

Industrial Waste Report

Number 24

October 2008

Frederick A. Laskey
Executive Director

Michael J. Hornbrook
Chief Operating Officer

Charles Button
Deputy Chief Operating Officer

Richard P. Trubiano
Director, Field Operations Department

Carolyn McAvoy Fiore, Director,
Toxic Reduction and Control

Tracy McGrath
Program Manager, Compliance

Patricia Kelley
Administrative Systems Coordinator

MASSACHUSETTS WATER RESOURCES AUTHORITY

NPDES Permit Number MA0103284
State Permit Number M-44

NPDES Permit Number MA0100404
State Permit Number M-139



This Industrial Pretreatment Program Annual Report is provided pursuant to 40 CFR 403.12(i) and Massachusetts Water Resources Authority's (MWRA's) National Pollutant Discharge Elimination System Permit numbers MA0103284 and MA0100404. It covers the reporting period of July 1, 2007, through June 30, 2008 (FY08).

Executive Summary and Program Highlights

The FY08 report documents MWRA's ongoing efforts to implement the requirements of 40 CFR Part 403, General Pretreatment Regulations. Some highlights from TRAC's FY08 activities in the metropolitan Boston and Clinton sewer services areas include:

Significant Industrial Users: The number of facilities designated as Significant Industrial Users (SIUs) in MWRA's sewer service areas at any time during FY08 was 226. At the end of the fiscal year, the number of SIUs was 216. TRAC staff inspected 226 SIUs. TRAC staff sampled 194 SIUs. 32 SIUs were not monitored because either they did not discharge during the year, or were recategorized as non-SIUs before they could be sampled. The number of SIUs in Significant Noncompliance (SNC) was 50.

Enforcement Program: TRAC issued a total of 276 early enforcement actions (Notices of Violations and Traps Warning Letters) and 67 higher-level (orders and penalty assessment notices) enforcement actions to industrial and commercial facilities. TRAC assessed a total of \$145,850.00 in penalties against permitted sewer users, and collected a total of \$877,680.00 in penalties during the fiscal year.

FES Odor and Corrosion Special Studies: TRAC staff continue to play a key role in MWRA's effort to reduce excessive corrosion and odor levels observed in the Framingham Extension Sewer (FES) and points downstream. FY08 marked a milestone in that all of the original six industrial facilities that were required to meet either a biochemical oxygen demand or sulfate limit had achieved compliance. The last to do so was Conopco (formerly, Good Humor-Breyers Ice Cream), which reached a final settlement with MWRA on December 10, 2007. The settlement required payment of past penalties in the amount of \$633,500 and continued operation of its pretreatment system installed earlier in 2007, to remove fats, oil and grease and biochemical oxygen demand from its discharge. The settlement also included a provision requiring Conopco to pay stipulated penalties for a period of two years for any violations of applicable discharge limits. The facility's BOD discharges, as well as its fats, oils and grease discharges, which contribute to BOD levels, are significantly lower than in prior years, resulting in reduced levels of BOD downstream in MWRA's interceptors.

MWRA also continued working with the five municipalities - Ashland, Framingham, Natick, Needham and Wellesley - that are undertaking various infrastructure improvements and other activities to reduce the level of sulfides discharged to MWRA's interceptors. In FY08, TRAC revised Municipal Discharge Permits for four of the five communities to incorporate updated compliance schedules to reduce the level of hydrogen sulfide discharged into MWRA's interceptors and renegotiated an extension of a settlement agreement for the fifth community.

Pretreatment Information Management System

TRAC staff continued to work closely with MWRA's MIS staff and Inflection Point Solutions (IPS), the consultant hired to replace TRAC's 16-year-old Information System (TRAC IS), to conform the commercial, off-the-shelf pretreatment information management system (PIMS) to MWRA's MIS environment. Specific activities conducted during FY08 included: design and refinement of the module to address MWRA's Incentive and Other Charges program; design of custom interfaces to facilitate data transfer between PIMS and MWRA's LIMS, Lawson, and GIS systems; installation of the PIMS system; unit testing; integration testing; Conference Room Pilot, System Acceptance Testing; and, external laboratory testing of the web-based reporting system. User Training took place in July 2008, followed by System Go-Live on August 18, 2008.

Section 1. Pretreatment Program Activities and Results

A detailed accounting of the pretreatment program activities and accomplishments for MWRA's Industrial Users (including Significant Industrial Users), during FY08 is presented below.

Appendix A contains information on MWRA's SIUs, and provides, in its Key, criteria for SIU status and compliance status codes. The Appendix provides information about why the facility is a SIU and whether it is in compliance with reporting requirements, categorical standards and local limits, dates of MWRA inspections and monitoring events for each facility, and what, if any, enforcement actions were taken by MWRA against the facility. Appendix B details all permitted industrial users not classified as SIUs. The information includes a description of the sampling locations and sampling requirements for each industry, any discharge violations during the year, and all enforcement actions taken against them during the year. Each SIU is inspected at least once per fiscal year and each SIU with a discharge to the sewer system is sampled at least once per fiscal year.

Statistics on MWRA's Significant Industrial Users (SIUs), and the number of SIUs in Significant Noncompliance (SNC) for FY08 for the Clinton and the metropolitan Boston areas are summarized below. The list of SIUs in SNC can be found in Appendix C.

Industrial Users

Total number of permitted industrial users during FY08 = 1361

The number of SIUs during the fiscal year = 226 (2 for Clinton)

The number of SIUs on June 30, 2008 = 216

The number of SIUs that were categorical industrial users (CIUs) = 97

Industries categorized as SIUs because of process flows of at least 25,000 gpd = 60

Industries categorized as SIUs for potential to violate (PTV) = 109

The number of SIUs in SNC = 50

The number last fiscal year = 50

The number of industries in SNC for reporting violations only = 10

The same number for last fiscal year = 7

Number of SIUs in SNC for discharge violations = 40

MWRA conducts meetings for SIUs annually, to review compliance issues and encourage facilities to reduce instances of violations. MWRA also imposes additional charges for late, incomplete, and missing reports to encourage timely reporting by SIUs and non-SIUs. In FY08, MWRA provided all of its SIUs the opportunity to tour the Deer Island Wastewater Treatment Plant. Approximately 100 facilities attended the tours that took place in November 2007. MWRA used the opportunity to remind SIUs of the critical role they play in effluent and residuals quality.

The EPA Pretreatment Annual Report Summary forms are attached to the end of this report as Appendix L. A list of permitted users that were SIUs in FY07 but not in FY08 is attached as Appendix D.

Permitting

Appendix A provides permit issue and expiration dates for all SIUs. During FY08, TRAC completed the following permitting activities:

Total Industrial permits issued = 537

Total Industrial permit renewals = 462

G1 Permit renewals = 318

Industrial permits issued to new dischargers = 75

Industrial permits revised = 40

Municipal permits issued = 45

Municipal permits revised = 4

Industrial permit renewals or issued to SIUs = 88

Temporary Construction Dewatering Permits issued or renewed = 11

Permits issued to municipal drinking water treatment plants = 2

Inspections

Appendix A provides dates of inspections for all SIUs. During FY08, TRAC completed the following inspection activities:

Facility inspections conducted = 996

Of these, the number of annual inspections of SIUs = 226

The number of repeat SIU inspections = 63

Inspections of septage receiving sites = 30

Inspections of gas/oil separators = 229

Number of annual G1 (photoprocessors) compliance reports reviewed = 287

Number of audits of G1 facilities conducted = 40

Number of audits of G2 facilities conducted = 2

Enforcement

During FY08, TRAC initiated a total of 346 enforcement actions to industrial and commercial users of the sewer system. The types of actions and the number of each type follows.

Appendices A, B, and E explain the various types of enforcement actions, and provide information on which facilities received enforcement actions, when and what type(s).

Notices of Violation issued = 265 (168 to SIUs)
Warning letters about gas/oil separator maintenance and accessibility = 11 (Appendix E)
Administrative Orders issued = 3 (1 to a SIU)
Notices of Noncompliance issued = 29 (12 to SIUs)
Enforcement Orders issued = 8 (0 to SIUs)
Compliance Schedules in Permits = 4 (0 to SIUs)
Notices of Proposed Permit Revocation or Suspension issued = 6 (1 issued to a SIU)
Administrative Settlements = 7 (6 with SIUs)
Criminal Referrals = 1 (0 to SIU's)
Penalty Assessment Notices issued = 21 (2 were to SIUs)
Total amount of penalties assessed: \$145,850.00 (\$133,800.00 to SIUs)
Total amount of penalties collected = \$877,680.00 (\$860,500.00 from SIUs)

Monitoring

During FY08, TRAC's sampling staff conducted routine and emergency sampling activities for the pretreatment program as well as for other MWRA programs. Appendix A provides information on the dates of all MWRA sampling events for each SIU.

A summary of sampling activities completed by the staff follows:

First time monitoring events at SIUs with flow = 194
Repeat events at SIUs = 804
First time monitoring events at non-SIUs = 67
Repeat events at non-SIUs = 142
Sampling events in support of NPDES permits = 104
Sampling events in response to emergencies = 14
Sampling events for the MWRA Local Limits program = 192
Sampling events for special projects = 640
Total number of monitoring events = 2,156

A sampling team is on call 24 hour a day to sample reported spills or releases occurring within or near the MWRA collection system.

Information Systems

TRAC's in-house Information Systems staff are responsible for supporting system design and implementation, data entry, quality assurance, and project management and coordination. This ensures that TRAC maintains accurate and up-to-date information for its currently permitted industries and historical records on additional firms that operate in the MWRA sanitary sewerage area.

TRAC-IS and LIMS: TRAC used its TRAC Information System (TRAC-IS) and a Laboratory Information Management System (LIMS) to store and analyze permit information, wastewater sampling results and compliance information throughout FY08. MWRA awarded a contract to Inflection Point Solutions in FY07 to replace its TRAC IS system. The new software, Pretreatment Information Management System (PIMS), was put into production on August 18, 2008. PIMS is a comprehensive information and decision support system that can identify violations, generate various documents with staff input, and store facility specific information including sample results. Specific activities conducted during FY08 included: design and refinement of the module to address MWRA's Incentive and Other Charges program; design of custom interfaces to facilitate data transfer between PIMS and MWRA's LIMS, Lawson, and GIS systems; installation of the PIMS system; unit testing; integration testing; Conference Room Pilot, System Acceptance Testing; and, external laboratory testing of the web-based reporting system. Additional information on PIMS will be included in MWRA's FY09 Annual Report.

LIMS: stores, tracks and analyzes laboratory data collected by MWRA sampling staff. Analytical results of industrial wastewater samples are transferred from LIMS to TRAC-IS on a weekly basis. Additionally, LIMS was designed to store non-industrial sampling information to support local limits studies and special projects such as toxic evaluation studies. The existing LIMS system is integrated with PIMS. Installation of a new LIMS is planned for FY09, and it will be integrated with PIMS when it is up and operating.

e-SMART: e-SMART is a web-based application that allowed laboratories to either enter data directly into the system, or submit data generated from their LIMS systems via the internet. In FY08, 24 labs are used e-SMART to report self-monitoring results on behalf of industries. TRAC required all permittees to submit laboratory results through the e-SMART program. The functional capabilities of this system have been incorporated into PIMS.

TRAPS System: The TRAPS system supported TRAC's gas and oil separator inspection and enforcement program. The system held inspection and enforcement records for over 3600 facilities. The data in this system was incorporated into PIMS.

Permit TRACking System: This system assisted Industrial Coordinators in the development of inspection and permit related documents by integrating a relational database with word processing software. Staff generated standardized inspection reports, industrial permits, fact sheets, and data encoding sheets. The functionality has been incorporated into PIMS.

Legal Support

MWRA's Law Division provides legal and policy advice and counsel to TRAC managers and staff, and represents MWRA in pretreatment-related matters.

In FY08, Law Division work for TRAC included:

- Reviewing and commenting on TRAC penalty assessment notices, and on enforcement orders, notices of noncompliance, rulings, and penalty assessment notices as requested;

- Representing MWRA in administrative and Superior Court appeals of penalty assessment notices, enforcement orders, notices of noncompliance and permits;
- Representing MWRA in pre-enforcement negotiations; and,
- Tracking bankruptcy filings by MWRA permittees.

There were no changes or revisions to the Sewer Use Rules and Regulations in FY08.

Odor and Corrosion Project for MWRA's Framingham Extension Sewer Service Area

MWRA has been studying the complex odor and corrosion problem in the Framingham Extension Sewer (FES) and downstream sewers for several years. A study conducted in 2001 identified three major sources of the problem: 1) industrial discharges containing high BOD and sulfate, 2) communities that discharge into these lines that contribute higher than normal sulfide levels to these lines, 3) the length and subsequent detention time of the lines. After identifying sources of the problem, MWRA identified and evaluated a number of available odor and control options including industrial and municipal controls and treatment options for the sewer lines.

Industrial Controls: In November 2001, MWRA's Board of Directors approved permit specific limits for Biochemical Oxygen Demand (BOD) of 2000 mg/l and of 500 mg/l for sulfate. FY08 marked a milestone in that all of the original six industrial facilities that were required to meet either a biochemical oxygen demand or sulfate limit had achieved compliance. The last to do so was Conopco (formerly, Good Humor-Breyers Ice Cream), which reached a final settlement with MWRA on December 10, 2007. The settlement required payment of past penalties in the amount of \$633,500 and continued operation of its pretreatment system installed earlier in 2007, to remove fats, oil and grease and biochemical oxygen demand from its discharge. The settlement also included a provision requiring Conopco to pay stipulated penalties for a period of two years for any violations of applicable discharge limits. The facility's BOD discharges, as well as its fats, oils and grease discharges, which contribute to BOD levels, are significantly lower than in prior years, resulting in reduced levels of BOD downstream in MWRA's interceptors.

Municipal Controls: MWRA also continued working with the five municipalities - Ashland, Framingham, Natick, Needham and Wellesley - that are undertaking various infrastructure improvements and other activities to reduce the level of sulfides discharged to MWRA's interceptors. In FY08, staff revised Municipal Discharge Permits for four of the five communities to incorporate updated compliance schedules to reduce the level of hydrogen sulfide discharged into MWRA's interceptors and renegotiated an extension of a settlement agreement for the fifth community.

Treatment Approaches: MWRA continues to use a combination of chemicals (a proprietary nitrate-based chemical with an oxidizer) to treat the high sulfide wastewater traveling through the FES. This has been very effective at reducing the generation of hydrogen sulfide at both the addition point and for many miles downstream. MWRA is using the combination of chemicals in the FES from about May through November of each year.

Local Limits

MWRA last adopted modified local limits on June 20, 2003. In anticipation of renewed NPDES permits, MWRA staff began a renewed round of sampling in January 2005 to support an evaluation of existing metropolitan Boston and Clinton local limits. This sampling continued throughout FY08.

Emergency Response

TRAC field staff are responsible for responding to emergency events, toxics releases, or spills to the sewer system. These releases may potentially result in interference (disabling of the treatment plant's facilities/processes), or pass-through (discharge of toxics through the treatment works into the receiving waters). Due to the abrupt and often hazardous nature of these events, they generally take precedence over normal monitoring and inspection activities. Chemical and oil spills also pose significant concerns to the collection and treatment systems, due to the possibility of explosion, toxic fumes, and facility damage.

TRAC staff respond to these types of events to assess their potential to affect the sewer system and downstream facilities. TRAC staff are an integral part of MWRA's emergency response organization, and are trained to respond immediately to emergencies posing a threat to public health, worker safety, and facility operation. A TRAC manager, a team of sampling associates and a fully equipped sampling van are on-call 24 hours a day to respond to reported emergencies.

TRAC emergency responses may be initiated for both short-term, episodic releases and continuing events, which may potentially impact the collection and treatment system. The following describe some of the events to which TRAC responded in FY08:

- July 20, 2007 – TRAC staff responded to a spill of Lithium Bromide Solution, Chromate Inhibitor, from a chiller valve. The spill flowed into a sump that discharged to a surge tank in the company's neutralization system. The MSDS indicated that the spilled solution contained Cr⁺⁶ at a concentration of 0.025%. The chiller system held 600 gallons of the lithium bromide product. However, it was not known how much made it to the sewer, but once the leak was discovered, all manufacturing and discharges ceased. The company responded to the spill with an in-house HAZMAT team for clean up. In addition, Clean Harbors was called in to store the solution in frac tanks. Clean Harbors also used a VAC truck to pump the spilled solution from the surge tank to the frac tank. After the incident and clean up was over, Clean Harbors manifested and hauled away all the liquid in the frac tank.
- September 4, 2007 – TRAC staff responded to a fuel oil spill in the City Square Tunnel northbound vent building. The spill resulted from an equipment malfunction (stuck solenoid valve) on the main fuel tank, which caused an overflow of fuel oil. The fuel oil made it to an ejector pit via a floor drain in the vicinity of a day tank. The day tank holds 30 gallons of fuel oil, while the main fuel tank holds thousands of gallons. The amount of fuel oil that spilled and made it to the sanitary sewer was never determined.

- November 11, 2007 - Fire Chief Ronayne, Canton Fire Department, called to report a heating oil spill at the Canton High School, in Canton, MA. Chief Ronayne stated that there was a possibility that heating oil may have been discharged to the area sanitary sewer because of the proximity of sewer ejector pits near the oil spill at the Canton High School mechanical room. TRAC staff responded to the scene when the fire chief requested assistance to determine any possible impacts to the sanitary sewer system. The school boilers used to heat the school can utilize either natural gas or #2 fuel oil. In the mechanical room, a ¼-inch fuel line that fed the combustion chamber of the boiler loosened and leaked fuel oil on the mechanical room floor. The Canton Fire Department immediately called MWRA, MADEP and CYN Oil for a HAZMAT response.

It was determined from a site inspection that the heating oil spill leaked onto the floor, into a floor drain, and then into a series of three-sewer ejector pits. A visual inspection of area manholes indicated that the manholes were clean and free from fuel oil contamination. All spilled oil residual in the school building and ejector pits was cleaned and hauled away by CYN Oil. The unmanned MWRA pump station, located on University Avenue, Canton, did not receive a negative impact from the spill.

- June 19, 2008 – TRAC staff responded to an oil spill in Brighton. The reported spill was insulating oil from an NSTAR transmission line that surfaced on the side of Sunderland Street in Brighton and ran down the side of the street to a catch basin at the intersection of Sunderland and Strathmore Streets. When TRAC staff arrived at the scene at 10:30 am, Boston Water and Sewer (BW&S) and Brookline DPW staffs were in the process of removing manhole covers to determine the path of the release. The flow was found in a storm line at the intersection of Strathmore and Beacon and Brookline DPW placed absorbent booms in the line to absorb some of the oil. The BW&S and Brookline DPW staffs determined that the oil spill was contained to the storm drain that drains to the Muddy River.

The Muddy River runs under Route 9 at that point for about 100 yards before emerging again on the other side. The river was completely covered with the product, therefore, MADEP mobilized equipment and personnel to contain the spill before it reached the Charles River. Since it was determined that there was no impact to the sanitary sewer, TRAC staff left shortly thereafter.

Pass-Through and Interference

There were no instances of Pass-Through or Interference at the Clinton Wastewater Treatment Plant in FY08. TRAC staff investigated plant issues as a result of unusual turbidity levels in May 2008, but no industrial or commercial cause was identified. The investigation continued into FY09.

There were no investigations of, nor were there any instances of, Pass-Through or Interference at the Deer Island Wastewater Treatment Plant in FY08.

Pretreatment Program Resources

MWRA's Toxic Reduction and Control section (TRAC) is organized along a functional alignment. Presently, a Regional Manager oversees Industrial Coordinators, who conduct inspections, draft permits, and issue low-level enforcement actions (Notices of Violation) and three staff responsible for implementing MWRA's septage and gasoline/oil separator programs. A second Regional Manager oversees all monitoring staff, who collect industrial and other wastewater samples. A Program Manager oversees enforcement staff as well as staff dedicated to the management of TRAC's information system. TRAC has 47 full-time permanent positions (see Appendix G). As of October 2008, one position was vacant. TRAC continues to rely on Technical Services staff from the Field Operations Department's Operations Support section to provide technical support for short and long-term projects to reduce toxics entering the collection system. TRAC also relies on the Field Operations Department for clerical and secretarial staff.

Budget

MWRA's FY08 budget for the Toxic Reduction and Control Department (excluding laboratory analytical costs) was \$3,555,174. The majority of that cost was wages and salaries.

Program Cost Recovery

MWRA's Incentive and Other Charges Program, administered by TRAC, continues to recover a substantial portion of MWRA's costs of inspecting, monitoring, and permitting industrial sewer users. For FY08, TRAC collected \$1,844,496.13 in permit charges from permit holders. Collections are at more than 98% of the adjusted amount invoiced. TRAC issued 6 Notices of Proposed Permit Suspension to permit holders that did not pay their charges. Permit holders either paid their outstanding charges or the issues were otherwise resolved (e.g., some users were out of business).

Pollutant Analyses and Comparison to Environmental Standards

The Environmental Quality Department (ENQUAD) evaluates the water quality and biological health of Massachusetts Bay, Boston Harbor, and the rivers tributary to the harbor to ensure that the Deer Island discharge does not harm the marine environment, to monitor the impacts of CSOs, and to track the effects of the Boston Harbor Project on the harbor.

MWRA measures pollutant concentrations in the plant influent to determine if pollutants are present in quantities that could inhibit proper operation of the treatment facilities, in the effluent to determine the effectiveness of its pollutant control measures and compliance with water quality standards, and in the sludge to ensure it meets beneficial reuse criteria. This section discusses the results of these analyses.

Priority Pollutants Scans

Metropolitan Boston Service Area: MWRA performs scans for priority pollutants on Deer Island Treatment Plant (DITP) influent and effluent samples. Additional non-priority pollutants are analyzed in support of meeting receiving water quality goals and the beneficial reuse standards for plant biosolids.

Appendix H presents the analyses of influent and effluent samples from DITP. Results are presented as monthly averages of all the samples analyzed during the fiscal year. When averaging the results of the inorganic compounds, undetected values are assumed to be half the method detection limit. Organic compounds below the method detection limit are also presented as half the detection limit. Results are reported in quantitation limits, which are about five times the method detection limit. Thus, in the calculations, $1/10$ of the quantitation or $1/2$ of the method detection limit are used. This allows the data to be used without the less conservative assumption that non-detect values are zero. Analyses performed using non-EPA approved ultra low detection methods generally confirm that this methodology is a conservative way to estimate the concentrations of undetected pollutants.

Analyses usually detect very few of the priority pollutants in the influent. As would be expected for a large urban system, surfactants, fats, oils and grease, and most metals are detected regularly. Bis(2-ethylhexyl)phthalate, an organic compound used in the manufacture of plastic materials, 4-methylphenol (*p*-cresol), an intermediate in the manufacture of chemicals, dyes, plastics and antioxidants, toluene, a solvent and a chemical that is used in the manufacture of benzene derivatives, dyes, and perfumes, tetrachloroethene, a chemical used in the textile and dry cleaning industries, methylene chloride, a solvent, and 2-butanone, widely used as a solvent and intermediate product in the manufacture of ketones and amines, were detected consistently. No pesticides were detected by EPA-approved methods. When characteristics of Deer Island influent are compared to literature inhibition values, analysis shows that no parameters exceeded the thresholds. Deer Island did not experience any problems with process inhibition in either the sludge digestion or the activated sludge process during FY08. Appendix H includes tables comparing Deer Island's influent monthly average concentrations to inhibition values.

The activated sludge process removes most of the organic pollutants. Chloroform and acetone, breakdown products of the process used in secondary treatment, are detected in the effluent consistently. Methylene chloride was detected in 15 and tetrachloroethene in 13 of 24 samples. The activated sludge process also effectively removes metals. Removal rates range from a low of 44% for nickel, a high of 96% for mercury and 92% for silver. Removal rates for copper and lead were over 85%, cadmium and zinc were about 82% and about 77% for chromium. Priority pollutants in Deer Island Treatment Plant effluent are considerably below levels that would meet water quality criteria after dilution. In fact, toxic contaminants generally met water quality criteria in the effluent even before dilution. Copper is the only parameter that requires use of the dilution factor to meet the water quality criteria. MWRA's NPDES permit allows for a 50:1 dilution for determining compliance with acute water quality criteria, and a 70:1 dilution for chronic water quality criteria standards. Appendix H includes tables comparing Deer Island's effluent to both acute and chronic water quality standards.

Clinton Treatment Plant: MWRA performs priority pollutant scans on Clinton Treatment Plant influent and effluent samples. Appendix I presents the results of all these analyses.

Analyses showed very few of the priority pollutants in the influent. Aluminum, arsenic, copper, lead, mercury, zinc, and a few organic compounds: chloroform, toluene, 4-methylphenol (*p*-cresol), bis(2-ethylhexyl)phthalate were detected regularly while 2-butanone was detected in six of eleven samples. No pesticides were detected in the influent.

Appendix I compares Clinton influent samples to literature inhibition values for its treatment processes. No parameters exceeded either the published acute inhibition level for the activated sludge or the sludge digestion processes. The plant experienced a nitrification process upset in December 2007 but was not attributed to an industrial or illegal discharge. The upset was caused by a leaky process water line that was introducing chlorinated water into the primary tanks. Operators implemented remedial actions which included putting chlorine on manual feed to keep up with demand, cessation of solids processing to reduce stress on the activated sludge process, lowered sludge wasting to maintain biomass, and adding nitrifying bacteria cultures. Operational parameters were at normal levels by December 27, 2007.

Clinton effluent meets all the acute water quality standards for the Nashua River except for copper and zinc, and all the chronic water quality standards except for copper, zinc, and aluminum. Of 20 samples taken in FY08, there were nine calculated exceedances of the acute water quality standard for copper and ten for zinc. There were seven for copper and three for zinc exceedances of the chronic water quality standards.

Appendix I includes tables comparing effluent concentrations with both acute and chronic water quality criteria. Clinton Treatment plant permit allows for a 1.6:1 dilution for determining compliance with acute and chronic water quality criteria,

Copper in the effluent had been consistently violating permit limits. As a result of these violations, on September 30, 2002, MWRA received an administrative order (AO) from EPA, specifying an interim copper limit of 20 ug/L while requiring Clinton to reduce copper in the effluent. The average monthly effluent copper concentrations since the AO have all been well below the interim limit. The average annual effluent copper concentration for FY08 was 7.19 ug/L. The minimum and maximum effluent concentrations were 4.23 and 10.7 ug/L, respectively. Efforts to reduce copper entering the treatment plant include corrosion control and public outreach programs. The plant has taken steps in optimizing plant performance including not scheduling sludge processing during low flow days. In early 2008, Massachusetts issued water quality criteria for copper, 25.7 ug/L and 18.1 ug/L for acute and chronic criteria respectively, which the Plant should be able to meet. Also in June 2008, MWRA installed a USGS stream gage upstream of the Clinton Plant discharge location, to better quantify the flow in the river. Based on measurements to date, the river flow is at a minimum 20 % higher than reported releases from the Wachusett Dam, which means that the available dilution is greater than 1.6. If these new information were used, the calculated instream concentrations would most likely meet standards.

Toxicity

MWRA tests effluent toxicity every month at DITP. Effluent toxicity provides an overall view of effluent quality, ensuring that the effluent does not adversely affect the receiving waters.

MWRA's permit requires four tests for effluent toxicity. The 48-hour acute static toxicity tests using the mysid shrimp (*Americamysis bahia*) and the silversides fish (*Menidia beryllina*) measure potential short-term lethal effects caused by the effluent. A chronic survival and growth test using *Menidia* and a chronic fertilization test using the sea urchin (*Arbacia punctulata*) both measure subtle toxic impacts over a longer period of time. The results of these tests for FY08 can be found in Appendix J.

LC50 (Lethal Concentration 50%) is the concentration of effluent in a sample that causes 50% mortality of the test population during the duration of the test. The NOEC (No Observed Effect Concentration) is the concentration of effluent in a sample to which organisms are exposed in a life cycle or partial life cycle test that has no adverse effects. An NOEC of 1.5% means that 1.5% of the sample is effluent, and the remainder dilution water. Any acute LC50 below 50% or chronic NOEC below 1.5% would violate the NPDES limit. There were no toxicity permit limits violations for Deer Island effluent in FY08.

MWRA also tests effluent toxicity four times per year at the Clinton Treatment Plant. MWRA's NPDES permit requires two tests for effluent toxicity testing using freshwater daphnid shrimp, *Ceriodaphnia dubia*. One test is the 48-hour acute toxicity test, which measures potential short-term lethal effects caused by the effluent. The second test is a chronic survival and reproduction test, which measures subtle toxic impacts over a longer period of time. There were no toxicity permit limits violations for Clinton effluent in FY08. The results of the Deer Island and Clinton toxicity tests for FY08 can be found in Appendix J.

Residuals Quality

EPA and the Massachusetts DEP regulate the quality of sewage biosolids intended for beneficial reuse. At the federal level, these products are governed by the Clean Water Act. These regulations establish quality criteria for several metals and for the degree of pathogen reduction. Federal and state regulations have adopted a two-tier approach to biosolids regulation. Products meeting the strictest standards for all parameters (DEP Type I) may be distributed or marketed without regulation or restrictions. Products meeting only the less prohibitive Type II standards may be used as fertilizer, but additional distribution, use restrictions and management practices apply.

During FY08, MWRA biosolids met all applicable federal standards for unrestricted use as a fertilizer (see Appendix K for more details) and met all applicable state standards except for molybdenum. MWRA biosolids exceeded the state standard for molybdenum five out of twelve months. Approximately 231 tons of biosolids generated in August of 2007 were distributed in Massachusetts in violation of MWRA's Approval of Suitability. Mass DEP issued a Notice of

Violation to MWRA's contractor operator, New England Fertilizer Company (Nifco) stipulating that Nifco pay a fine and take steps to prevent further occurrences. Procedures are now in place that restrict the distribution of biosolids to Massachusetts locations until analytical results confirm that the molybdenum standards have been met.