

MWRA Annual Maintenance Status Sheets

July 2000 – June 2001

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

"The MWRA shall submit an annual status sheet to EPA and the MADEP on plant performance, using key indicators for maintenance and providing detailed information on any necessary equipment replacement"

General information on MWRA's Maintenance Program is presented below. The Annual Status Sheets are attached.

1. SYSTEM OVERVIEW

Deer Island Wastewater Treatment Plant

The Deer Island Wastewater 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 in accordance to MWRA's NPDES Permit, from the wastewater that is collected and transported through 5,400 miles of pipes and community owned sewer pipes and approximately 240 miles of MWRA-owned interceptors and tunnels.

It is a state of the art wastewater treatment facility and one of the most automated in the country. 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. MWRA's Board of Directors, Executive Director, management team, and staff are dedicated to providing the highest quality of asset management. MWRA has assembled a highly skilled and qualified staff and has committed to a capital budget 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 operates and maintains MWRA's wastewater transport system, transporting 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, 11 pumping stations, 4 headworks facilities, and 5 combined sewer overflow (CSO) facilities. The primary goal is to operate the system in a manner that will provide uninterrupted wastewater transport service to our member communities 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 MWRA's Pelletizing Facility. NEFCO's proposal contains a plan for the maintenance, repair and replacement of the facility. This plan is intended to establish the standard by which to measure NEFCO's performance. At this time, it may be too early to draw any specific conclusions because the operating agreement went into effect March 1, 2001 and the majority of vital equipment is new; the equipment was recently accepted or is currently undergoing acceptance testing.

The new operating agreement calls for six-month, 12 month, and subsequent annual reviews to ensure that NEFCO is operating and maintaining the facility correctly. The operating agreement also requires NEFCO to provide a letter of credit in the amount of \$1,000,000 that MWRA may draw on in the event that there is a material breach of the operating agreement like failing to adequately maintain the facility.

2. PERMIT VIOLATIONS

There were no NPDES permit violations at any MWRA facility due to inadequate maintenance efforts.

3. COMPUTERIZED MAINTENANCE MANAGEMENT SOFTWARE

The maintenance management software used by MWRA is MAXIMO version 4i.

The software includes safety features that allow users to document hazardous materials in real time, automate lockout/tag-out/lineup activities, and "push" proper procedures out to 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. 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 all aspects of the DITP maintenance program and is being 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 analysis. 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, for example, or an equipment part.

The MAXIMO system has been very successful at Deer Island, and thus MWRA is implementing the use of MAXIMO throughout the wastewater system.

NEFCO is in the process of installing and populating its computerized maintenance management software. When the process is complete, reporting parameters will be established to monitor and report compliance with maintenance standards.

4. FACILITIES ASSET MANAGEMENT PROGRAM

The goals of MWRA's multi-year maintenance plan include coordinated, consistent asset inventory, condition assessment, maintenance scheduling and long-term replacement planning. MWRA is developing 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 and cost-effective operations and maintenance procedures.

Since the start-up of DITP and other facilities, 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. MWRA's management team believes that it is important to modify the existing program with the goal of achieving a more holistic approach to maintenance management. MWRA's 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 reliability.

5. SUMMARY OF CURRENT MAINTENANCE PROGRAM

As indicated in Tables 1 & 2 below, MWRA has made a significant overall commitment to the maintenance of its wastewater facilities. MWRA's FY02 Current Expense Budget allocates over \$22 million with a commitment of over 250 staff to the maintenance effort. Additional maintenance related and improvement projects are also included in MWRA's Capital Program. MWRA's 10 year Current Expense Budget anticipates and includes annual budgeted increases for maintenance as DITP and other facilities age.

TABLE 1 – FY02 APPROVED MAINTENANCE ANNUAL BUDGET				
Object Code	Deer Island	Transport	Residuals	Total FY02 Approved
Wages and Salaries	\$7,503,546	\$3,407,113	\$0	\$10,910,659
Overtime	\$647,073	\$137,052	\$0	\$784,125
Fringe Benefits	\$24,372	\$4,305	\$0	\$28,677
Chemicals	\$40,900	\$0	\$0	\$40,900
Utilities	\$0	\$113,118	\$0	\$113,118
Maintenance (Parts & Supplies)	\$6,630,145	\$2,571,633	\$887,421	\$10,089,199
Training and Meetings	\$0	\$1,800	\$0	\$1,800
Professional Services	\$60,000	\$0	\$0	\$60,000
Other Materials	\$266,525	\$99,000	\$0	\$365,525
Other Services	\$5,000	\$48,625	\$0	\$53,625
TOTAL	\$15,177,561	\$6,382,646	\$887,421	\$22,447,628

TABLE 2 – MAINTENANCE STAFFING LEVELS				
	Deer Island	Transport	Residuals	Total
Deputy Director	1	0	1	2
Maintenance Managers	3	3	0	6
Engineers	11	3	3	17
Planners	10	3	0	13
Area Managers	8	2	0	10
Administration	3	2	0	5
Unit Supervisors	20	4	0	24
Mechanic Specialists	30	13	0	43
I&C Specialists	19	1	0	20
Electrical Specialists	18	4	0	22
B&G Workers	12	2	0	14
Pipeline Maintenance, general	0	16	0	16
Plumbers	11	4	0	15
HVAC Specialists	10	2	0	12
Machinists and Welders	6	7	0	13
Carpenters/Painters	3	9	0	12
Equipment Operators	3	5	0	8
Garage Repair Specialists	3	0	0	3
Masons	0	4	0	4
Total	171	84	4	259

The maintenance program is supplemented by a series of service contracts. These contracts are intended to provide specialized services beyond the resources of MWRA's maintenance staff. Table 3 below shows the service contracts currently used by MWRA.

TABLE 3
CURRENT SERVICE CONTRACTS
Trash removal
Janitorial services
Digester cleaning *
PICS maintenance
Security
Copier/fax maintenance
Electrical testing
CTG maintenance
Boiler maintenance
Elevator maintenance
Crane maintenance
Oil separator cleaning
Vibration analysis
Overhead door maintenance
Lab hood certification
Locksmith services
HVAC chemical treatment
Power sweeping
Pest control
Public area groundskeeping
CCTV maintenance
Legionella testing
Bridge crane services
Air balancing
Lube oil analysis
Instrumentation maintenance

* Not an annual contract

Annual Status Sheets – Deer Island Treatment Plant

July 2000 - June 2001

Critical Equipment Availability: Twelve-Month Average - 97.1 %

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 97% versus a 100% availability because the plant normally operates at approximately one-third the design flow capacity.

Backlog: 4 weeks

Backlog is determined by totaling the planned craft hours in open workorders and comparing them to craft resources available. A four-week backlog constitutes four weeks of work for the entire maintenance workforce. This backlog is within industry standards.

Preventive Maintenance (PM):

80% of all PMs were completed, 32,500 PM work orders per year

Incomplete PM's that are not completed in one month are rolled over into the next month's workload.

Average Craft Hours per Month

Preventative Maintenance	5471 hours	33%
Corrective Maintenance	7227 hours	44%
Emergency Maintenance	205 hours	1%
Project Work	2745 hours	17%
Other Work	776 hours	5%

Total Work Orders: 43,000 work orders per year

Equipment Replacement: Major replacements in the past year include the following:

- Thermal Power Plant 480 volt transformer replacement – \$ 30,000
The electrical system to the thermal power plant has a redundant power supply. Transformer oil is routinely tested to determine if the transformer is deteriorating. The oil analysis determined immediate replacement was required and a replacement transformer was installed. No interruption of power to the thermal power plant occurred from this activity.
- 54 return activated sludge pump shaft were replaced under warranty - \$ 500,000
Several pump shafts failed prematurely from an incorrect shaft material being supplied from the original equipment manufacturer. The manufacturer rebuilt the pumps with new shafts at no cost to MWRA. The operational impact was minimal based upon the installed redundancy.

- Residual digester gas compressors were rebuilt with new impellers and mechanical seals - \$ 75,000
The three digester gas compressors were rebuilt to provide reliable operation. The pump impeller and mechanical seals were upgraded and better reliability has been achieved. The gas compressor unavailability previously resulted in the gas flares being used instead of the thermal power plant boilers to burn the digester gas.
- Thermal power plant electrical bus duct was replaced under warranty - \$ 100,000
The electrical bus ducts transmit power from Boston Edison or the Thermal Power Plant from transformers to switch gear. The electrical bus duct has failed in the thermal power plant area from moisture and hydrogen sulfide attacking the copper bus duct coating or connections. The bus duct was replaced in kind. A project to upgrade this bus duct to cable bus will start in August 2001. The plant was able to operate and fix the bus duct without impact to operations.
- Gravity thickener rake arm and bearing improvements were completed - \$ 30,000
Failures of the gravity thickener rake arms and bearings were resulting in low availability of the thickeners. The design of the lubrication system for the bearings has been upgraded for four of the six thickeners. The rake arm material has been upgraded to stainless steel for one thickener. The remaining thickener rake arms will be upgraded as they fail. No operational impacts occurred from these failures.
- Primary and Secondary Scum Tip Tube Improvements - \$ 200,000
The primary and secondary tip tubes to collect scum have had numerous maintenance issues. The materials and operations of the tip tubes have been upgraded to provide an operational system that is now operating as designed.

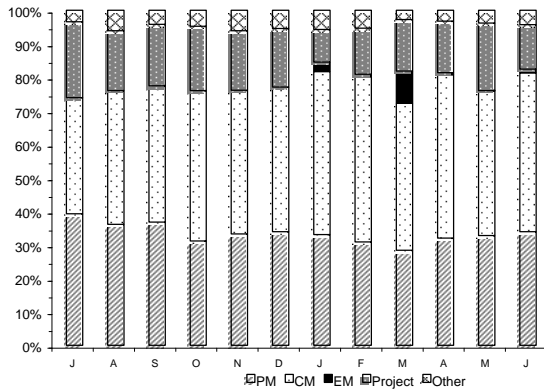
Annual Report: Attached, please find the Deer Island Maintenance page of the MWRA Report on Key Indicators of Performance for the 4th quarter FY01. Monthly maintenance data is shown under five headings.

- Preventive Maintenance, Corrective Maintenance, Emergency Maintenance, Project Work and Other Work break down the Distribution of Craft Hours in a bar chart. The target for Preventative Maintenance is 55% of the total craft hours. The reduction in PM hours reflects staff's continuing review of PM work orders for suitability and cost-effectiveness.
- There is a table showing the actual craft hours. The table includes a monthly total of craft hours and a year-to-date average of the PM percentage.
- The percentage of Preventive Work Orders Completed is shown with respect to the target of 85 percent in a bar chart.
- Total work orders and the numbers completed are shown in a table. The table also shows a year-to-date average of the percentage of work orders completed.
- Preventive Maintenance, Corrective Maintenance, Emergency Maintenance, Project Work, Other Work, and Non-Work Order Time break down the Total Maintenance Hours in a pie chart.

Deer Island Maintenance

June 2001

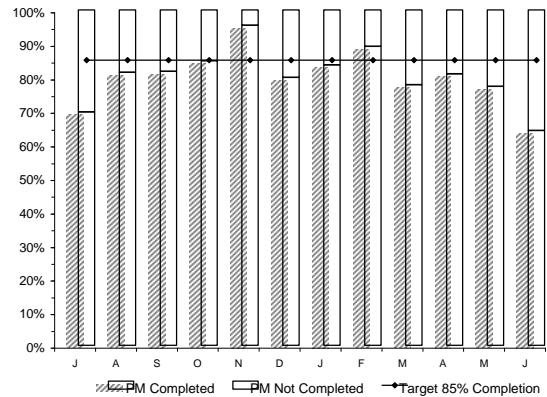
Distribution of Craft Hours



The target PM goal was removed because PM hours have been on a decrease since January 2000. We continually review the OEM tasks and modify the PMs to provide more consistent maintenance hours and intervals.

JUN NPL Time **27%** YTD NPL **27%**

Preventive Work Orders % Complete



Maintenance did not meet their PM goal this month, due to recurring vacancies in the Instrumentation Department as well as excessive HVAC problems, specifically Cryo Facility chillers and air handlers in critical plant areas. Also, the Electrical Department responded to faults caused by lightning, addressed dip tube short circuits and worked to complete punch list items to obtain building Certificates of Occupancy. June had approximately a 35% increase in the total PMs issued due to annual PM generation.

Craft Hours

	J	A	S	O	N	D	J	F	M	A	M	J
PM	6104	6202	5680	5453	5451	5406	5961	4798	4676	5051	5584	5285
CM	5389	6893	6292	7879	7057	6890	8805	7707	7277	7717	7379	7436
EM	0	0	8	10	0	0	492	107	1595	80	16	154
Project	3528	3079	2847	3368	2933	2782	1775	2149	2533	2431	3437	2077
Other	548	1066	660	851	1017	889	1048	845	482	534	677	691
FY01 Total	15569	17240	15487	17561	16458	15967	18081	15606	16563	15813	17093	15643
FY00 Total	16982	18863	19291	17467	14319	18237	17627	17905	20491	17506	19029	16398
% PM	39%	36%	37%	31%	33%	34%	33%	31%	28%	32%	33%	34%
YTD Avg	39%	38%	37%	36%	35%	35%	35%	34%	34%	33%	33%	33%

Preventive Work Orders

	J	A	S	O	N	D	J	F	M	A	M	J
Total	3262	2674	2720	2829	2154	2857	2684	2188	2750	2725	2308	3350
Completed	2268	2176	2221	2401	2055	2282	2243	1950	2135	2206	1782	2144
% Completed	70%	81%	82%	85%	95%	80%	84%	89%	78%	81%	77%	64%
YTD Avg	70%	75%	78%	79%	86%	85%	86%	87%	83%	83%	81%	80%

Craft Hour Definitions: Total hours charged to work orders by the following categories: **PM** - Preventive Maintenance is to maintain operation of equipment. **CM** - Corrective Maintenance is to restore operational condition. **EM** - Emergency Maintenance is to restore operations with minimal downtime to avoid or minimize hazard/system failure. **Project** - Repairs necessary due to contractor or designer deficiencies. **Other** - Shut downs, safety, standing work orders, warranty work. **NPL Time** - Vacation, training, etc. not charged to the maintenance of equipment or facilities. Non-productive time is x hours and x% of total labor hours.

RCM Pilot Program -- Primary Battery A Comparison

	RCM* PM Battery A		OEM** PM Battery B		PM Maintenance Change		
	Implementation Date	Maintenance Labor Hrs	Operations Labor Hrs	Maintenance Labor Hrs	Operations Labor Hrs	%	Hrs
	Primary Sludge	#####	89	154	250.5	0	-64%
Primary Scum	#####	22	8.8	81	0	-73%	-59
Channel Aeration	#####	28	5	NA	NA	-46% X	0
HVAC	#####	11.5	0	10	0	+15%	+1.5
Sample Pumps	##### XX	0	0	0	0	0	0
Power Supply	#####	0	0	0	0	0	0
Chlorine Gas Detectors	#####	0.5	0	1	0	-50%	-0.5
Hot Water Flush (W5)	##### XXX	0	0	0	0	0	0
Building Fire Systems	#####	0	0	0	0	0	0
Cross Collectors	#####	0	0	0	0	0	0
Primary Sump Pumps	#####	0	0	0	0	0	0
Upper/Lower Collector	#####	0	0	0	0	0	0
Total		151	167.8	342.5	0	-64%	-220

* RCM = Reliability Centered Maintenance

** OEM = Original Equipment Manufacturer's Recommendation

Bold = Systems are implemented

X = Proposed PM change annually (no template within Battery "B-C-D")

XX = RCM determined sample pumps are not required and were mothballed. There were no previously scheduled PM's and no new RCM PM's.

XXX = RCM determined W5 system is redundant to the W4 system. There were no previously scheduled PM's and no new RCM PM's.

RCM is a defined process using input from plant operations and maintenance staff to determine the maintenance requirements of any physical asset in its operating context. Whereas OEM uses the recommendations of the original equipment manufacturer to set time based maintenance tasks, the objective of RCM is that the correct maintenance is completed at the appropriate time interval based upon the systems operating context. The Primary Battery A RCM structured maintenance hours were compared to the Battery B existing OEM methodology. The review period is from the RCM implementation date to present. Upon full implementation the RCM program maintenance metrics will be changed from existing method to tracking "planned" vs "unplanned" maintenance with a goal of 75% "planned" maintenance and 100% PM completion.

Annual Status Sheets – Wastewater Transport Facilities

July 2000 - June 2001

Critical Equipment Availability:

The Critical Equipment evaluated in FY01 includes pumps and screens in the (11) pump stations, (6) CSO's, (1) Screenhouse, and (4) Headworks. Transport facilities operated at full capacity throughout the year.

Pump and Screen Availability Chart

<u>Locations</u>	Pumps Available (monthly)	Pumps Required	Screens Available (monthly)	Screens Required
Pump Stations (11)	38	24	13	10
Pumping CSO's (2)	8	6	9	7
Screenhouse (1)	0	0	4	3
*Gravity CSO's (3)	0	0	4	3
Headworks (4)	0	0	18	13
Total available (reported)	46	30	47	36
Total number (in facilities)	48		48	
Total number required	30		36	
Percentage available	95%		99%	
Percentage required	63%		75%	

* Constitution Beach was taken out of service in September/October 2000. Two additional screens are located at this facility, not included in the above chart. All equipment at this facility was available 100% of the time until taken out of service.

All CSO facilities operated with full chlorination capability. The required number of pumps in each gravity and pumping CSO was available throughout the year. A total of (6) chemical feed pumps are required and an average monthly total of (12) was available.

Backlog:

Transport is currently piloting a new computerized maintenance management system. Statistical reports for backlog tracking are under development as part of the implementation of the new MAXIMO system and will be centralized under a work coordination group. Backlog varies from as low as 2 weeks for essential work orders to as long as long as 6 months for low priority work.

An Oracle-based system was designed to track primarily corrective maintenance work orders. Work order status reports are used to track and prioritize work in accordance with available resources. Backlog levels depend on resources available, but daily coordination insures that primary and critical equipment is functioning at adequate levels at all times.

Preventive Maintenance (PM):

Preventive Maintenance is performed by both Operational and Maintenance staff. The primary focus is critical equipment with attention to equipment checks on a daily basis. Reporting of hours for the PM/PDM effort was tracked by facility in the Oracle-based system and reflects approximately 30% of the workload of the maintenance staff.

With the advent of FAMP (see section 4, page 3), Transport has begun the process of tagging and developing PM tasks for much of its equipment. This program is evolving in manner similar to Deer Island's program. The goal is consistent maintenance practices. PM workload will be tracked in a similar manner as Deer Island by the beginning of FY03.

Equipment Replacement: Major equipment replacement during the past fiscal year includes the following:

- Alewife Brook Pump Station, replace pump rotating assembly - \$45,900
Work on the No. 4 pump was completed this year to improve efficiency. The No. 4 is the smallest of the four available pumps at this facility. A variable frequency drive (VFD) is planned for the upcoming fiscal year for this pump to enable the facility to operate efficiently at low flows, and reduce electrical consumption.
- Alewife Brook Pump Station, replace electrical service - \$35,000
This project was required as result of a new power service from the utility company after installation of new transformers and a transformer pad. The existing ductbank entering the facility leaked and allowed water to infiltrate the lower level of the facility. A new ductbank, wiring and main breaker were installed from the transformer station into the facility and to the motor control center.
- Alewife Brook Pump Station, replace screen sub-components - \$14,025
Replaced all sub-components of the No. 2 screen unit. The screen units were problematic and the recommendation from the supplier was to overhaul each unit and begin with new operational parameters for speed and frequency. Each screen was balanced with appropriate number of rakes.
- Delauri Pump Station, replace influent meter - \$15,000
The influent sonar meter was replaced with a new unit as a result of damages caused by a traffic collision into the electronic control box off the road. This meter provided the facility with more accurate upstream readings.
- Caruso Pump Station, replace wet well level sensors - \$15,000
The wet well level instrumentation was redesigned. State-of-the-art ultra-sonic level sensors will read water levels without the use of floats. This project was the result of required maintenance to repair stilling wells pulled away from the walls. Replacement of two units was scheduled and performed by in-house electricians. This equipment resulted in more efficient and reliable facility

operation and the elimination of extensive maintenance requiring extreme depth confined space entry.

- Prison Point, install new hydraulic filtration system - \$15,800
Installed a new hydraulic filtration system to purify system fluids that operate gate controls and hydraulically driven equipment throughout the facility. The system is addition to the plant to enhance operation and extend the useful life of each component.
- Columbus Park Headworks, replace chemical pumps - \$24,600
Replaced the entire chemical feed system including pumps, piping and liners. The system replaced failing pumps with peristaltic units and piping with PVD and polypropylene fused piping. They pump caustic soda and hypochlorite into the scrubber system.
- Nut Island. Replace conveyor rollers - \$25,000
Replaced approximately 40 rollers on conveyors. Original equipment, although per specifications, were wearing at a high rate. New roller and bearings have grease fittings to allow proper greasing and maintenance under the adverse conditions of grit and material abrasion.
- Nut Island, replace containment area sump pumps - \$34,000
Sump pumps were replaced at the chemical containment areas and in the main sump pit for the scrubber overflow. This work took place from FY00 to FY01, including design modifications, new overhead discharge piping, and float controls. The project was completed in FY01.
- Remote Headworks, replace brake/motor assemblies - \$33,000
The screen drive units are being replaced with pneumatic brake/motor assemblies. These replace the existing electric brake units that wear frequently and require removal. The re-designed units have been installed in total at Ward Street (FY00) and (1) unit at Chelsea, and (1) unit Columbus Park. Six units remain to complete all screens at the Headworks.
- Remote Headworks, replace grit pods - \$36,500
Grit pods were replaced for channels 3 and 4 at the Chelsea Headworks. Both the primary and secondary pods were replaced as a result of thinned walls from grit ejection. One of the grit pod was replaced with a thicker wall construction to eliminate pre-mature failure. Another pod was replaced at the Columbus Park Headworks for channels 3 & 4. As pods are replaced in the future they will be with the modified unit.
- Framingham Pump Station, replace grinder motors - \$10,000
Grinder motors were replaced as a result of moisture infiltration causing motor/electrical failures.

- Framingham Pump Station, installation of chemical feeders - \$75,000
Chemical feeders were installed in an attached building at the Arthur Street Station. The feeders are used to inject potassium permanganate to reduce odors and control hydrogen sulfide downstream of the facility. The system was designed by in-house technical support staff and installed by maintenance trades staff.

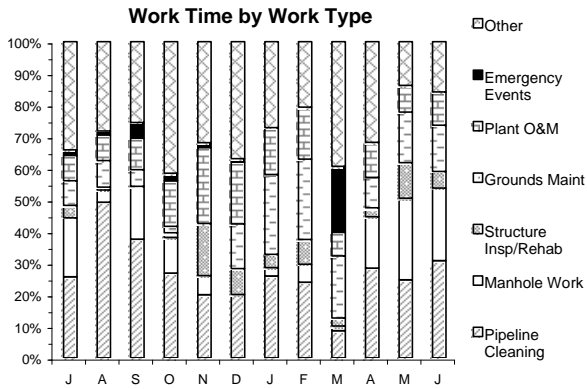
Annual Report: Attached, please find the Transport Maintenance page of MWRA's Report on Key Indicators of Performance for the 4th quarter FY01. Monthly maintenance data for facilities maintenance is included on this page. Data is shown under two headings.

- Preventive/Predictive Maintenance, Corrective Maintenance, Project Work, Emergency Work, and Other Work break down the Facilities Maintenance Work Time by Work Type in a bar chart. Preventive/Predictive maintenance work hours are reported man-hours by maintenance and operational staff. The total of all hours is categorized as shown.
- Total work hours for Pipeline Maintenance, Facilities Maintenance and TV Inspection are shown on a bar chart.

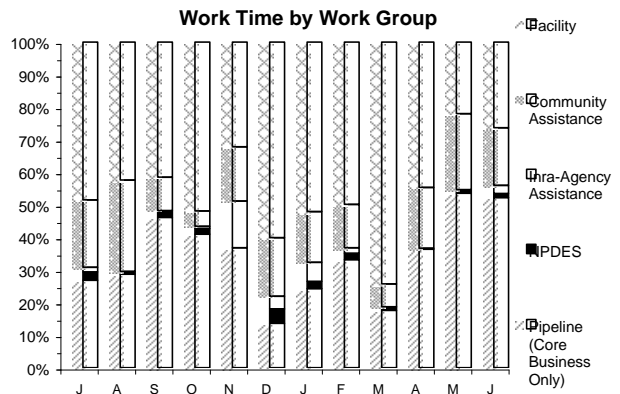
Transport Maintenance

June 2001

Pipeline Maintenance

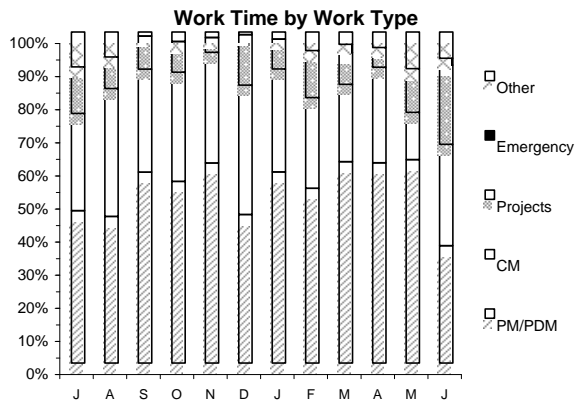


Frame and covers were replaced at 13 locations in East Boston, section 38. Pipeline cleaning included section 41, Melrose (removed an obstruction). The Woburn Sandcatcher was cleaned as part of the routine maintenance. O & M support included dewatering the Framingham Force Main for testing of the Arthur Street Facility.



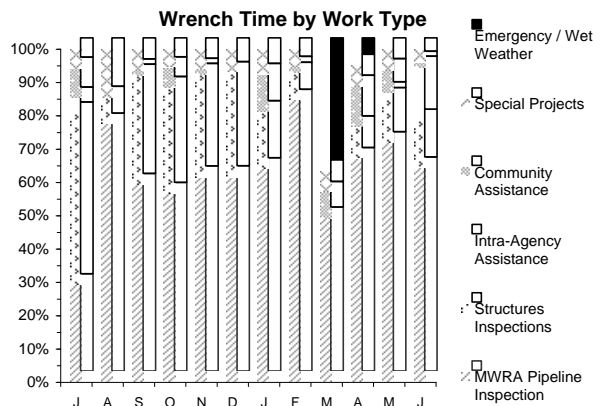
Community assistance work included vector/jetting work in Everett and Milton. Approximately 3700 feet was cleaned for Everett. Intra-Agency assistance was provided at the Cosegrove intake and at the Deer Island Treatment Facility scum tanks. Pipeline core business attributed to about 55% of all work related areas. NPDES inspections were performed on time.

Facilities Maintenance



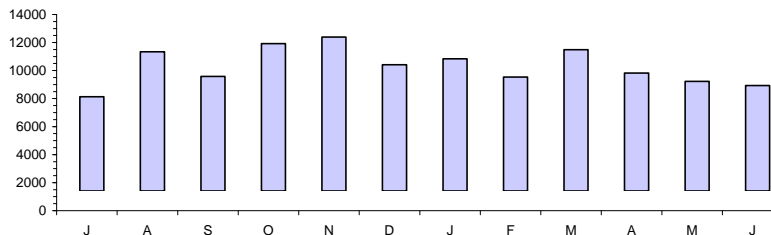
This month, hours recorded for preventive/predictive maintenance included hours for trades staff only. Operational manhours were not recorded due to the transition of administrative staff and re-organization at the Chelsea Facility. However, based on the current month about 35% of manhours for trade staff were attributed to PM, achieving previous Benchmarking goals.

Technical Inspections



The number of crew members available for television inspections was reduced due to an employee IA. This resulted in 2 crews concentrating their efforts on MWRA pipelines. The other 1/2 crew was absorbed within those 2 TV crews resulting in more productivity per crew.

Total Work Hours



Work Hour Definition: Total hours charged to work orders including travel time. Work hours include training time, but do not include I/A, sick, vacation, holiday or other time. It includes supervisors hours only when engaged in work order activities. This total includes Pipeline Maintenance, Facility Maintenance and TV Inspections.

Annual Status Sheets – Wastewater Transport Pipelines

July 2000 - June 2001

Manhole Inspection and Rehabilitation Program:

The Technical Inspections Unit within the Field Operations Department 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 carry out the manhole renovations that result in reduced I/I. The manholes are renovated using cementitious material applied with spinning equipment and then covered with special coatings to resist corrosion from hydrogen sulfide.

In FY01 1,248 manholes were inspected. Approximately 102 manholes were repaired or rehabbed. This work included frame and cover replacements, external repairs to raised manholes, internal repairs using the spin-cast application, and other miscellaneous repair work.

Pipeline Rehabilitation Program:

Section 17.5, Everett, Massachusetts was repaired under contract. Approximately a 100-foot section of 36 inch diameter brick sewer was replaced as a result of failing crown bricks. The total project cost was approximately \$560,000.

A segment of the Metropolitan Sewer Section 38, Bremen Street, East Boston, Massachusetts was replaced under an emergency contract. An 110-foot section was repaired after a collapse. The project cost was approximately \$120,000.

The Chelsea Truck Sewer Relief Project combines components of the MWRA's long-term CSO control plan. It includes the relief of the Chelsea Branch Sewer and Revere Extension Sewer to minimize CSO discharges to Chelsea Creek while reducing surcharging in the upstream transport system. The first construction contract was awarded in September of 1999 and completed in August 2000. Modifications to the Chelsea Screenhouse included connection points and provision for flow control at the Chelsea Screen House to support the Chelsea Branch Sewer rehabilitation. This contract to modify the Chelsea Creek Screenhouse was awarded in June 2000. The project cost for this portion was \$284,350.

Pipeline Inspection and Cleaning:

The Technical Inspection Unit (TIU) conducts internal inspections of MWRA structures and pipelines to reveal potential problem areas and identify required maintenance. Pipeline inspections averages about 70% of the workload followed by inspections of structures, which include manholes. Approximately 70 miles of pipelines were TV inspected in FY01. Included in this total is approximately 10 miles of community assistance work.

Pipeline crews perform a variety of maintenance activities on MWRA's wastewater transport system. The system includes a network of 228 miles of interceptor sewer lines. Approximately 25 miles of pipelines and 30 siphons were cleaned in FY01.

In addition to general pipeline and manhole repair work performed by the pipeline crews, the following are other activities performed throughout the year:

- Pipeline and structure repair work consisting of short sections, shallow excavation
- Construction activities, such as fencing, trenching, pavement, and masonry repairs
- Community Assistance, to clear obstructions and clean sections in community lines
- Plant beautification and grounds keeping at Transport Facilities
- Assistance to TIU to clear lines or bypass pump for TV inspection work
- 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
- Easement clearing for clear access to pipelines and structures
- Operational coverage at facilities during wet weather events
- Emergency response and overflow monitoring during wet weather events
- Response to odor complaints in the system

Annual Report: On page 8, please find the Transport Maintenance page of the MWRA Report on Key Indicators of Performance for the 4th quarter FY01. Monthly maintenance data for pipeline maintenance is included on this page. This data is shown under four headings.

- Pipeline Inspections, Structures Inspections, Intra-Agency Assistance, Community Assistance, Special Projects and Emergency /Wet Weather break down Technical Inspections Wrench Time by Work Type bar chart. Pipeline inspections averages about 70% of the workload followed by structures inspections, including manholes, averaging about 30%. Approximately 71 miles of pipelines were inspected. Structures inspected include about 1,248 of manholes. Other structures inspections include tidegates (65 for FY01) as part of the monthly routine inspections as part of the NPDES require. Other structures included (53) Head Houses and (114) Diversion Structures.
- Pipeline Cleaning, Manhole Work, Structure Inspection/Rehabilitation, Grounds Maintenance, Plant O&M, Emergency Events and Other Work break down Pipeline Work Time by Work Type in a bar chart. Work is documented in the Oracle-based CMMS and is extracted to formulate the graph. Grounds maintenance includes snow removal during the winter months. Plant O & M includes work activities at the facilities for grit cleaning or dewatering activities.
- Pipeline (Core Business), NPDES, Intra-Agency Assistance, Community Assistance and Facility Work break down Pipeline Work Time by Work Group in a bar chart. Core business includes general pipeline cleaning and structures maintenance. This chart demonstrates that the pipeline maintenance crews provide assistance to other groups

within and outside of the MWRA. Inspections include tide-gates as part of the monthly routine inspections as part of the NPDES requirements. These hours are documented separately, with the responsibility shared by the Technical Inspections Unit.

- Total work hours for Pipeline Maintenance, Facilities Maintenance and TV Inspection are shown on a bar chart.

Annual Status Sheets – Fore River Pelletizing Plant

July 2000 - June 2001

Critical Equipment Availability: Twelve Month-Average – 66.7 %

The current maintenance monitoring software does not track down time, but operating logs indicate that approximately 7 of the 12 centrifuges were available for 9 months and 11 centrifuges were available for 3 months. 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 all 12 centrifuges are available to NEFCO giving the plant more than enough capacity to process current flows from Deer Island. In fact, NEFCO has shifted to 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:

Since March 1, 2001 (New Contract Start Date), staff completed 1,262 or about 85 % of the 1,485 work orders that were opened.

Equipment Replacement: Under the new contract, the contract operator has a budget of \$325,000 for capital repair and replacement projects including:

- Overhaul two sludge feed pumps - \$20,000
- Explosion protection system service for six process trains - \$42,000
- Screw conveyor replacement/rehabilitation - \$120,000

Note:

The Contract Operator is responsible for facility maintenance of the Fore River Pelletizing Plant. MWRA staff assures that adequate equipment is operational and, in general, maintained. Staff will work with the operator under the new contract to obtain more detailed records.