

October 15, 2011

Stephen Perkins, Director
Office of Ecosystems Protection
U.S. Environmental Protection Agency
Water Enforcement
OES4-SMR
5 Post Office Square, Suite 100
Boston, MA 02109-3912

Ms. Ann Lowery, Acting Assistant Commissioner
Department of Environmental Protection
1 Winter Street
Boston, MA 02108

RE: Massachusetts Water Resources Authority
Permit Number MA 0103284
O&M Annual Report

Dear Mr. Perkins and Ms. Lowery:

Attached please find the MWRA's annual status sheets on plant performance and maintenance for the period covering July 2010 – June 2011. This submittal fulfills the requirements of MWRA's NPDES Permit MA0103284 - Section I.18.f and I.18.g that states in part:

“The MWRA shall submit annual status sheets on plant performance, using key indicators for maintenance”

The Status Sheets will be posted at www.mwra.com.

If you have questions or need additional information, please feel free to call Grace Bigornia-Vitale at 788-4942.

Sincerely,

Michael J. Hornbrook
Chief Operating Officer

MWRA Annual Report on Operation & Maintenance

July 2010 – June 2011

This report has been generated to fulfill the requirements of MWRA's NPDES Permit MA0103284 - Section I.18.f that states:

"Within ninety (90) days of the effective date of this permit, the permittee shall develop and implement a long-range operations and maintenance plan that will maximize the life of the treatment facility. The permittee shall report on the plan's implementation and results to EPA and the MADEP on a yearly basis"

Also included with this submittal are the annual status sheets on plant performance, and maintenance as required in section I.18.g.

1. SYSTEM OVERVIEW

Deer Island Sewage Treatment Plant

The Deer Island Sewage Treatment Plant (DITP) is the centerpiece of MWRA's \$3.5 billion program to protect Boston Harbor against pollution from Metropolitan Boston's sewer systems. The DITP's purpose is to remove human, household, business, and industrial pollutants from the wastewater that is collected and transported through 5,400 miles of pipes and community owned sewer lines and approximately 228 miles of Authority owned interceptors and tunnels.

DITP is a state of the art wastewater treatment facility and one of the most automated in the country. The MWRA has made a considerable capital investment in the DITP and is fully committed to ensuring that this valuable public asset is cared for in the best possible manner. The MWRA's Board of Directors, Executive Director, management team, and staff are dedicated to providing the highest quality of asset management. The MWRA has assembled a highly skilled and qualified staff that will ensure that the treatment plant is operated and maintained to the satisfaction of the regulatory agencies and the public.

Wastewater Transport System

The Field Operations Department (FOD) operates and maintains MWRA's wastewater transport system, which transports wastewater from MWRA member communities to the Deer Island Treatment Plant. This system includes a network of 228 miles of interceptor sewer lines, and related appurtenances; a screen house; 12 pumping stations; 4 headworks facilities; and 4 combined sewer overflow (CSO) facilities. The primary goal is to operate the system in a manner that will provide uninterrupted wastewater transport service in a safe, cost-effective, and environmentally sound manner.

Fore River Pelletizing Plant

The operation and output of the Fore River Pelletizing Plant (FRPP) is regulated, in part, by the terms of a newly issued federal NPDES permit, 40 CFR 503 regulations, and state sludge regulations in Massachusetts (310 CMR 32.00) and the states to which the pelletized product is shipped. Other important external factors that influence operation of the FRPP include an extensive residuals management facilities plan developed as part of the permitting process for the FRPP as well as commitments to local communities.

Under the terms of the current operating agreement between New England Fertilizer Company (NEFCo) and MWRA, NEFCo budgets for, and performs all necessary predictive, preventive and routine maintenance at the FRPP. NEFCo's agreement contains a plan for the maintenance, repair and operation of the facility. At this time, it appears that NEFCo performance meets the necessary standard for proper operation and maintenance. Since the inception of the agreement in March of 2001, there has not been an incident requiring an interruption in service.

The operating agreement requires NEFCo to provide a letter of credit in the amount of \$1,000,000 (adjusted for inflation) that MWRA may draw on in the event that there is a material breach of the operating agreement, such as failing to adequately maintain the facility.

2. PERMIT VIOLATIONS

There were no violations at MWRA facilities due to inadequate maintenance efforts.

3. COMPUTERIZED MAINTENANCE MANAGEMENT SOFTWARE

The maintenance management software used by the Authority is MAXIMO version 5.2. The software includes safety plan and job plan features that allow users to document hazardous materials and areas around the plant. It has the ability to automate lockout/tag-out procedures or tasks and generate associated work orders for the field. MAXIMO provides document management capabilities to streamline maintenance and regulatory functions, and workflow capabilities for synchronizing operations. Applications can be fine-tuned to suit specific work processes or integrate with other programs. The software also includes mobile applications for gathering and downloading data and an intuitive interface.

Maintenance staff can prioritize tasks, assign work based on the availability of necessary parts and labor, and analyze equipment failures in order to implement appropriate preventive maintenance measures.

The MAXIMO maintenance management tool is used to manage the DITP maintenance program and has been implemented for all Wastewater Facilities. The software is used for work order management, planning and scheduling, asset management, resource management, recording of maintenance costs, and generation of reports and analyses. The software can store large amounts of data and is equipped with built-in failure analysis programs. In addition, MAXIMO contains the historical record for all

maintenance activities, thus allowing staff to better address a problem with a facility, or a specific asset group.

The MAXIMO system was upgraded in February 2007 to an intranet version (Maximo 5.2) for both Deer Island and Field Operations Division. The upgrade allows continued customer support and takes advantage of web-based software maintenance. This version reduces the labor hours for MIS staff to maintain the software as all testing and programming are completed remotely and not at each desktop computer. MWRA is currently reviewing Maximo version 7.5 for future implementation.

MWRA has completed the implementation of the transportation module within Maximo. This module focuses on fleet services which includes all MWRA plated vehicles. Software is customized specifically to track, document and report information about all Transportation vehicles and equipment.

NEFCO has installed and populated a computerized maintenance management software - Quickmaint. Quickmaint is used for work order management including preventive and corrective maintenance work.

4. FACILITIES ASSET MANAGEMENT PROGRAM (FAMP)

The goals of the MWRA multi-year maintenance plan include coordinated, consistent asset inventory; condition assessment; maintenance scheduling and long-term replacement planning. The MWRA has developed and implementing, this multi-year plan, in part, under an initiative entitled the “Facilities Asset Management Program.” This asset management program addresses the goal of becoming more efficient by developing consistent, compatible best practices, cost-effective operations and maintenance procedures.

Since the start-up of new Authority facilities, the MWRA has been conducting its maintenance on a calendar schedule in accordance with the original equipment manufacturers’ (OEM) recommendations. This approach to maintenance was primarily driven by the contractual obligations of the OEM warranties. The Authority’s management team believed that it was important to modify its existing program with the goal of achieving a more holistic approach to maintenance management. MWRA management acknowledges the importance of asset management and developed the Facilities Asset Management Program (FAMP) to meet the long-term demands of facility maintenance. The main objective of the FAMP program was to develop a sound maintenance strategy that would ultimately lead to better overall asset management and extended equipment life and increase reliability.

During Phase 2 of FAMP, the MWRA expanded its efforts in the areas of condition monitoring; Reliability Centered Maintenance rollout; asset replacement prioritization and capital improvements; and training of staff. DITP is currently in Phase 3 of FAMP continuing building on each phase and focusing on Maximo upgrade to version 7, continue rollout of RCM, and expand condition monitoring oil analyses by using on site testing equipment.

5. SERVICE CONTRACTS

The maintenance program is supplemented by a series of service contracts. These contracts are intended to provide specialized services beyond the resources of the MWRA maintenance staff. Table 1 below shows the service contracts currently used by MWRA.

TABLE 1
DEER ISLAND CURRENT SERVICE CONTRACTS
Laser alignment
Boiler maintenance
CCTV maintenance
Centrifuge maintenance
Combustion Turbine Generator maintenance
Continuous emissions monitoring
Copier/fax maintenance
Crane maintenance
Cryogenics facility maintenance
Digester Mixer overhauls
Electrical testing
Elevator maintenance
Facilities coatings
HVAC chemical treatment (Legion Ella testing)
Hydro turbine generator maintenance
Hydraulic maintenance
Janitorial services
Lab hood certification
Plant and Public access landscape services
Locksmith services
Lube oil analysis
Oil separator cleaning
Overhead door maintenance
Pest control
Plant instrumentation and control system (PICs) maintenance
Pratt Whitney Preferred service
Public access grounds keeping
Reactor Mixer gearbox rebuild
Security
Steam turbine generator maintenance
Trash removal
Vibration analysis

Deer Island Treatment Plant

July 2010 - June 2011

Annual Report: Attached, please find the Deer Island Maintenance page of the MWRA Report on Key Indicators of Performance for FY11. Monthly maintenance data is shown under six headings.

- Preventive Maintenance Orders Completed - Maintenance is working to reach the PM goal of 100%. The average PM % completed was 99.9% for the past five years.
- Work Order Kitting - The first step to increase wrench time is to have all parts available for work orders. Kitting is a task where the maintenance planner identifies the specific parts required for a task on the work order and electronically sends to the warehouse personnel to assemble the parts in one location (kit) for the technician to pick up and use. Deer Island reached their goal of 100% of all preventive maintenance work orders in FY10. In FY11, we started kitting all work orders and currently have reached 40%.
- Predictive Maintenance - To extend the useful life of equipment and plan for equipment replacements, predictive maintenance technologies are being implemented. 3987 work orders were completed for vibration, acoustic ultrasonic, ultrasonic thickness, and oil analysis in the past year. For the year, 18 % of all work orders were predictive maintenance. This is an increase from 2010.
- Maintenance Backlog in Hours - Backlog is determined by totaling the planned craft hours on open work orders and comparing them to craft resources which are available. The average backlog for last year was 16,682 hours for day to day plant maintenance activities which is under the industry standard of 8,730 hours to 17,460 hours. DITP monitors all of our metrics very closely to ensure the backlog is not affecting our availability of equipment.
- Maintenance Project Backlog in Hours – The average backlog for normal day to day maintenance activities and project backlog was 16,682 hours which includes 2,417 hours of project backlog.
- Maintenance Overtime - The goal to maintain maintenance overtime to 5% of total wages and salaries. DITP was below the benchmark with 4%. This doesn't include any wet weather event overtimes were maintenance staff is on site only as a precaution during a storm.

Critical Equipment Availability: 12-Month Average – 99.1%

An equipment availability report is generated daily that details the critical equipment required to treat the design flow of approximately 1.2 billion gallons per day. Higher maintenance priority is given to equipment that drops below the number required. No operational impact has occurred in the past year from a 99.1% versus a 100% availability because the plant normally operates at approximately one-third the design flow capacity.

Day to Day Plant Maintenance Average Backlog was 16,682 hours Backlog is determined by totaling the planned craft hours on open work orders and comparing them

to craft resources which are available. Day to day plant maintenance backlog includes all PM, PdM, Project and CM backlog. A backlog of 16,682 hours constitutes a 5.7 weeks of work for the entire maintenance workforce. This backlog is within the industry standards of 8,730 hours to 17,460 hours or 4 to 6 weeks. DITP monitors all of the metrics very closely to ensure the backlog is not affecting the availability of equipment.

Preventive Maintenance (PM):

99.9% of all PMs were completed and 18,288 PM work orders were initiated this year. Incomplete PM's that are not completed in one month are rolled over into the next month's workload and given a high priority to complete first.

Predictive Maintenance (PdM)

3987 predictive maintenance work orders were completed in the past year. Predictive maintenance work includes vibration, acoustic ultrasonic, ultrasonic thickness and oil analysis and is proactive maintenance work to extend equipment useful life.

Average Craft Hours per Month:

Preventative Maintenance	3055 hours	22.0 %
Predictive Maintenance	164 hours	2.0 %
Corrective Maintenance	8263 hours	60.5 %
Emergency Maintenance	30 hours	0.5 %
Project Work	1218 hours	9.0 %
Other Work	847 hours	6.0 %
Total	13,577 hours	100.0 %

Total Work Orders:

35,077 work orders initiated this year
33,342 work orders completed/closed

Equipment Replacement:

Major replacements, in the past year, include the following:

- Centrifuges Refurbishment - \$ 67,000

We currently have twelve waste sludge centrifuges which because of the high speed rotating assembly and critical nature of the process require maintenance. The centrifuges require refurbishment at regular intervals based upon running hours for normal wear and tear. Due to the intricacy of the equipment all overhauls are sent back to Alfa Laval, the original equipment supplier. In the past year, one waste sludge centrifuges and gearbox were refurbished.

- Digester Mixers Refurbishments - \$81,786

One digester mixers was refurbished based upon impeller and bearing wear identified through vibration testing. Due to the intricacy of the equipment all overhauls are sent back to SIHI, the original equipment supplier.

- Coating Contract \$809,300

The Coating contract was awarded to SOEP Company. The areas completed in FY11 were Sulfuric Acid secondary containment area, Gravity Thickener catwalks, and Pump structures at South System Pump Station.

- Reactor Aerator/Mixer Gearbox Rebuilds \$ 279,296

The secondary reactor aerators and mixers have large gearboxes that have started to fail. Eight gearboxes were refurbished in FY11 with new gears, seals, and bearings as necessary.

- Steam Turbine Generator 5 year overhaul - \$365,900

A maintenance contract was put in place to perform annual preventive maintenance and repairs as necessary. In FY11, additional maintenance was required due to the five year annual maintenance schedule.

- Cryogenic Facility Repairs - \$269,421

The cryogenic facilities have an annual maintenance contract to handle preventive maintenance and some project maintenance work. The maintenance work includes two shut downs per year and scheduled projects. The scheduled project this year was the level D inspection for compressor 2A which was to repair the rotating assembly, shroud, and intercoolers.

- Roof Replacements - \$ 2,700,000

DITP has started a program to replace facility roofs over the next few years. The three facilities which were completed in FY11 were East/West Odor control, Grit Facility, and Centrifuge Facility. They were replaced due to normal wear and tear.

- Elevator Controllers \$125,000

We have replaced the existing elevator controller in Power Plant. We replaced the existing controller with a new Galaxy controller. The Galaxy controller variable-frequency closed loop controller with phase 1-2 fire service and code compliant features. The existing controller was obsolete.

- Tip Tube project for Primaries \$142,000

The Tip Tube project was initiated to install new tip tubes, actuator and drive to capture scum as designed by in-house staff. DITP has started a pilot program on Primary B-11 and B-12. The units have completed their pilot program and have been deemed successful. We have purchased and received additional stainless steel material to install all new tip tubes on the last two tanks in each Battery. In FY11, maintenance staff completed Primary C-11 and C-12. DITP will complete Primary tanks in Battery A and D in FY12. The long term plan is to turn over design to engineering to have a CIP contract to install new tip tube assembly for all tanks throughout primaries.

- Electrical Repairs - \$291,000

The electrical system on Deer Island is extremely important which requires constant maintenance and equipment replacements to ensure reliability. These steps are necessary throughout the electrical distribution system. Some of these repairs and

changes are installing new various variable frequency drives, install new and rebuilt Gem drive units, install new communication/interface cards, circuit breakers and install Uninterrupted Power Supply units (UPS).

- Eccentric Plug Valves \$162,632

The valves are replacing original valves on all twelve digesters in all Modules at the Deer Island Treatment Plant. These valves are used for both tank isolation (10-inch) and for gas venting (8-inch). Methane gas generated from the treatment process is discharged from each of the four individual digester tanks within each of the three digester modules. The methane gas collected is then sent to either the gas compressor building for use in the Thermal Power Plant or sent to a waste gas burner.

- Carbon Absorbers \$355,000

The Carbon absorbers had two repair contracts. The first contract was to repair two units as soon as possible. The second contract was to inspect and repair six units. The work which was identified out of the inspection was repair screens and supports which holds the carbon in place. Coat the bottom layer of the Carbon Absorber to protect the metal from corrosion.

- Grinder Winthrop \$66,000

The Winthrop facility has three grinders which were in need of refurbishment. DITP had two refurbished this year and one scheduled for next year. Cleaning rakes remove heavy debris from the bar rack and deposit it into collection hoppers. After the screenings are dumped into the hopper they then go through a grinder (Macho Monster Grinder Model 4000). This is a universally sized two shafted solid reduction device that pulverizes influent solids into a particle size that facilitates free flow and easier disposal of debris. The cutters and cartridge seal are replaced and unit is back to original specifications.

- Electric Carts \$114,000

Deer Island often uses burden carriers, which in effect are small electric “carts” to transport personnel, materials, equipment and supplies across its wide expanse, to and from its many facilities. Utilizing smaller, electric burden carriers is less costly than conventional vehicles and is more environmentally friendly. These new burden carriers will replace 10 of an existing fleet of 70 models, most of which were first procured for Deer Island under a fit-out process approximately 14 years ago.

Wastewater Transport System

July 2010 - June 2011

Wastewater Transport System Overview

The Field Operations Department (FOD) operates and maintains MWRA's wastewater transport system, which transports wastewater from MWRA member communities to the Deer Island Treatment Plant. This system includes a network of 240 miles of interceptor sewer lines and related appurtenances, a screen house, thirteen pumping stations, four remote headworks facilities, three combined sewer overflow treatment (CSO) facilities and two combined sewer overflow (CSO) storage facilities. In the past year, the South Boston storage CSO facility pump station and odor control buildings were completed and are now operational. The Union Park CSO facility is operated under contract. The contract requires compliance with the facility NPDES permit and includes well defined maintenance tasks. The primary goal is to operate the system in a manner that will provide uninterrupted wastewater transport service in a safe, cost-effective, and environmentally sound manner.

Wastewater Transport Facilities

1. Facilities Operational Statement

During FY11 Wastewater Transport facilities operated at full capacity throughout the year. All required equipment to maintain flow and process of wastewater was available. CSO facilities operated with sufficient chlorination and dechlorination, though some NPDES exceedances were reported. The required number of pumps in each gravity and pumping CSO was available throughout the year.

2. Equipment Availability

The critical equipment evaluated includes pumps and screens in the pump stations, CSOs, the screenhouse, and headworks. Operational staff track and report the availability of critical equipment on a daily basis and report on a weekly basis. The critical equipment availability for FY11 for FOD facilities was 99.99%. Higher maintenance priority is given to equipment that drops below the number required.

3. SCADA Program

The MWRA Supervisory Control and Data Acquisition (SCADA) systems provide a means of monitoring and controlling facilities and equipment from a remote centralized location, as well as providing a continuous record of facility operations.

The Wastewater SCADA Implementation program originated with the development of a Master Plan in July 1999. In June 2002, Contract 6532 was awarded to Camp Dresser & McKee, Inc., to provide design, integration, training, construction administration and resident inspection services for SCADA improvements at MWRA's wastewater facilities.

Phase I (Construction Package 1 - Contract 6533), the first and most complex construction contract was completed in 2008. This contract successfully upgraded equipment, installed instrumentation, and integrated seven pumping facilities, three CSO facilities, and the Chelsea Screen House into MWRA's SCADA system;

Phase II (Construction Package 2 - Contract 6534) was awarded in February 2008. This contract added instrumentation upgrades to the three older headworks facilities (Ward Street., Chelsea Creek, and Columbus Park) and the Nut Island headworks facility, to standardize and integrate these four facilities into the SCADA system. The contract also included the upgrade of software, PLC and screen displays at the Squantum, Quincy and IPS facilities to make them consistent with the other wastewater facilities.

At the completion of Phase II, the only remaining wastewater transport facility to be upgraded in the SCADA system was the Arthur Street Pump Station. This work was completed during FY10 using a combination of in-house resources and consultant services.

4. Equipment Replacement and Significant Maintenance Projects

Equipment replacement is part of the overall maintenance strategy that ensures compliance with permit requirements. Projects and initiatives are completed during each fiscal year to maintain redundancy and continued reliability. Many projects are extensive, requiring significant in-house resources and use of specialty/service contractors. Some examples of key improvements, equipment replacement, or significant repair work during the past fiscal year include in-house and out-sourced projects:

In-house Projects

Remote Headworks Improvements: Staff are working to replace equipment at the headworks to maintain equipment reliability. Each year, staff will work to upgrade the headworks equipment. In the past year the following replacements have been completed:

- 6 Incline Screws – 2 Chelsea Creek, 2 Columbus Park, 2 Ward Street
- 3 Horizontal Screws – 3 Chelsea Creek
- 2 Channels - Collector Chain, Shoes, Wear Strips – 1 Chelsea Creek, 1 Ward Street
- Grit Piping – 40 feet of grit piping and 6 fittings were replaced at Chelsea Creek, Ward Street and Columbus Park

Ward Street Headworks Chemical Tank Replacement: One of two outside hypochlorite tanks developed a crack. The two existing tanks were removed and replaced with new tanks and returned to service.

Nut Island Classifier Rebuilds – The classifiers chutes and screws were in need of replacement/repair. MWRA Welder/Machinist repaired the chute using rolled stainless steel and welding it to the existing chute. A new longer screw with an external lower bearing was installed. The modification should prolong the life of the screw and chute. Modifications to four classifiers were completed this year.

Nut Island Classifier Influent Gates: The influent gates for Classifier 5 and 6 did not provide adequate isolation. New gates were purchased and installed in the channels.

Prison Point Detention Tank Spray Line Rebuilds: The spray lines for cleaning the detention tanks after activations were sagging and failing due to failed supports. New supports were fabricated and installed by the plumbers and new PVC piping and spray nozzles were installed for the six detention tanks.

Cottage Farm Fine Screen Couplings: The shear couplings were worn beyond repair and were replaced with new couplings.

Caruso Conveyor Belt Roller Replacement: All of the rollers for the Caruso conveyor were replaced to provide more reliable service.

Hayes Pump Station Screen Replacement: The screen rake and brake assembly was replaced in its entirety with a new unit based upon its performance during high flow conditions. The new assembly has worked well since installation.

Hayes Pump Station Odor Control Building Roof Replacement: The slate roof, wood gutters, and soffits on this historic structure was replaced in kind and were painted.

Hingham Pump #3: This pump was rebuilt and the packing was replaced with a mechanical seal. Mechanics, Electricians, and Plumbers completed this work.

Hough's Neck Pump Replacement: Pump #2 was not providing sufficient flow and was replaced.

Intermediate Pump Station Actuator Replacement: Six Rotork actuators in the lower level were replaced with upgraded models due to failures and to improve reliability.

Intermediate Pump Station Electrical Upgrades: The transformer temperature controller was replaced and new transient voltage surge suppressors were installed to resolve unexplained main facility breaker trips.

Outsourced Projects

Cottage Farm CSO Gearbox Rebuilds: The facility pump gearboxes were all rebuilt with new bearings, seals, and new backstops by Philadelphia Gear. The gearing on pump #3 gearbox required replacement due to wear and tear.

Caruso Pumps 1-2 and 1-3 Rebuilds: These pumps were removed and reinstalled by in house staff. The pumps were rebuilt offsite by outside contractors. New mechanical seals were installed on these pumps after installation.

Caruso Pump Wetwell Repairs: Sluice Gate #4 and wetwell #2 dewatering piping were repaired by JF White Divers who was assisted by MWRA staff.

New Neponset Pump #2 Upgrades: The drive shaft and gear box for pump 2 at New Neponset were sent out for inspection and rebuild. Both pieces of equipment were returned from outside vendors and reinstalled by Equipment Maintenance Mechanics. The variable frequency drive was replaced by a vendor with a new model.

New Neponset Odor Control Carbon Adsorbers: New carbon adsorbers were purchased and were placed on an outside pad by a contractor. MWRA staff completed all wiring to complete the automatic operation of these new units.

Intermediate Pump Station Electrical Issues: VFD #2 was replaced with an upgraded model and put into service. The surge suppressors for the station were serviced to provide improved protection of all the VFDs from utility power surges.

Wastewater Transport Pipelines

1. Manhole Inspection and Rehabilitation Program

The Technical Inspections Unit (TIU), of the FOD conducts manhole inspections. These inspections facilitated the beginning of the manhole rehabilitation program. Specialized equipment and training are the essential elements of the program. Pipeline maintenance crews perform manhole renovations and repairs that result in reduced I/I. The manholes are coated using cementitious material applied with spinning equipment and then covered with special coatings to resist corrosion from hydrogen sulfide.

In FY11 TIU staff inspected a total of 703 manholes. Approximately 129 manholes were rehabilitated utilizing in house staff. An additional 27 manholes in Boston, Chelsea and Quincy were rehabilitated by an outside contractor at a cost of \$78,954. The rehabilitation work included frame and cover replacement, external repairs to raised manholes, internal repairs using the spin-cast application, and other miscellaneous repair work.

2. Pipeline Rehabilitation

Pipeline Rehabilitation projects are first identified by the TIU during routine television inspections of the pipelines and interceptors. MWRA Engineers review these projects and perform or coordinate all necessary design and construction contracting, beginning with conceptual design. The following represents a list of current and ongoing pipeline projects construction/rehabilitation included in the MWRA Capital Budget.

East Boston Branch Sewer Rehabilitation, East Boston:

Initial work consisted of repair of approximately 5400 feet of 45-inch x 41-inch brick sewer, using a cured-in-place, resin-impregnated, flexible felt tube liner. Construction began in April 2003 and substantial completion in May 2004. A final video inspection performed after one year revealed 900 linear feet of liner failure. Removal and replacement of the failed portions, performed under the contract warranty, was completed in 2005.

The design and construction phases for new sewers to replace existing, hydraulically-limiting sewers are complete. Construction of approximately 13,500 feet of relief sewers by micro tunneling and 6,000 feet by pipe bursting began in June 2008 and was completed in July 2010. The project cost was \$5.4 million.

Section 624 Braintree-Weymouth Interceptor

Approximately 2,000 feet of Section 624, a 57-inch x 60-inch concrete sewer, required rehabilitation due to continued corrosion from discharges containing hydrogen sulfide from the Hingham Pump Station. Construction was completed in December 2010. The project cost was \$2.5 million

Contract 7248 Section 50 to Section 51 Sewer Connection, Melrose

Contract 7248 includes the construction of approximately 660 feet of new 18-inch PVC sewer, a new 18-inch gate valve, and removal and replacement of approximately 35 linear feet of 20-inch-diameter, cast-iron pipe with new 20-inch-diameter, ductile-iron pipe. The project is designed to eliminate SSOs at the Roosevelt Elementary School in Melrose. Construction began in February 2010 and was completed in August 2010. The project cost was \$653,640.

3. Pipeline Inspection and Cleaning

The Technical Inspection and Wastewater Pipeline Maintenance groups were merged to more efficiently and consistently maintain the wastewater collection system. The work performed by the inspection staff is an important element to the planning and execution of pipeline maintenance work. The inspection tasks are shared by the entire staff and the maintenance workload is prioritized based on inspection data and information.

TIU conducts internal inspections of MWRA structures and pipelines to reveal potential problem areas and identify locations requiring maintenance. Pipeline inspections average about 70% of the workload followed by inspections of other structures and manholes. Approximately 36.34 miles of pipelines were TV inspected in FY11.

Approximately 0.89 miles of Community Assistance inspections were also performed. TIU uses sonar technology to inspect full pipes and structures enhancing our ability to identify maintenance areas.

Pipeline maintenance crews perform a variety of maintenance activities for the MWRA's Wastewater Transport system. The Transport collection system includes 240 miles of interceptor sewer lines. Approximately 39.88 miles of pipeline and 57 siphons were cleaned in FY11.

In addition to general pipeline and manhole repair work performed under this program, the following are other activities pipeline crews perform during the year:

- pipeline spot repair work in shallow excavations
- clear obstructions and clean sections in community lines under the Community Assistance Program
- snow plowing and removal during winter months

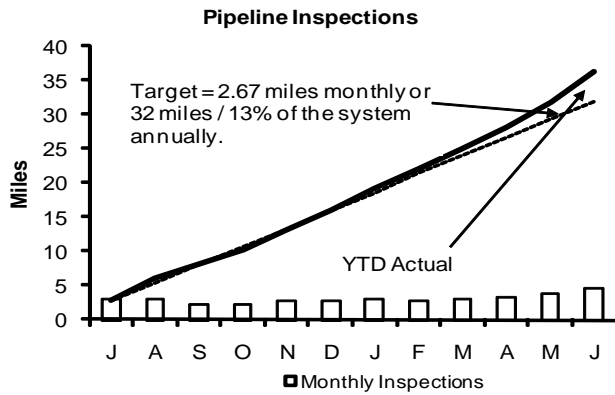
- NPDES inspections and best practice management activities
- emergency pumping activities for communities during major wet weather events
- by-pass pumping for contracted pipeline rehabilitation or repairs
- emergency response and overflow monitoring during wet weather events
- response to odor complaints in the system

The attached “Maintenance Pipeline and Structure Inspections and Maintenance” page provides a breakdown of the pipeline inspections and maintenance activities for FY11.

Wastewater Pipeline and Structure Inspections and Maintenance

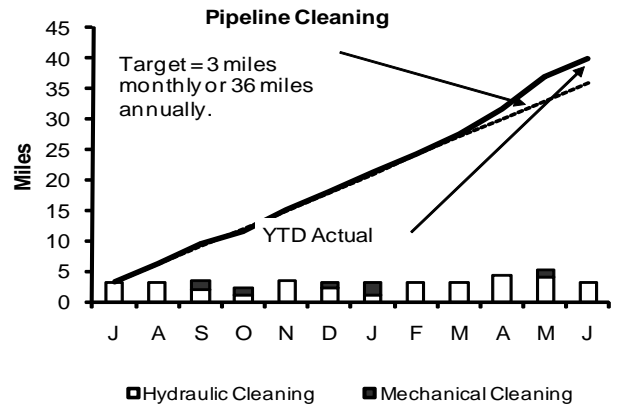
Yellow Notebook JUNE FY 11

Inspections

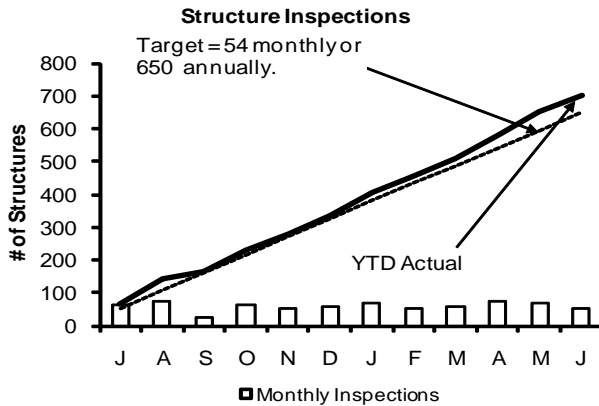


Staff internally inspected 4.55 miles of MWRA sewer pipeline. The year-to-date total for FY11 is 36.34. Community Assistance was provided to the town of Winthrop, 120 linear feet of 12" diameter sewer was inspected this month.

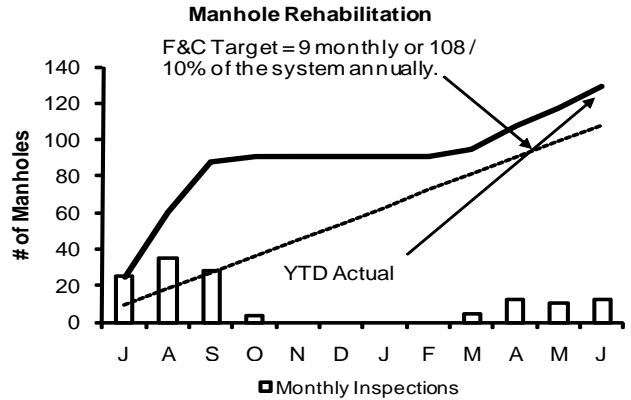
Maintenance



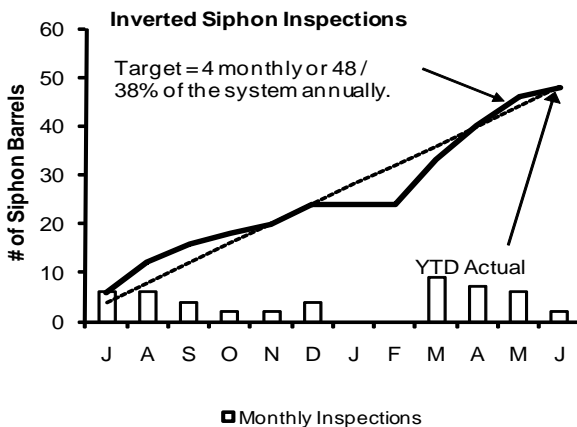
In June staff cleaned 3.01 miles of MWRA's sewer system and removed 8 cubic yards of grit and debris. The year to date totals for FY11 is 39.88 miles. No Community Assistance was provided this month.



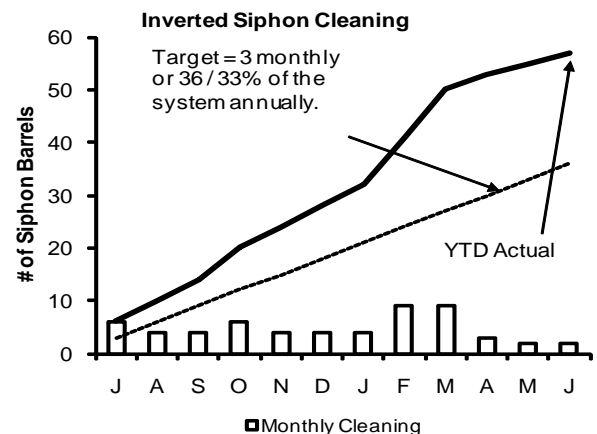
Staff inspected the 12 CSO structures and performed 38 additional manholes/structures inspections in June, bringing the total for the fiscal year to 703 inspections.



In June staff replaced 12 frames and covers, the year to date total for FY11 is 129.



In June, 2 siphon barrels were inspected. The fiscal year total remains at 48.



In June, staff cleaned 2 siphon barrels, the year to date total for FY11 is 57.

FY11 Maintenance Program Costs, Staffing and Contracts

1. Budget

FOD has made a significant commitment to the maintenance of its wastewater system. Additional maintenance and improvement projects are included in the MWRA Capital Program and are identified on an annual basis. A Master Plan is ongoing within the Authority to prioritize projects and to determine required funding needs. The budget below includes only the Current Expense Budget (CEB). Maintenance includes protecting the many assets of the MWRA with individual programs that care for facility interior and exterior elements, maintain plant equipment, inspect and clean wastewater pipelines and structures, plan/schedule and track maintenance activities, manage each program and supervise staff, and provide adequate administrative support. The table below includes a summary of the approved budget in FY11 for programs within FOD for related maintenance activities.

FY11 APPROVED MAINTENANCE ANNUAL BUDGET

Budget Line Item	Total Funding
Wages and Salaries	\$8,612,209
Overtime	\$348,123
Maintenance (Parts & Supplies)	\$4,390,051
Professional Services	\$180,000
Other Materials	\$248,799
Other Services	\$407,378
Total	\$14,197,170

2. Staffing

A total of 131 employees are included in the chart below. They represent personnel responsible for the maintenance of wastewater transport facilities and pipelines. Unit Supervisors for each trade provide supervision and support in their respective areas: electrical, mechanical, machinists and welding, plumbing, HVAC, painting, and carpentry. Facility Maintenance and Equipment Maintenance are two consolidated programs made up of the mechanic specialists, machinists, metalworkers, welders, plumbers, HVAC specialists, electricians, building & grounds workers, and facility specialists (carpenters, painters, and masons). These groups perform maintenance activities at both wastewater and water facilities.

Work Coordination in FOD provides scheduling and job planning at all water and wastewater facilities, water and wastewater pipeline maintenance, and Western Operations. The Wastewater Pipeline Maintenance and Technical Inspection programs maintain the collections system for the Transport system only. The staffing represents FY11 average levels for employees reporting to the Chelsea Facility. The table below indicates the amount of staffing available and dedicated to maintenance efforts.

MAINTENANCE STAFFING LEVELS

Staffing Categories	No. of Staff
Equipment Maintenance Program	
Maintenance Manager	1
Engineers	3
Program Manager/Area Manager	4
Administration	1
Mechanic Specialists	20
Electrical Specialists	11
Plumbers	8
HVAC	6
Machinists and Welders	5
	59

Work Coordination Group Program	12
Collection System Technical Inspections Program	10
Wastewater Pipeline Maintenance Group	18
Building & Grounds Program	17
Facility Maintenance Program (Carpenters, Painters, Masons)	15
Subtotal	72
Total	131

Staffing levels may vary as a result of vacancies, transfers, and other factors. This chart provides a number of available staff during the fiscal year for maintaining the collections system and wastewater facilities. Equipment Maintenance, Building & Grounds, and Facility Maintenance programs perform similar core business functions at Water Pumping Facilities and locations.

3. Service Contracts

The Maintenance Program is supplemented by a series of service contracts. These services are intended to provide resources beyond the in-house capabilities of the Maintenance staff. FOD currently utilizes the following service contracts and services, listed below, to supplement the existing workforce and assist with maintenance projects at wastewater facilities.

<u>CURRENT SERVICE CONTRACTS</u>
Elevator Maintenance
Crane Maintenance
Hydraulic Equipment Maintenance
Instrumentation Maintenance
Fuel Storage Tanks
Fire Alarm and Sprinkler
Air Compressor Service
Boiler and Water Heater
Pest Control Services
Trash Removal
Electrical Testing
Groundskeeping
Lube Oil Analysis
Union Park Station Operation and Maintenance
Generator Maintenance
Overhead Door Maintenance

Wastewater Transport Equipment Maintenance

1. Annual Report

The Field Operations Department Equipment Maintenance page for key indicators of performance for FY11 is attached. Monthly maintenance data is shown under six headings.

- Operations Light Maintenance PM Hours – In an effort to free up maintenance staff to complete more detailed and complex maintenance, operations staff have been committed to completing a number of the routine monthly preventative maintenance tasks. These tasks generally consist of observation and light maintenance tasks. The industry benchmark is 10% - 15% of the total preventative maintenance hours. In FY 11 operations staff completed an average of 493 hours per month which accounted for 21% of the total preventative maintenance hours.
- Overall Preventive Maintenance – The preventive maintenance work orders are completed by both operation and maintenance staff. The goal for FY11 was to complete 100% of all preventative maintenance work orders. The average pm completion for FY11 was 99%.
- Time In Maximo – To ensure accurate data in the Maximo database, 8 hours of staff time per day must be entered into Maximo. The goal is 100%. The average for FY11 was 100%.
- Operations Light Maintenance % PM Completion – In an effort to free up maintenance staff to complete more detailed and complex maintenance, operations staff have been committed to completing a number of the routine monthly preventative maintenance tasks. The goal for operations staff is to complete 100% of the preventative maintenance work orders. In FY11 operations staff completed an average of 99% of the work orders.
- Maintenance Backlog in Crew Hours - Backlog is determined by totaling the planned craft hours in open work orders and comparing them to craft resources available. The FY11 backlog average was 11,417 hours which remains within the industry standard of 6,130 to 12,260 hours.
- Overtime Spending – Maintenance overtime spending was \$80,000 over budget for FY11. The overtime was used to support call ins for emergency maintenance and planned overtime. It was also used for emergency coverage and maintenance coverage related to multiple wet weather events.

In addition to these monthly performance indicators Field Operation's staff also tracks the following:

2. Critical Equipment Availability

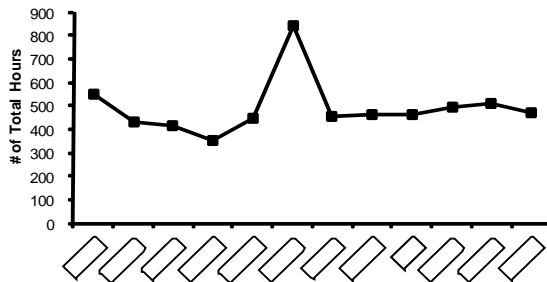
The average equipment availability for FY11 was 99.9 %. An equipment availability report is generated daily that details the critical equipment required to collect and transport the wastewater flow at the facility design capacity. Higher maintenance priority is given to equipment that drops below the number required. No operational impact has occurred in the past year because of the high daily equipment availability.

Field Operations' Metropolitan Equipment & Facility Maintenance

June 2011

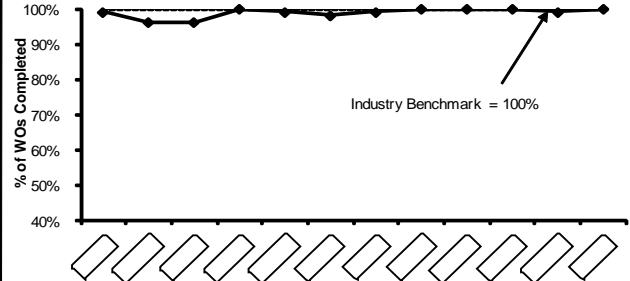
Several maintenance and productivity initiatives are in progress. The goal for the Overall PM completion and the Operator PM completion was raised to 100% for Fiscal Year 2010. The Operator PM initiative frees up maintenance staff to perform corrective maintenance and project work, thus reducing maintenance spending. Backlog and overtime metrics monitor the success of these maintenance initiatives.

Operations Light Maintenance PM Hours



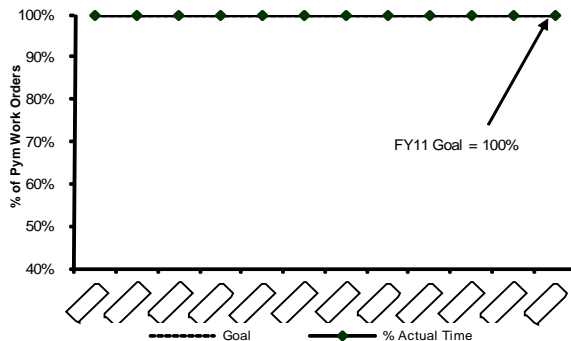
Operations staff completed 470 hours of preventive maintenance in June. 100% of the Ops PMs were completed. Overall, Operations completed 20% of the total PM hours for the month, which is greater than the Industry Benchmark of 10% to 15%.

Overall Preventive Maintenance



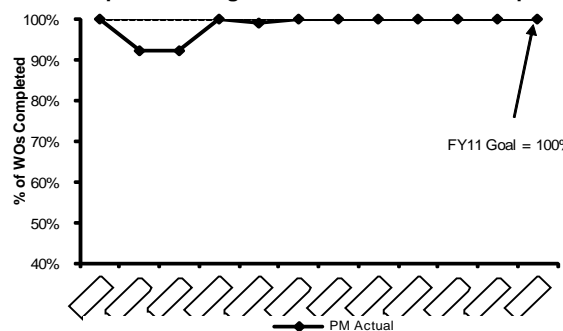
In June, Field Ops completed 100% of all PMs. In FY 10 the PM completion goal was raised to 100%, which is the Industry Benchmark.

Time in Maximo



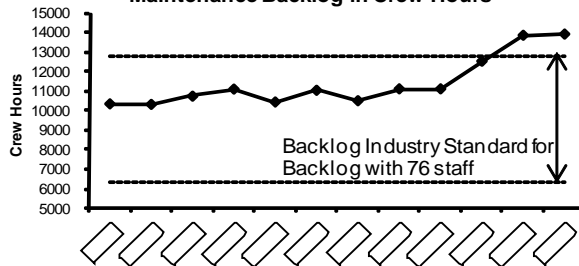
To ensure accurate data in the Maximo database, 8 hours of staff time per day must be entered into Maximo. 100% of the time was entered in June. Maintenance managers ensure each week that time is entered for each supervisor's staff.

Operations Light Maintenance % PM Completion



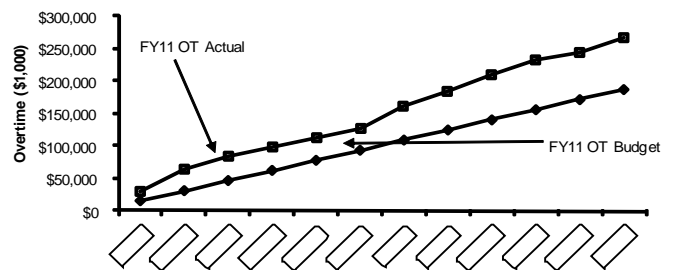
Starting in FY10, Operations' PM goal is completion of 100% of all PMs each month; Operations completed 100% in June.

Maintenance Backlog in Crew Hours



Current backlog is at 13,884 hours while overtime spending was \$8k over budget for June. The industry standard for maintenance backlog with 76 staff (currently planned staffing levels) is between 6,380 and 12,770 hours. There are currently two vacant positions a WSS foreman and a facilities specialist.

Overtime Spending



Maintenance overtime was \$8k over budget for June. Overtime spending for the year is \$80K over budget. Overtime in June was used for several Headwork's repairs as well as wet weather coverage.

Annual Status Sheets – Fore River Pelletizing Plant

July 2010 - June 2011

Critical Equipment Availability: Twelve Month-Average – 80.0 %

Operating logs indicate that an average of 10 of the 12 centrifuges were available in FY11. The centrifuges and ancillary equipment make up the critical components at the Pelletizing Plant because sludge can be processed through the Dryers or it can be sent to a landfill via the by-pass system. At this time, 10 centrifuges are available, giving the plant more than enough capacity to process current flows from Deer Island. The facility is currently operated on a 5-day workweek, ceasing operations most weekends.

Backlog:

The current maintenance monitoring software does not track craft hours, but it is estimated that the outstanding work orders could be completed in approximately two weeks.

Work Orders:

- In FY11, 1,499 work orders were opened and 1,410 were completed, or about 94%.

Equipment Replacement:

More than \$1,760,000 was spent on replacement parts and maintenance related items in FY11 including:

- Overhaul of Process Trains 2, 4, and 6.
- Replacement of Mixer Feed B Screw on Train 6 and liners on Train 2.
- Replacement of Wet Feed Conveyors on Trains 1, 4, and 6.
- Dryer drum rebuild on Trains 2, 4, and 6.
- Complete overhaul of Centrifuge Rotating Assemblies #9 and #10.
- Regenerative Thermal Oxidizer Nos. 2, 3, and 4 media replacement.
- Replaced air end and rebuilt motor on 150 HP air compressor.
- Replaced Fire Alarm Control Panel and all speaker-strobes.