor's Management Report (MMR) reflects, and those re-categorized upon inspection by DEP as high priority. Including the reclassified hydrants as high priority is inconsistent with the current reporting methodology. We will work with the Mayor's Office of Operations to develop new methodology to more transparently capture both those hydrants identified by FDNY as well as those identified by DEP inspectors as high priority."

DEP Fire Hydrant Repair Data Sufficiently Reliable, But Some Concerns Exist

DEP generally provided us with Hansen data on fire hydrant service requests, work orders, and repairs for Fiscal Year 2009 that were sufficiently reliable for audit testing purposes. However, the following data accuracy and completeness concerns arose during the audit.

DEP's service request and work order lists had a relatively small number of clearly erroneous service dates in Hansen. These were instances in which the indicated resolution dates

were either before the date of the service request or after the date of the list. There were also work order completion dates that preceded the work order initiation dates.

To assess the reliability of Hansen data, we examined the March 4, 2010 list of 44,269 Fiscal Year 2009 service requests, the January 23, 2010 list of service requests that were still pending as of the close of business on June 30, 2008, and the April 21, 2010 DEP list of work orders that were initiated in Fiscal Year 2009. We identified the following data irregularities:

- 9 of the 44,269 service requests on the March 4, 2010 service request list showed resolution dates that were after the date of the list. According to the Hansen list, these 9 service requests were closed between March 14, 2010 and October 31, 2017.

- 57 of the 44,269 service requests on the March 4, 2010 service request list showed resolution dates occurring before the dates of the requests. For example, one service request had a resolution date of July 8, 1989 and a service request date of June 26, 2009—more than 20 years after the resolution date.

- 351 of the 21,695 work orders on the April 21, 2010 work order list had completion dates before the dates that the work orders were initiated or after the date of the list.[8] For example, one work order was listed as having been initiated on April 10, 2009, and completed on April 17, 2000. Another work order was listed as having been initiated on June 15, 2009, and completed on January 2, 2014.

- 144 work orders on the April 21, 2010 work order list were resolved by inspection, which is a resolution code more typically entered by the Maintenance Yards.

When inspections and repairs are completed, BWSO employees enter in Hansen the dates that these steps are completed. However, the system does not have controls to limit the entering of obviously incorrect dates. DEP officials told us that these date irregularities occurred because of data input errors. They emphasized that the number of data errors is small in comparison to the number of service requests that have to be entered in the system and that they are in the process of correcting these flaws in the system.

At the exit conference, DEP officials stated that Hansen was not originally created to be a case management system. Hansen was initially intended to primarily be a system for recording water and sewer complaints. Over time, the system has been modified to be more of a case management tool. DEP acknowledged that the system needs further improvement in this regard. In addition, DEP officials stated that they are working on making the end users more cognizant of the need for accuracy in entering data in Hansen.

[8] For this review, we looked at work order completion dates rather than service request resolution dates. DEP stated that due to data entry errors, completion dates do not always match resolution dates. As noted above, we found that 605 of the 17,125 unique work orders initiated in Fiscal Year 2009 had resolution dates that were either prior to the request date or prior to the date that the work order was initiated.

When we matched the March 4, 2010 service request and April 21, 2010 work order lists, there were 468 service requests associated with two or more work orders (a total of 962 work orders). DEP acknowledged that some of these were inadvertent duplicates but stated that the others were legitimate because they relate to situations in which a hydrant had more than one problem to be addressed.

DEP officials stated that they do not have performance indicators relating to the timeliness of completing work orders. We believe, however, that DEP should consider creating performance indicators for the completion of work orders as part of an effort to develop written time standards for handling fire hydrant complaints, as recommended above. If performance indicators are created for work orders, then it would be prudent, in accordance with good internal controls, to simultaneously establish safeguards to ensure that multiple work orders are not initiated for service requests in an attempt to artificially improve timeliness data. (It is important to note that we did not find any evidence that DEP improperly initiated any orders in an attempt to improve its timeliness data.)

Finally, we found that 1,521 of the Fiscal Year 2009 service requests identified on the April 21, 2010 work order list did not appear on the March 4, 2010 service request list. At the exit conference, DEP officials attributed the discrepancy to non-hydrant-related service requests being excluded from the March list but included on the April list. Officials stated that some work orders do not originate from hydrant-related complaints. For example, a service request might be generated because of a 311 call about a water problem (e.g., a water main break, low water pressure, or dirty water) that was later determined to be related to a faulty hydrant. In such a case, a hydrant repair work order might be generated in relation to a non-hydrant-related service request. Our review of the 1,521 service requests that did not appear in the March list, however, revealed that a number of them were hydrant-related and therefore should have been included in that list. After the exit conference, we sent the list of 1,521 service requests to DEP for a detailed explanation as to why these service requests had not been included on the March 4, 2010 list. Officials, however, did not provide us with any further information on these service requests.

Recommendations

DEP should:

6. Update Hansen to incorporate application controls that would prevent the system from accepting clearly erroneous service request resolution and work order completion dates.

   ***DEP Response*:** "DEP's Office of Information and Technology is currently working to develop date restrictions for both service requests and work orders that will prevent dating errors such as a repair start date and time that predates the identification of a broken hydrant. We expect to implement this fix by December 30, 2010."

7. Monitor the use of the resolved-by-inspection resolution code when a work order has been initiated on a service request.

   ***DEP Response*:** "While it acknowledges that the audit found no evidence of such improper manipulation, the draft audit report calls for the establishment of 'safeguards to ensure that multiple work orders are not initiated for service requests in an attempt to artificially improve timeliness data.' DEP supports good internal controls and safeguards in general, but we note that the particular problem alluded to cannot actually be the case. The metric for which DEP Field Operations is held accountable is keeping the number of hydrants requiring repair as low as possible. That number only improves when work orders are closed. For example, if there is only one hydrant requiring repair and five work orders are created to address different aspects of the repair, the MMR only reflects one hydrant."

   ***Auditor Comment*:** DEP did not respond to this recommendation but rather addressed a suggestion we made in the body of the report. Nevertheless, in reply to this response, we continue to believe that multiple work orders could be used to artificially improve data on the timeliness of repairs. Considering that DEP has agreed to establish performance measures for the repair of high-priority work orders, multiple work orders associated with a single service request could be initiated to artificially improve timeliness data. As we noted above, we found no evidence that this has happened. However, we continue to believe that, in conjunction with establishing performance measures for work orders, DEP should also establish controls to monitor the use of multiple orders to prevent such an occurrence from happening.

Supervisory Reviews of Inspections and Repairs Needed

According to DEP, Maintenance Yard and Repair Yard supervisors generally do not verify inspection or repair results. FDNY procedures require its staff to inspect the work that DEP does in response to its service requests and to notify DEP if FDNY determines that DEP's handling of the request was unsatisfactory. For the 311 requests, however, there are no such inspections. BWSO maintenance and repair crew supervisors need to check a sample of inspections and repairs performed in response to 311 requests to help ensure that the work on these requests is satisfactory.

Recommendation

DEP should:

8. Require its crew supervisors to check a sample of the inspections and repairs completed in response to 311 requests.

   ***DEP Response*:** "DEP supervisors are required to check the performance of repairs and inspections. In the rare instances that they have been found to have failed to

properly supervise crews, supervisors have been brought up on disciplinary charges. In light of concerns raised during the course of this audit, DEP Borough Managers have reinforced this standard to all personnel."

NYC Environmental Protection

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November 29, 2010

Ms. Tina Kim
Deputy Comptroller for Audits
Office of the Comptroller
1 Centre Street
New York, NY 10007-2341

Re: Audit ME10-082A

Dear Ms. Kim:

Thank you for the opportunity to comment on your draft audit report on the Department of Environmental Protection's (DEP) Fire Hydrant Repair Efforts. We appreciate the diligence of your auditors and the fact that this draft takes into account many of the concerns we raised with the preliminary draft.

DEP is responsible for the repair and maintenance of the City's 109,000 hydrants and as the data shows our efforts are responsive and successful. Over the last three years, the average percentage of hydrants out of service has been 0.44%. And as you note in your audit, 88% of hydrant service requests and repairs were resolved within 10 days. We recognize our important role in protecting the public and assisting the members of the FDNY who put themselves in harm's way every day. We continue to work closely with FDNY to ensure that first responders have the water supply they need to fight a fire anywhere in the City. We are meeting that goal.

Below we detail our responses to your recommendations many of which we found to be very helpful:

1. "Develop written time standards for handling fire hydrant complaints, especially those that are deemed to be high priority."

   DEP implemented internal standards in December 2009 aimed at improving overall performance. These standards require immediate notification to Repair crews of Maintenance's inspections which deem a hydrant to be a priority. The goal of the agency is to repair high priority fire hydrants within 10 days.

2. "Improve [DEP's] tracking of pending requests so that it can identify all requests that have been open for an extended period of time, determine why they remain open, and take the necessary actions to resolve them"

   DEP's Bureau of Water & Sewer Operations (BWSO) has implemented a new report to all Borough Managers as part of our reorganization of

field operations. The report flags unresolved repair work orders related to complaints by highlighting the increasing age of open work. This detailed reporting assists in the management of the backlog of outstanding work, including hydrant repairs.

3. "Ensure that service request resolution dates are not entered into Hansen when requests have been placed in the no resolution/pending resolution category."

   The no resolution/pending resolution code is only used to identify a service request that was resolved in error. HANSEN restrictions prevent the removal of a resolution date and/or resolution code once they are entered and null values are not allowed. For quality control purposes the no resolution/pending resolution code allows these service requests to be monitored until they are resolved correctly.

4. "Include in the average repair time for FDNY-designated high-priority repairs the time between the date of the FDNY fax and BWSO's entry of the request in Hansen."

   To improve efficiency and implement better quality control thus eliminating any delay between receiving faxes from FDNY and entry of the request into the Hansen system, we plan to provide FDNY with direct access to Hansen, beginning in April 2011. The system will track all FDNY inspections and requests including the automatic generation of a work order for the repair of high priority hydrants. In addition, FDNY will have the ability to receive, complete and track the progress of hydrant inspections.

5. "Develop a performance indicator that tracks [DEP's] timeliness in resolving hydrant service requests that the agency itself designates as high-priority."

   The draft audit report combines two data sets: those received as high priority from FDNY, which the Mayor's Management Report (MMR) reflects, and those re-categorized upon inspection by DEP as high priority. Including the reclassified hydrants as high priority is inconsistent with the current reporting methodology. We will work with the Mayor's Office of Operations to develop new methodology to more transparently capture both those hydrants identified by FDNY as well as those identified by DEP inspectors as high priority.

6. "Update Hansen to incorporate application controls that would prevent the system from accepting clearly erroneous service request resolution and work order completion dates."

   DEP's Office of Information and Technology is currently working to develop date restrictions for both service requests and work orders that will prevent dating errors such as a repair start date and time that predates the identification of a broken hydrant. We expect to implement this fix by December 30, 2010.

7. "Monitor the use of the resolved-by-inspection resolution code when a work order has been initiated on a service request."

While it acknowledges that the audit found no evidence of such improper manipulation, the draft audit report calls for the establishment of "safeguards to ensure that multiple work orders are not initiated for service requests in an attempt to artificially improve timeliness data." DEP supports good internal controls and safeguards in general, but we note that the particular problem alluded to cannot actually be the case. The metric for which DEP Field Operations is held accountable is keeping the number of hydrants requiring repair as low as possible. That number only improves when work orders are closed. For example, if there is only one hydrant requiring repair and five work orders are created to address different aspects of the repair, the MMR only reflects one hydrant.

8. "Require [DEP's] crew supervisors to check a sample of the inspections and repairs completed in response to 311 requests."

DEP supervisors are required to check the performance of repairs and inspections. In the rare instances that they have been found to have failed to properly supervise crews, supervisors have been brought up on disciplinary charges. In light of concerns raised during the course of this audit, DEP Borough Managers have reinforced this standard to all personnel.

Throughout the Draft Audit Report, tables were created to indicate percentage of resolved work within a certain time period. The time periods indicated were "resolved in 30 days or less," "resolved between 31 and 60 days," "resolved between 61 and 90 days," "resolved between 91 and 365 days,"and "resolved in more than 1 year." While this represents an improvement over the preliminary draft report where all work between 61 and 365 days was aggregated into a single category, it still lumps a range of nine month's work together where most of that work was completed in the three to six month period. As we discussed at the pre-exit and exit conferences, those time periods do not present a clear and accurate picture of when certain repairs are resolved. For the year included in the audit, 97% of the repairs occurred within 90 days and 99% occurred within 180 days. This demonstrates that far more work was resolved within a shorter time period than one year. We request that additional time periods be included in your presentation, including "resolved between 91 and 180 days," "resolved between 181 and 275 days," and "resolved between 276 and 365 days."

Finally, in a number of places, the draft audit report suggested that DEP "failed to provide" information you had requested. As we discussed at the exit conference, and as I stated in my response to your preliminary draft, DEP was initially unclear about some of the specific data required to conduct the audit. I hope you have found that we have been responsive when the scope of a particular request was cleared up, and I would again ask that you please let me know if there is any outstanding data you need to complete the audit.

DEP is proud of our role in the maintenance and state of the firefighting system within the City. Consistently less than one percent of hydrants are out of service at any given time. Every year DEP performs over 20,000 repairs to protect the public and the we take

that responsibility very seriously. We hope that the final audit report takes these concerns into consideration, and we look forward to working with you in the future.

Sincerely,

Kathryn Garcia

c: Elizabeth Weinstein, Director, Mayor's Office of Operations
James Roberts, Deputy Commissioner for Water & Sewer Operations