November 8, 2013

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

David Ferris, Director
Division of Watershed Management
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 Mr. Ferris:

Attached please find the MWRA's annual status sheets on plant performance and maintenance for the period covering July 2012 – June 2013. 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.state.ma.us/harbor/html/whatsnew.htm.

If you have questions or need additional information, please feel free to call Betsy Reilley at (617) 788-4940.

Sincerely,

Michael J. Hornbrook
Chief Operating Officer

cc: MA DEP, Wilmington
MA DEP, Worcester
B. Pitt, US EPA
T. Borci, US EPA
C. Vakalopoulos, MA DEP
F. Laskey, MWRA

MWRA Annual Report on Operation & Maintenance

July 2012 – June 2013

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 240 miles of interceptor sewer lines and related appurtenances, a screen house,13 pumping stations, 4 remote headworks facilities, 3 combined sewer overflow (CSO) facilities and 2 combined sewer overflow (CSO) storage 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 the 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, 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 breech 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. 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 implemented, 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, extended equipment life and increase reliability.

MWRA has expanded its efforts in the areas of condition monitoring; Reliability Centered Maintenance (RCM) rollout; asset replacement prioritization and capital improvements; and training of staff. DITP is continuing to build the program, focusing on Maximo upgrade to version 7.5, continuing rollout of RCM, consolidating the tool data-base in Maximo, expanding condition monitoring oil analyses by using on site testing equipment, and reviewing analytical software for better asset management decision making.

4. 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 use 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 and expected to implement over the next year.

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 computerized maintenance management software - Quickmaint. Quickmaint is used for work order management including preventive and corrective maintenance work.

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
Catch Basin Contract
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
Reactor Mixer gearbox rebuild
Recycle contract (Scrap/Paper)
Security
Steam turbine generator maintenance
Trash removal
Vibration analysis

Deer Island Treatment Plant

July 2012 - June 2013

Annual Report: Deer Island Maintenance page of the MWRA Report on Key Indicators of Performance for FY13. Monthly maintenance data is shown under six headings.

- Preventive Maintenance Work Orders Completed - Maintenance is working to reach the PM goal of 100%. The average PM % completion rate is 99.9% over the past seven 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 the information to warehouse personnel to assemble the parts in one location (kit) for the technician to pick up and use. Deer Island reached their goal of 46% in FY13.
- Predictive Maintenance - Extending the useful life of equipment and allows for better planning for equipment replacements. 5,767 work orders were completed for vibration, acoustic ultrasonic, ultrasonic thickness, and oil analysis in the past year. Deer Island reached its FY13 goal of 20 % of all work orders were predictive maintenance.
- 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 16,812 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 16,812 hours which includes 2,017 hours of project backlog.
- Maintenance Overtime - The goal is to maintain maintenance overtime to 5% of total wages and salaries. DITP was below the benchmark with 2.4%. This doesn't include any wet weather event overtime requiring maintenance staff to be onsite as a precautionary measure.

Critical Equipment Availability: 12-Month Average – 99.4%
An equipment availability report is generated daily that details the critical equipment required to treat the maximum 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 99.4% versus 100% availability because the plant normally operates at approximately one-third the design flow capacity.

Day to Day Plant Maintenance Average Backlog was 16,812 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 16,812 hours constitutes 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 18,465 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)
5767 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 by monitoring and trending equipment characteristics.

Average Craft Hours per Month:

Preventative Maintenance	2947 hours	22 %
Predictive Maintenance	863 hours	7 %
Corrective Maintenance	7793 hours	59 %
Emergency Maintenance	5 hours	1 %
Project Work	712 hours	5 %
Other Work	889 hours	6 %
Total	***13,209 hours***	***100.0 %***

Total Work Orders:
33,881 work orders initiated this year
33,232 work orders completed/closed

Equipment Replacement:

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

- Centrifuge Refurbishment $157,500

  There are twelve waste sludge centrifuges which, due to high speed rotating assembly and critical nature of the process, require maintenance. 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, two waste sludge centrifuges and gearbox were refurbished.

- Digester Mixer Refurbishments $74,482

  One digester mixer 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.

- Reactor Aerator/Mixer Gearbox Rebuilds $270,764

The secondary reactor aerators and mixers have large gearboxes that have started to fail. Six gearboxes were refurbished in FY13 with new gears, seals, and bearings.

- Boiler, STG and Hydro Plant Maintenance $1,145,000

A maintenance contract was put in place to perform annual preventive maintenance and repairs as necessary. This contract was combined with Hydro plant and STG to save money with one contract on like equipment and save on mobilization cost. In FY13, additional maintenance was required on the Steam Turbine.

- Cryogenic Facility Repairs $608,464

The Cryogenic facility has 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 replace vaporizer controls, replace wafer valve on chiller and butterfly valves on Mole Sieve.

- Elevator Controllers Replacements $100,000

We have replaced two existing elevator controllers in the Power Plant and North Main Pump Station. We replaced the existing controllers with a new Galaxy controller. The Galaxy controller's variable-frequency closed loop controller with phase 1-2 fire service and code compliant features is a state of the art system. The existing controllers were obsolete.

- Electrical Repairs $405,433

The electrical system on Deer Island is extremely important and requires continued 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, rebuilt Gem drives, power line conditioners, transformers, circuit breakers and Uninterrupted Power Supply units (UPS).

- Grinder Rebuilds $46,000

The Residuals Complex at Deer Island has small Muffin Monster grinders, installed "in-line" to provide continuous grinding of sludge into uniform, homogenized slurry. The sludge, which travels through these in-line grinders, is transported from Primary and Secondary treatment processes. The in-line grinders in Residuals are used after pre-treatment solids and rags are removed. In-line grinders are smaller than the larger channel grinders due to the composition of sludge entering them. Normal wear and tear to the grinders caused by constant operation wears the gears and seals requiring periodic service to re-build the grinders or cutter blocks.

- Electric Cart Replacements $104,000

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 78 most of which were first procured for Deer Island under a fit-out process approximately 18 years ago.

- Roller Gates Rebuilds $141,000

The primary function of roller gates is to isolate channels or chambers. Isolation of flow is necessary for maintenance tasks to be performed. Stop logs are fabricated of structural steel and have specifically designed rubber fittings on the tops and bottoms that mate with the units above and below them to provide a water-tight seal. As part of the overhaul, the stop logs will be dismantled, removing all existing wheels, axles, bushings, retainers and seals. The stop logs will then be cleaned, shop blasted, and repainted to the original specifications. They will then receive all new wheels, bushings, retainers, and seals, per the original manufacturer's specifications. The current plan is to overhaul approximately 15 stop logs each year until all have been refurbished.

- Purchase Digester Mixer $200,000

There are twelve anaerobic digesters on Deer Island that have been in operation for more than15 years. Mixer assemblies are critical to the proper operational performance of the digesters. The presence of heavy grit in digester sludge wears down the impellers, rendering the entire assembly less efficient. Deer Island staff recently examined the effects on gas production when mixers are taken out of service for repair. Results suggest that a malfunctioning assembly reduces gas production by as much as 10% per month; Loss of a digester also means increasing the dosing of ferric chloride in the other digesters to combat the development of struvite. DITP purchased a new Digester Mixer to be used as a spare to reduce the time a digester is out of service. In all, staff estimates that the added costs associated with a failed mixer assembly could average approximately $22,000 per month.

- Purchase Control Valve Actuators $676,000

Primary effluent and return sludge valves play a major role in wastewater treatment plant operations. Proper balancing of flow is a critical part of plant performance. The primary effluent line carries wastewater through the reactor train into the reactor chamber. Here, the wastewater blends with the return sludge line carrying microorganisms or "bugs," which consume any of the Biochemical Oxygen Demand (BOD) in the reactor chamber. There are a total of 18 of these large valve actuators, of which nine are for 72-inch-diameter valves, nine are for 42-inch–diameter valves. All of the original actuators are electric, gear-driven actuators and staff is finding it increasingly more difficult to control the desired range. These new actuators are electro-hydraulic actuators, which staff has found to provide a much tighter control range.

- Purchase Grit Classifier $100,000

Deer Island operates and maintains a system of 16 grit classifiers in the Grit Facility, eight each in the east side and west side. *Grit* is defined as abrasive, heavy and insoluble, inorganic materials, such as sand and cinders, and organic materials, such as corn, seeds, and coffee grinds that must be removed from the influent waste stream in the treatment process. If not removed properly, grit can accumulate in aeration basins, digesters, heat exchangers, pipelines and channels, causing excessive wear on pump impellers, piping systems and other wastewater treatment equipment, resulting in additional operational and maintenance costs. DITP purchased a new Grit Classifier to have a spare unit on site.

- Air Compressor Replacements $130,000

The Thermal/Power Plant on Deer Island utilizes two large Ingersoll Rand compressors that provide air to run instrumentation controls for the high-pressure boilers and steam turbine. Staff conducted a subsequent investigation of the compressors and determined that the extreme vibration readings were indication of mechanical damage to either the bearings or gears. The manufacturer of the compressors performed an assessment of the damage as well and determined that the minimum cost to repair would be approximately the same as the cost to replace. DITP purchased two new compressors. The new compressors include a high-efficiency, high-output compression element with slow rotational speeds, resulting in reduced energy usage, high free air delivery, and increased reliability compared to the current units. They also will operate with lower noise levels.

- HVAC Equipment $283,000

A key aspect of ensuring optimal operational performance of equipment on Deer Island is reducing occurrences of heat-related stresses. Excessive heat presents a constant challenge to HVAC staff as they work to maintain proper temperature and humidity levels within electrical buildings and facilities throughout the plant. DITP has purchased chillers, condensers, coils and associated equipment to ensure equipment reliability and take into account the environment at Deer Island. The replacement equipment includes use of environmentally beneficial R-22 refrigerant and electro-fin™ coating to protect surfaces from exposure to the corrosive nature of hydrogen sulfide. This coating will prolong the useful life of these HVAC units.

Wastewater Transport System
July 2012 - June 2013

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, 13 pumping stations, 4 remote headworks facilities, 3 combined sewer overflow treatment (CSO) facilities and 2 combined sewer overflow (CSO) storage facilities. In 2011, 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 FY13 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 FY13 for FOD facilities was 99.95%. 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 continued to work to replace equipment at the headworks to maintain equipment reliability. Each year, staff works to upgrade the headworks equipment. In the past year the following replacements have been completed:

- Columbus Park – 1 channel wear strips were replaced. An incline grit screws and a screening pod were also replaced
- Ward Street – 1 channel was rebuilt with new chain, flights and wear shoes. The incline screws were also replaced for this channel
- Chelsea Creek – 1 channel was rebuilt with new chain, flights and wear shoes. One incline screw was replaced in this channel

Ward Street Headworks Grit Pods: Two existing grit pods and associated piping were removed and replaced. The new pods were installed, re-piped, and returned to operations.

Hayes Screen Rebuild: New sprockets, shafts, bearings, chain, raking elements, motor and clutch were installed. The frame was repaired, cleaned, and painted and the screen was placed back in service.

Chelsea Screen House Screens 3 and 4: New carriage assemblies, motors, and pin racks were installed in these screens.

Chelsea Headworks Hypochlorite System: The hypochlorite system in the odor control room was refurbished entirely with new pumps, piping, and tank. The containment was repaired by in house masons and coated by the painters.

Cottage Farm Screen Room Air Handling Unit: A new air handling unit was purchased. The old unit was removed and the new unit installed by the HVAC technicians.

Nut Island Grit Conveyor: The #4 grit conveyor was rebuilt. Work included removing covers, both belts, all drums, shafts, rollers and bearings. All new drums, shafts, rollers and bearing were installed. The new belts were strung by MWRA mechanics and the belts were vulcanized by a vendor.

Nut Island Odor Control Fan: The two speed motor for the #1 odor control fan failed. The motor was removed and rebuilt. The rebuilt motor was installed, aligned and put back into service.

Nut Island Classifier: The #6 classifier screw was refurbished with a new screw and the bearing location moved to outside the classifier and a mechanical seal installed.

Braintree/Weymouth Dewatering Pump: A new dewatering pump was installed to replace the existing pump. The new pump has reduced the dewatering time significantly.

Braintree Weymouth Bar Racks: Bar racks were fabricated and installed upstream of the facility grinders by in house staff. The bar racks are used by Operations to capture screening materials to improve station operation.

New Neponset A/C Unit: A new AC unit was installed at the New Neponset facility to replaced an old unit in poor condition.

Hingham VFD Replacement: The #1 pump VFD failed and was replaced by in house electricians.

Quincy Grinder: The grinder had failed and was replaced with a rebuilt grinder.

Outsourced Projects

Braintree Weymouth Grinder: One grinder failed and was removed and reinstalled by in house staff. The grinder was rebuilt offsite by the grinder manufacturer.

Caruso Pump 1-4 Rebuilds: The pump was removed and reinstalled by in house staff. The pump was rebuilt offsite by outside contractors. New mechanical seals were installed on the pump after installation.

Framingham Pumps 1 and 3: The pumps were removed and reinstalled by in house staff. The pump was rebuilt offsite by outside contractors. New mechanical seals were installed on the pumps after installation. A new check valve was installed that had failed on the pump discharge.

IPS Pump 1 Motor: The motor bearings were noisy and hot. The motor was removed and reinstalled by in house staff. The motor was rebuilt by and outside vendor.

Nut Island Switchgear Improvements: The switchgear was modified to allow the diesel generator fans to be powered directly from the diesel generator, metering for transient events, and surge protection.

Prison Point Hypochlorite Tank Leak: One hypochlorite tank had a pinhole leak. The tank was fiberglass repaired to return the tank to service.

Prison Point HVAC Upgrade: The HVAC system was upgraded with new fans and ductwork to improve the air quality in the facility by an outside contractor. The work was substantially complete this year.

Squantum Pump #3: The pump was removed and reinstalled by in house staff. The pump was rebuilt offsite by outside contractors.

Wastewater Transport Pipelines

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 FY13 TIU staff inspected a total of 1168 manholes. Approximately 132 manholes were rehabilitated utilizing in house staff. 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. The following is a current pipeline construction/rehabilitation project included in the MWRA Capital Budget.

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 32.25 miles of pipelines were TV inspected in FY13.

Community Assistance was provided to member communities on an as needed basis. This assistance included:

- City of Everett by-pass pumping. Everett had a partial sewer collapse and MWRA personnel assisted by providing 2 pumps.
- City of Waltham siphon cleaning. MWRA assisted in the cleaning of a 2 barrel siphon.
- City of Waltham pipe collapse. Waltham had a partial sewer collapse and MWRA personnel assisted by providing a pump.

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 28.69 miles of pipeline and 75 siphons were cleaned in FY13.

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

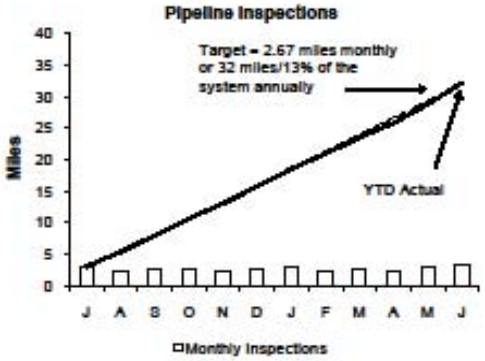
The attached “Maintenance Pipeline and Structure Inspections and Maintenance” page provides a breakdown of the pipeline inspections and maintenance activities for FY13.

Wastewater Pipeline and Structure Inspections and Maintenance

June 2013, FY 13

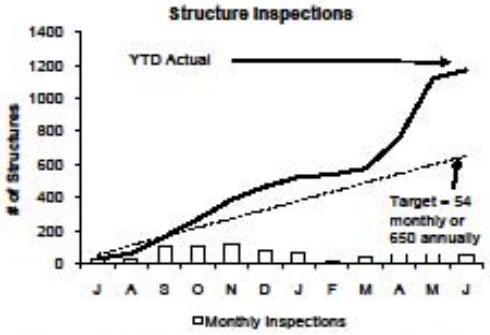
Inspections

Pipeline Inspections



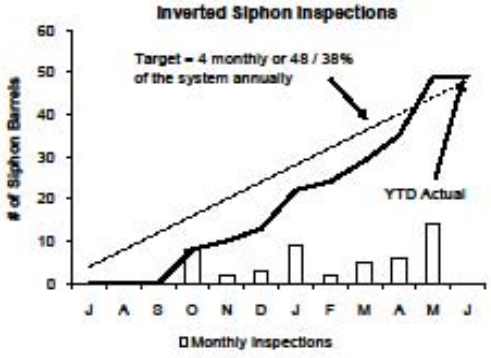
Staff internally inspected 3.41 miles of MWRA sewer pipeline during the month of June. The year to date total is 32.25 miles. No Community Assistance was provided this month.

Structure Inspections



Staff inspected the 12 CSO structures and performed 38 additional manhole/structure inspections during the month of June. The year to date total is 1168 inspections.

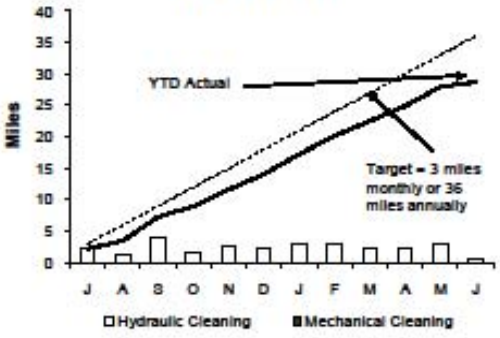
Inverted Siphon Inspections



Staff did not inspected any siphon barrels during the month of June. Year to date total is 49 inspections.

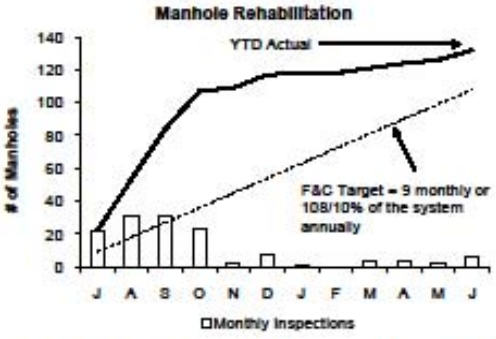
Maintenance

Pipeline Cleaning



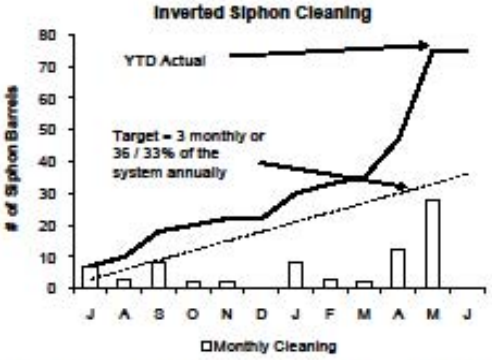
Staff cleaned 0.73 miles of MWRA's sewer system and removed 7 yards of grit and debris during the month of June. The year to date total is 28.69 miles. No Community Assistance was provided this month.

Manhole Rehabilitation



Staff replaced 6 frames & covers during the month of June. The year to date total is 132.

Inverted Siphon Cleaning



Staff did not clean any siphon barrels during the month of June. The year to date total remains at 75 barells.

FY13 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 FY13 for programs within FOD for related maintenance activities.

FY13 APPROVED MAINTENANCE ANNUAL BUDGET

Budget Line Item	**Total Funding**
Wages and Salaries	$8,205,823
Overtime	$481,975
Maintenance (Parts & Supplies)	5,170,796
Professional Services	$300,000
Other Materials	$217,587
Other Services	$142,200
Total	$14,518,381

2. Staffing

A total of 122 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 FY13 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	**19**
Electrical Specialists	**12**
Plumbers	**9**
HVAC	**6**
Machinists and Welders	**4**
	59

Work Coordination Group Program	**12**
Collection System Technical Inspections Program	**9**
Wastewater Pipeline Maintenance Group	**12**
Building & Grounds Program	**15**
Facility Maintenance Program (Carpenters, Painters, Masons)	**15**
Subtotal	**63**
Total	**122**

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.

CURRENT SERVICE CONTRACTS
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
Grounds keeping
Lube Oil Analysis
Union Park Station Operation and Maintenance
Generator Maintenance
Overhead Door Maintenance
Vibration Monitoring

Wastewater Transport Equipment Maintenance

1. Annual Report

The Field Operations Department Equipment Maintenance page for key indicators of performance for FY13 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 FY13 operations staff completed an average of 332 hours per month which accounted for 13% 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 FY13 was to complete 100% of all preventative maintenance work orders. The average PM completion for FY13 was 100%.
- Items Kitted Utilizing Maximo – In an effort to more efficiently complete work, maintenance staff and work coordination center staff have utilized the Lawson/Maximo interface to better kit stock and non stock material. The goal is to kit at least 50 items per month. The average for FY13 was 55 items per month.
- 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 duties. The goal for operations staff is to complete 100% of the preventative maintenance work orders. In FY13 operations staff completed an average of 100% 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 FY13 backlog average was 7,645 hours which remains within the industry standard of 6,130 to 12,260 hours.
- Overtime Spending – Maintenance overtime spending was $15,770 under budget for FY13. 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 weather events.

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

2. Critical Equipment Availability

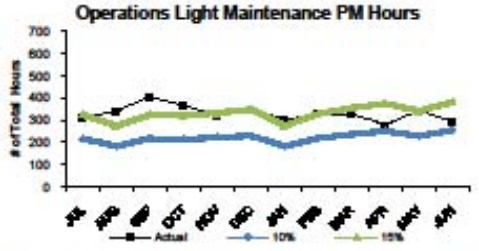
The average equipment availability for FY13 was 99.95 %. An equipment availability report is generated daily that details the critical equipment required to collect and transport the wastewater flow at the facility design capacity. Higher maintenance priority is given to equipment that drops below the number required. Because of the high daily equipment availability. no operational impact has occurred in the past year.

Field Operations' Metropolitan Equipment & Facility Maintenance

June 2013, FY13

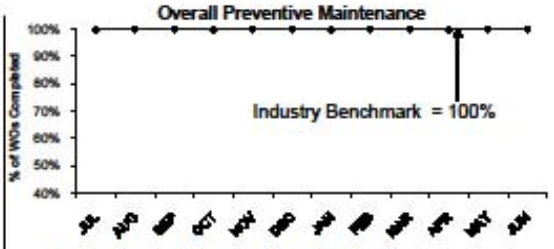
Several maintenance and productivity initiatives are in progress. The goal for the Overall PM completion and the Operator PM completion was raised to 100% for Fiscal Year 2010. The Operator PM and kitting initiatives frees up maintenance staff to perform corrective maintenance and project work, thus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

Operations Light Maintenance PM Hours



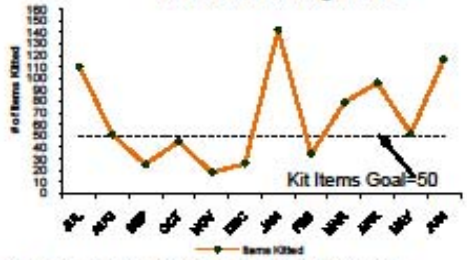
As part of efforts to improve efficiency, Operation staff completed 291 hours of preventive maintenance in June, about 11% of the total PM hours, which is within the Industry Benchmark of 10% to 15%. This frees up maintenance staff for heavier maintenance projects. Operators completed 100% of the Ops PMs scheduled.

Overall Preventive Maintenance



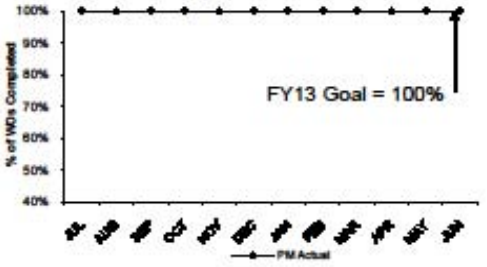
In June, Field Ops completed 100% of all PMs. Maintenance staff completed 100% of their assigned PMs and Operations staff completed 100% of their PMs.

Items Kitted Utilizing Maximo



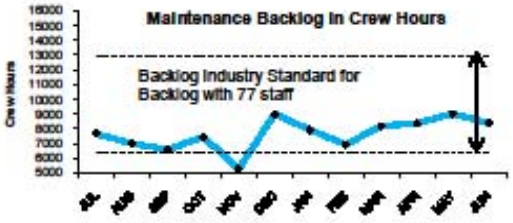
In an effort to more efficiently complete work, maintenance staff and work coordination staff have utilized the Lawson/Maximo interface to better kit stock and non stock material. The goal for FY13 is to "kit" 50 stock and non stock items total per month. 116 items were kitted during the month of June.

Operations Light Maintenance % PM Completion



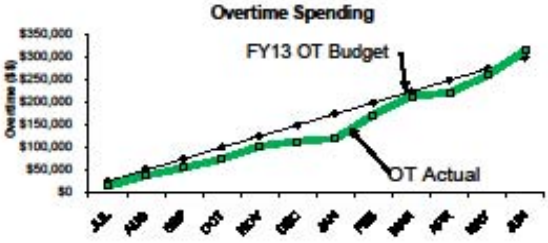
Operations' PM goal is the completion of 100% of all PMs each month; Operations completed 100% in June.

Maintenance Backlog in Crew Hours



Current backlog is at 8381 hours while overtime spending was $31k over budget for June. The industry standard for maintenance backlog with 77 staff (currently planned staffing levels) is between 6,450 and 12,940 hours. There are currently two vacant Facility Specialist positions.

Overtime Spending



Maintenance overtime was $31k over budget for June and is currently $15k over budget for FY13. Overtime in June was used for wet weather events and emergency maintenance.

Annual Status Sheets – Fore River Pelletizing Plant

June 2012 – July 2013

Critical Equipment Availability: 76.16%

Operating logs indicate that of the 2,190 machine days in the fiscal year 2013, centrifuges were available for 1,668 days for an availability of 76.16%. The centrifuges and ancillary equipment make up the critical components at the Pelletizing Plant because dewatered sludge can be processed through the dryers or it can be sent through a bypass system to trucks and taken to a landfill. The primary reason for the 76% availability was the installation of 8 new centrifuge control panels and associated equipment. At the present time, all 12 centrifuges are available giving the Plant more than enough capacity to process flows from Deer Island. The facility is currently operated on a 5-day workweek ceasing operations on 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.

Maintenance Work Orders:

In FY2013, 1,948 work orders were opened and 1,624 were completed. This equates to an 83% completion rate. The Preventative Maintenance system is currently being modified to include updates for equipment changes, new lubrication schedules and new equipment inspection and cleaning practices. It is expected that the completion percentage will improve as the modifications to the system are completed.

Maintenance:

More than $2.122 million was spent on replacement parts and maintenance related items in FY2013, including:

- Centrifuge control panels and VFD upgrades on eight of the twelve centrifuges. Two upgrades were completed prior to FY13 and the last two have been completed since FY13.
- Centrifuge repairs – one complete rotating assembly and two scrolls were sent back to the manufacturer and have been overhauled to OEM condition
- Furnace and gas piping was completely replaced on train 3 to meet updated codes.
- Drum 3 inlet and outlet were repaired based on manufacturers recommendations during annual inspections
- Conveyor Repairs – Several small to medium repairs were completed; Major repairs include:
    - New screw and wear bars installed on Train 3 separator B
    - Extensive steel repairs on the Train 3 separator A trough
    - Replaced mixer B, screws and liners on Train 3 mixer B
    - Fabricated and replaced the dryer feed conveyor, trough and chute on Train 5