



MASSACHUSETTS WATER RESOURCES AUTHORITY
Charlestown Navy Yard
100 First Avenue, Building 39
Boston, MA 02129

Frederick A. Laskey
Executive Director

Telephone: (617) 242-6000
FAX: (617) 788-4889
TTY: (617) 788-4971

December 13, 2012

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 2011 – June 2012. 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 617-788-4942.

Sincerely,

Michael J. Hornbrook
Chief Operating Officer

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

Wastewater Transport System

July 2011 - June 2012

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 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 FY12 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 FY12 for FOD facilities was 99.92%. 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 was rebuilt with new chain, flights and wear shoes. The incline grit shoes were also replaced for this channel
- Ward Street – 1 channel was rebuilt with new chain, flights and wear shoes. The incline grit shoes were also replaced for this channel
- Chelsea Creek – 1 channel was rebuilt with new chain, flights and wear shoes.

Chelsea Creek Headworks Chemical Tank Replacement: The two existing tanks were removed and replaced with new tanks and returned to service. The tanks were removed from the outside vault and replaced with new tanks.

Columbus Park Headworks Chemical Tank Replacement: The two existing tanks were removed and replaced with new tanks and returned to service. The tanks were removed from the outside vault and replaced with new tanks.

Alewife Screen Rebuilds: Both screens at the Alewife Pump Station were rebuilt with new sprockets. The rebuilds were required due to the wear and tear of the existing components.

Alewife Air Handling Unit: The original Air Handling unit which provided fresh air and heat to the screen room was worn and beyond its useful life. A new more energy efficient unit was purchased and installed.

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

DeLauri Screen #2 Rebuild: New sprockets, shafts, bearings, chain, raking elements, motor and clutch were installed. The frame was cleaned and painted and the screen was placed back in service.

Nut Island Uninterruptable Power Supply (UPS): The SCADA UPS was unreliable and undersized. A new UPS was purchased and installed by MWRA Electricians.

Nut Island Shuttle Conveyor: The original shuttle conveyor needed to be rebuilt. The rebuild consisted of new rollers, bearing and belt.

Nut Island Screening Conveyor: The #1 screening conveyor was rebuilt. Work included removing covers, both belts, all drums, shafts, rollers and bearings. All new drums, shafts, rollers and bearing were installed. Two 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 #4 odor control fan failed. The motor was removed and rebuilt. The rebuilt motor was installed, aligned and put back into service.

Braintree/Weymouth Grinder: The #2 grinder was removed and replaced with a spare grinder. The original grinder was sent out for rebuild.

Alewife A/C Unit: A new AC unit was installed at the Alewife facility to ensure the proper operation of the VFD's for the pumps.

Hingham Pump Station Grinder: The #1 grinder was worn and in need of replacement. A spare grinder was installed and put into service. The old grinder will be rehabilitated and become the spare.

Prison Point Grinder: The screening grinder was removed and replaced with a spare grinder. The used grinder was sent out for rebuild and will be used as a spare.

Chelsea Headworks Air Compressor: MWRA engineers provided the design for an additional compressor to be installed at the facility. The additional compressor was required to assist in the transport of grit during wet weather events.

Outsourced Projects

Caruso Pump 1-3 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.

Chelsea Screen House Lightning Protection: The lightning protection was removed and replaced with a new system by a contractor. Surge protection was added by in house staff to support the installation.

Electrical Upgrades: The Hayes electrical transfer switch, the Prison Point secondary main breakers and distribution panel and the Caruso secondary main breakers were removed and replaced. This equipment was identified as needing replacement from the annual electrical testing contract.

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

New Neponset Gearbox #3: The gearbox and shafts was removed and shipped to the vendor where it was refurbished with new gearing, bearings, and seals. The gearbox was reinstalled by in house staff and returned to service.

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 FY12 TIU staff inspected a total of 1097 manholes. Approximately 145 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 represents a list of current and ongoing pipeline projects construction/rehabilitation included in the MWRA Capital Budget.

Section 156 Rehabilitation, Everett

Contract 7393 includes rehabilitation of approximately 1,800 feet of Section 156 and a portion of adjacent Sections 19 and 17, and associated structures/manholes located in the City of Everett. The sewer is a 120-year-old, 61-inch by 56-inch rounded horseshoe brick sewer, which conveys flows of up to 40mgd, and was in fair to poor condition. Construction began in July 2011 and was substantially completed in November 2011.

Section 186/4 Rehabilitation, Winthrop

Contract 7423 includes the slip lining of 2,100 linear feet of 108-inch diameter sewer interceptor. The slip lining will be accomplished with a 96-inch outside diameter pipe with the annular space grouted. The interceptor is located at the entrance to the Deer Island Treatment Plant along Tafts Ave in Winthrop. The design is underway. The construction is expected to start in winter 2013

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 33.54 miles of pipelines were TV inspected in FY12.

Approximately 2.22 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 52.74 miles of pipeline and 86 siphons were cleaned in FY12.

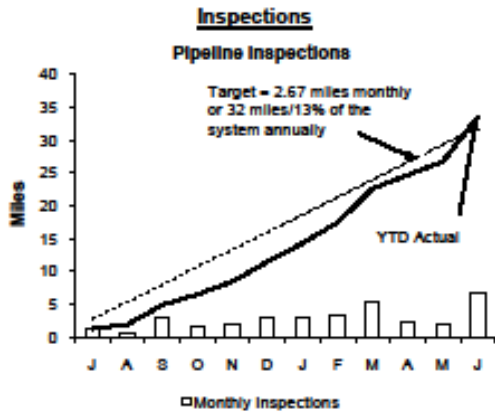
In addition to general pipeline and manhole repair work performed under this program, the following are other activities pipeline crews perform during the year:

- 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

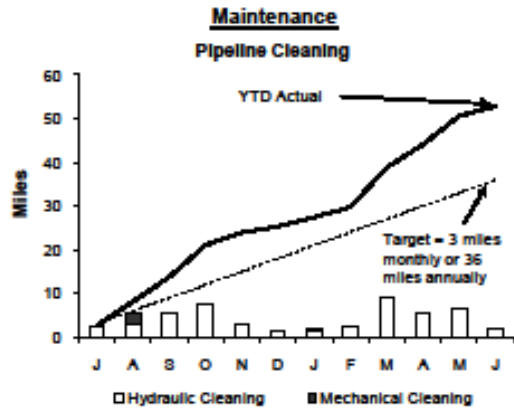
The attached “Maintenance Pipeline and Structure Inspections and Maintenance” page provides a breakdown of the pipeline inspections and maintenance activities for FY12.

Wastewater Pipeline and Structure Inspections and Maintenance

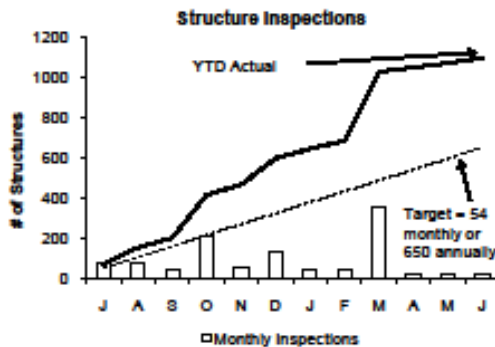
4th Quarter - FY 12



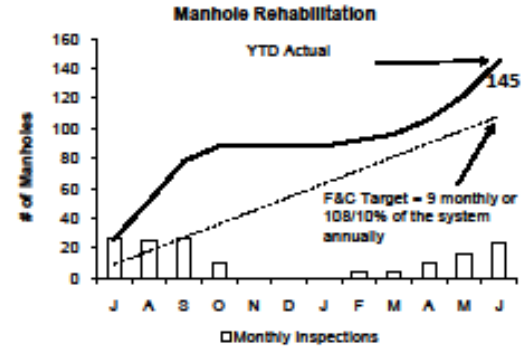
Staff internally inspected 10.94 miles of MWRA sewer pipeline during this quarter. The year-end total for FY 12 is 33.54 miles. Community Assistance was provided to the city of Somerville, 1,210 linear feet (0.23 miles) of 8" diameter sewer was inspected this quarter.



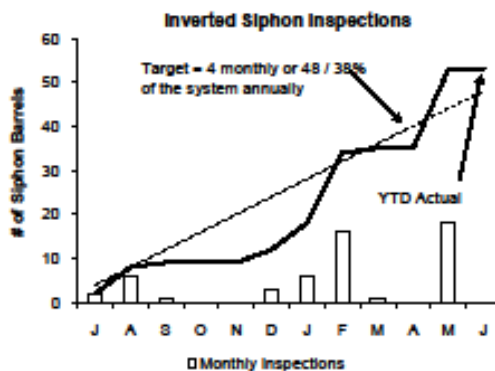
Staff cleaned 13.19 miles of MWRA's sewer system and removed 49 yards of grit and debris during this quarter, bringing the year-end total to 52.74 miles. Community Assistance was provided to the city of Waltham, resulting in 200 linear feet (0.04 miles).



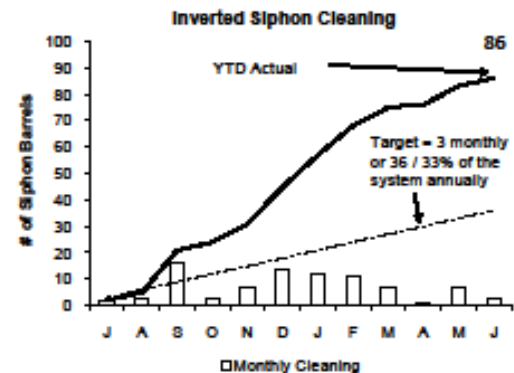
Staff inspected the 36 CSO structures and performed 31 additional manhole/structure inspections during this quarter, the year-end total is 1,097 inspections.



Staff replaced 49 frames & covers this quarter. The year-end total is 145.



Staff inspected 18 siphon barrels this quarter. The year-end total is 53 barrels.



This quarter, staff cleaned 11 siphon barrels. The year-end total is 86 barrels.

FY12 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 FY12 for programs within FOD for related maintenance activities.

FY11 APPROVED MAINTENANCE ANNUAL BUDGET

Budget Line Item	Total Funding
Wages and Salaries	\$8,329,825
Overtime	\$475,025
Maintenance (Parts & Supplies)	\$5,623,242
Professional Services	\$300,000
Other Materials	\$217,587
Other Services	\$155,200
Total	\$15,100,879

2. Staffing

A total of 126 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 FY12 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	5
	60

Work Coordination Group Program	12
Collection System Technical Inspections Program	9
Wastewater Pipeline Maintenance Group	14
Building & Grounds Program	16
Facility Maintenance Program (Carpenters, Painters, Masons)	15
Subtotal	66
Total	126

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
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 FY12 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 12 operations staff completed an average of 437 hours per month which accounted for 19% 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 FY12 was to complete 100% of all preventative maintenance work orders. The average pm completion for FY12 was 99%.
- 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 FY12 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 tasks. The goal for operations staff is to complete 100% of the preventative maintenance work orders. In FY12 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 FY12 backlog average was 11,648 hours which remains within the industry standard of 6,130 to 12,260 hours.
- Overtime Spending – Maintenance overtime spending was \$53,053 under budget for FY12. 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 FY12 was 99.92 %. An equipment availability report is generated daily that details the critical equipment required to collect and

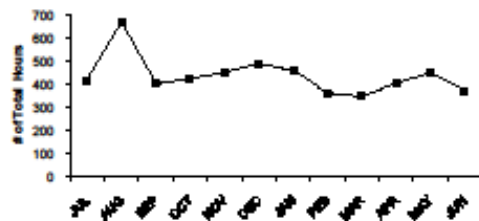
transport the wastewater flow at the facility design capacity. Higher maintenance priority is given to equipment that drops below the number required. No operational impact has occurred in the past year because of the high daily equipment availability.

Field Operations' Metropolitan Equipment & Facility Maintenance

June 2012

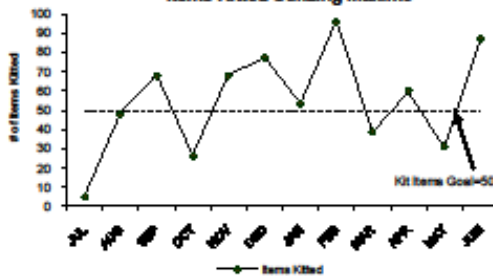
Several maintenance and productivity initiatives are in progress. The goal for the Overall PM completion and the Operator PM completion was raised to 100% for Fiscal Year 2010. The Operator PM and kitting initiatives frees up maintenance staff to perform corrective maintenance and project work, thus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

Operations Light Maintenance PM Hours



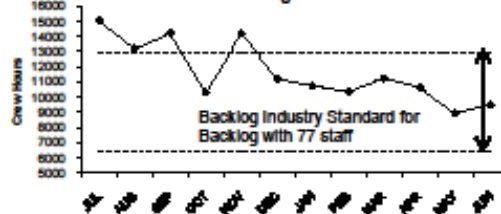
Operations staff completed 5/15 hours of preventive maintenance in June; 100% of the Ops PMs were completed. Overall, Operations completed 17% of the total PM hours for the month, which is greater than the Industry Benchmark of 10% to 15%.

Items Kitted Utilizing Maximo



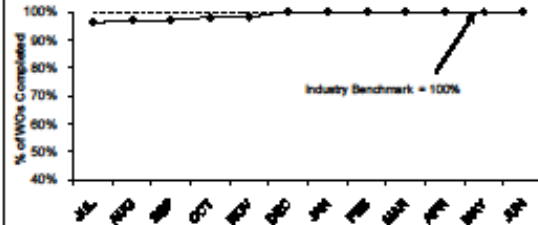
In an effort to more efficiently complete work, maintenance staff and work coordination staff have utilized the Lawson/Maximo Interface to better kit stock and non stock material. The goal for FY12 is to "kit" 50 stock and non stock items total per month. 87 items were kitted during the month of June.

Maintenance Backlog in Crew Hours



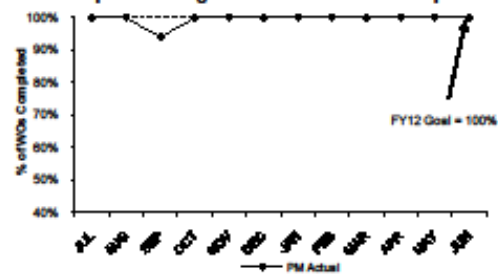
Current backlog is at 9527 hours while overtime spending was below budget for June. The industry standard for maintenance backlog with 77 staff (currently planned staffing levels) is between 6,450 and 12,940 hours. There is currently one vacant position which is a Facility Specialist.

Overall Preventive Maintenance



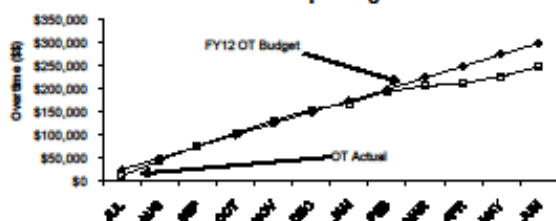
In June, Field Ops completed 100% of all PMS. Maintenance staff completed 100% of their assigned PMs and Operations staff completed 100% of their PMs.

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.

Overtime Spending



Maintenance overtime was \$5k below budget for June and is currently \$53k under budget for FY12. Overtime in June was used to complete emergency repairs.

Annual Status Sheets – Fore River Pelletizing Plant

July 2011 - June 2012

Critical Equipment Availability: Twelve Month-Average – 80.0 %

Operating logs indicate that an average of 10 of the 12 centrifuges were available in FY12. 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 FY12, 2,026 work orders were opened and 1,737 were completed or about 86%.

Maintenance:

More than \$2,066,000 was spent on replacement parts and maintenance related items in FY12 including:

- Sludge Storage Tank Grit Cleaning – The project was mostly completed during the 2012 fiscal year, however only about half of the expense is included in this PPR amount.
- Centrifuge Repairs – Rotating assemblies #5, 8, & 11 overhauled with full conveyor rehabilitation to OEM condition.
- Dryer Drum Repairs:
 - Train 2 drum replaced.
 - Train 4 inlet repaired per manufacturer recommendations.
 - Train 5 inlet and outlet bomb tail repaired per manufacturer recommendations.
- Conveyor Repairs – Several small/medium repairs completed; major ones include:

- Train 1 Mixer B conveyor overhauled with new tiled screw and liners.
 - Train 3 Wet Feed Conveyor overhauled with all new components.
- HVAC Repairs:
 - Both Control Room split air conditioning systems fully replaced.
 - RTU #6 (centrifuge room) and RTU #7 (conference room) fully replace