

**MASSACHUSETTS WATER RESOURCES AUTHORITY
CONTINGENCY PLAN:
OUTFALL SIMULATION PLANS FOR DEER ISLAND TREATMENT PLANT**

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NPDES Permit No. MA0103284

December 8, 2000

Environmental Quality Department Technical Report Series 2000-18

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1 Introduction

The MWRA has been charged with upgrading the sewage treatment and disposal facilities to improve the quality of the Boston Harbor and Massachusetts Bay system. Despite all indications that these treatment improvements and the relocation of the effluent outfall will result in only minimal impacts in the vicinity of the new discharge, MWRA was charged with verifying these expectations, and ensuring that any unanticipated effects be identified and remedied as quickly as possible. To assure that these concerns are addressed, MWRA, working with regulators and a scientific oversight committee, developed a comprehensive baseline and post-discharge outfall monitoring program (MWRA 1991, 1997a), a Contingency Plan (MWRA 1997b), a series of interpretive technical reports on the results of the monitoring (listed at <http://www.mwra.state.ma.us/harbor/enquad>) and an annual overview of monitoring results (Werme *et al.* 2000).

MWRA's Contingency Plan identifies caution and warning levels ("thresholds") for a number of effluent and receiving water parameters that would trigger action if they are exceeded. The Contingency Plan and NPDES permit require identification and reporting of these threshold exceedances. The thresholds apply to selected measurements made in the treatment plant as well as in the environment. The thresholds for the ambient monitoring program are focused on the Nearfield area around the outfall, though thresholds for dissolved oxygen and paralytic shellfish poisoning (PSP) extend beyond the immediate outfall discharge area.

MWRA's NPDES discharge permit requires that MWRA develop a plan for simulating (*i.e.* practicing) responses to unexpected problems at its Deer Island treatment facility or in Massachusetts Bay. This will provide an opportunity for MWRA to work out the details of a response and demonstrate readiness. This simulation plan includes two possible scenarios, one in the treatment plant and one in the environment. In the treatment plant scenario, MWRA treatment plant staff work to correct an operational upset of the chlorination process in the treatment plant. In the environmental scenario, MWRA environmental monitoring staff help coordinate information about a red tide bloom and then present the information to the Outfall Monitoring Science Advisory Panel (OMSAP) to consider whether or not the MWRA outfall exacerbated the red tide event. Although the Plan focuses on two practice examples, the experience gained by exercising the Plan will be transferable to exceedances of any Contingency Plan thresholds.

Section 8.e.iii of NPDES Permit #MA0103284 requires:

"Outfall Contingency Simulation - The permittee shall develop (within one hundred and twenty (120) days of the effective date of the permit) and implement (within 1 year of the effective date of the permit) an outfall contingency simulation plan. The plan shall simulate the notification and decision making process that would occur in the future in the event of unexpected problems at the treatment facility or in Massachusetts Bay. The simulation shall involve all relevant state and federal agencies and shall include an evaluation process. The plan shall be submitted to EPA, MADEP, NMFS, FDA, NOS, OMSAP, and the public (for the purpose of soliciting public comment) (See: Part I.20.e. of this permit), within one hundred and twenty days (120) days of the effective date of the permit for approval by EPA and the MADEP. MWRA shall perform a dry run of two different types of scenarios,

before the commencement of the discharge. (One dry run of a treatment plant chlorination system upset, and one dry run of a red tide event in Massachusetts Bay or Cape Cod Bay.)”

The first simulation specified by the permit, a Deer Island Treatment Plant (DITP) chlorination system upset, appears in Section 2 of this Plan. If chlorination at DITP fails, bacteria levels in the effluent would increase and could violate the permit limit. Violations of Permit effluent limits are “warning level” exceedances, requiring a rapid corrective response as specified by the Contingency Plan (as well as customary practice). The hypothetical malfunction is presumed to last long enough to impact the receiving waters; MWRA would conduct surveys to evaluate that impact.

The second simulation specified by the permit, a red tide event in Massachusetts Bay, appears in Section 3, along with a brief summary of the biology of the algae responsible for local outbreaks of “red tide,” and of the ongoing interaction between regional, State, MWRA and academic groups. A red tide event would lead to rapid notification of OMSAP, regulators, other interested parties, and posting on the MWRA website. This would be followed by rapid response evaluation of whether the MWRA discharge was contributing to the algae bloom, and determination of whether additional sampling was required to aid that evaluation.

MWRA conducted a “dry run” of each scenario prior to the new outfall going online, focusing on communication and notification processes. The results of each dry run are summarized in Section 4 of this document. Following comment on this Plan from the Environmental Protection Agency (EPA), the Massachusetts Department of Environmental Protection (MADEP), the National Marine Fisheries Service (NMFS), the Food and Drug Association (FDA), the National Ocean Service (NOS), the Outfall Monitoring Task Force (OMSAP), and the public, the Plan will be revised as needed, and then implemented as is required in the permit.

2 Deer Island Operational Upset Simulation Plan

2.1 Background

The disinfection process at Deer Island Treatment Plant (DITP) includes two steps. Sodium hypochlorite (NaOCl) is pumped from one of four storage tanks to the upstream end of the disinfection basins. Downstream from the facility (850 feet into the outfall tunnel), sodium bisulfite (NaHSO_3) is added to dechlorinate the effluent.

The scenario described in this document is a hypothetical failure of the chlorination process: a large volume of sodium hypochlorite is rapidly leaking out of one of the storage tanks into a containment area. Sodium hypochlorite stores are already low because severe weather has delayed the scheduled delivery by barge. The loss caused by the leak is substantial enough that all available sodium hypochlorite is depleted and the effluent is soon discharged without chlorination. The result is high pathogen levels in the effluent, and a Contingency Plan warning level exceedance of the fecal coliform threshold: a daily geometric mean greater than 14,000 fecal coliforms/100 ml at the point of dechlorination. Deer Island Operations staff would be the first to detect the problem by discovering the hypochlorite leak; laboratory staff would subsequently see chlorine residuals below detection in their samples and high bacteria counts in their analyses.

The scenario for the simulation, a loss of disinfection capability, has certain attributes warranting an especially rapid response. The effluent would be quickly degraded in quality and soon reach the environment. The link between chlorination failure and effluent degradation is strong and the appropriate corrective actions are clear. Furthermore, sodium hypochlorite is a hazardous chemical and must be cleaned up and disposed of with caution.

It is important to note that although the scenario presented is the most likely one MWRA can develop for an upset leading to chlorination failure, it is extremely unlikely. System redundancy and in-place operational and maintenance procedures would normally prevent the simulated events before chlorination failure occurred. For example, one operational practice is to ensure that at least one full hypochlorite tank be available as backup at all times, so the catastrophic failure of one tank (itself very unlikely) would not normally result in an inability to disinfect the effluent. Also, all DITP systems are subject to routine inspection/maintenance. A failure of one system needed to resolve a failure elsewhere in the system (failure in the line leading from the hypochlorite containment area sump to the disinfection basins, for example) would be detected and fixed before a situation requiring its use would arise.

MWRA already has three existing plans in place for dealing with a wide range of emergencies in the sewer system. These are based on customary practice, enhanced by the newness and size of the facility and MWRA's determination to take a superior approach to technology, systems, and processes. This Outfall Contingency Simulation extends the responses outlined in those plans to specific examples required by the NPDES permit to exercise the Contingency Plan. The existing plans are:

- Operations Division Emergency Response Plan, for response to a spill of toxic material within the collection and transport system (pipes leading to the treatment plant).
- Deer Island Treatment Plant Integrated Contingency Plan, which provides response procedures for environmental incidents and other emergencies that occur at the treatment plant facility.
- MWRA Emergency Directory, which includes an Authority-wide response plan which contains contact information to facilitate communications in the event of an emergency.

Although this scenario was designed for a chlorination failure that occurs during a regular workday, the plant is staffed 24 hours a day with supervisors and staff who can detect and work to resolve an operational problem at any time. In the event of a failure occurring during off-hours, essential staff will be contacted to provide remote assistance, and will arrive on-site to assist.

2.2 Scenario Overview

The chronology of events in the simulation can be summarized as follows:

1. DITP Process Operations control room staff detect a rapid drop in sodium hypochlorite levels in one of the four sodium hypochlorite storage tanks. Staff dispatched to the site discover a major rupture in one of the storage tanks, with the chemical spilling out into the containment area. The three other storage tanks are empty, awaiting refill from a barge that has been delayed due to severe weather off the mid-Atlantic coast. Deer Island's Incident Command Center is activated, and the

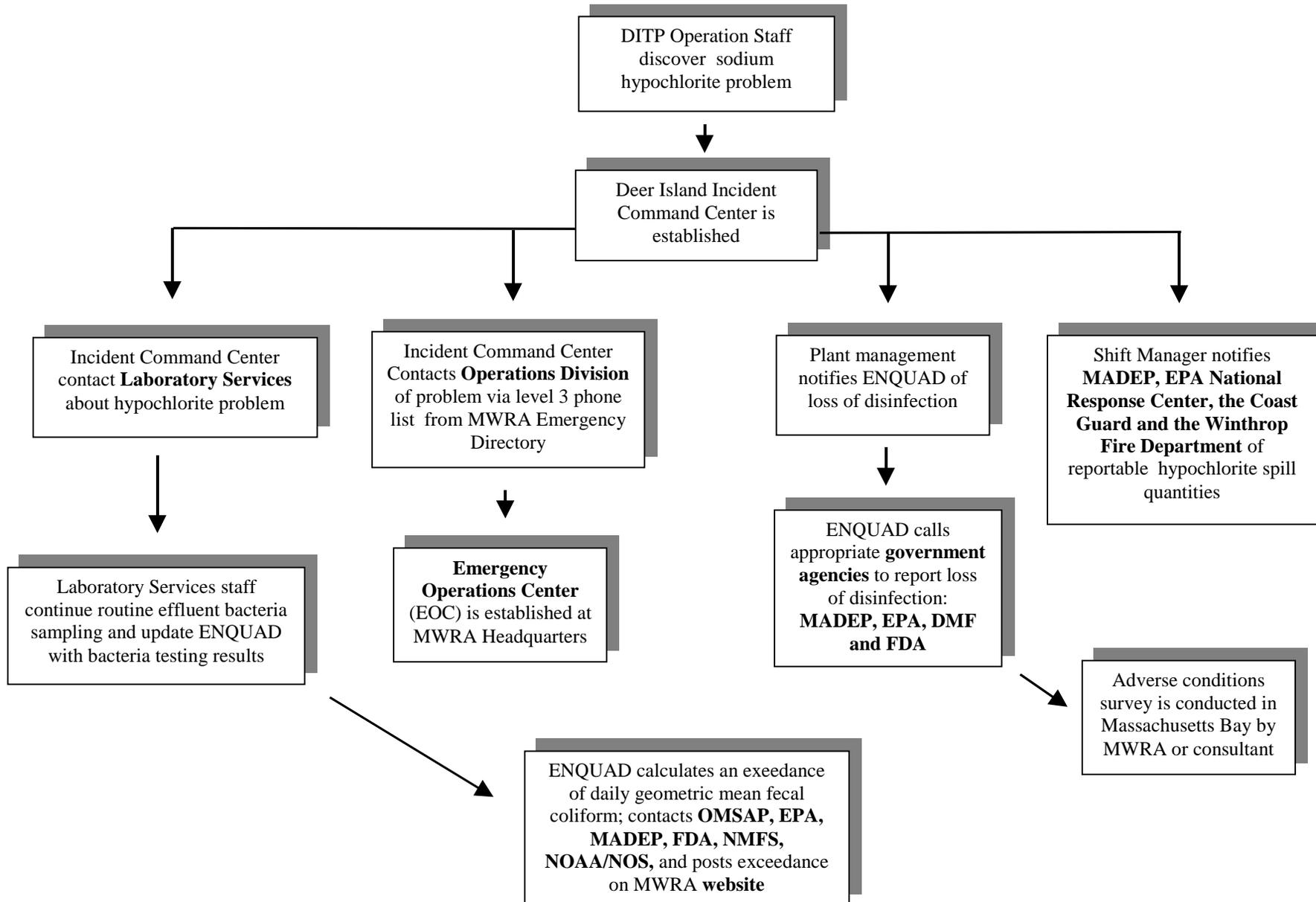
incident is classified as a Level 3 incident.¹ It is subsequently discovered that the line from the containment area sump to the disinfection basin is out of service. Since there is currently no way for sodium hypochlorite to be transferred to the disinfection basin, there will be a temporary loss of disinfection.

2. Plant management notifies Laboratory Services as well as the Operations Division. DITP Process Control notifies Environmental Quality Department (ENQUAD) staff about the loss of disinfection; ENQUAD staff in turn notify the appropriate federal and state agencies, and arrangements are made to conduct an adverse conditions survey in Massachusetts Bay as soon as possible. The Field Operations Director chooses to activate the Emergency Operations Center (EOC) at MWRA headquarters in Charlestown.
3. At Deer Island, the Shift Manager orders emergency shipments of sodium hypochlorite, to arrive via tanker truck. When the first shipment arrives (in about 24 hours), the chemical is pumped from the truck directly into the disinfection basin. Disinfection capabilities return to DITP.
4. Laboratory Services staff determine through routine effluent sampling that the disinfection failure resulted in two consecutive fecal coliform counts above 14,000 colonies/100 ml. ENQUAD calculates that the results will lead to a daily geometric mean fecal coliform count exceeding the NPDES permit limit, triggering a Contingency Plan warning level threshold. ENQUAD staff carry out notifications of the threshold exceedance.

Appendix E of this document details the levels of failure that lead to an adverse condition survey, and also includes the parameters to be measured and the stations to be sampled.

¹ A Level 3 Incident is defined in the MWRA Emergency Response Plan as a threat to public health and safety, which may include anticipated hazardous chemical releases and property damage. It also requires interagency coordination.

Figure 1. MWRA notification flowchart for chlorination failure.



2.3 List of Expected Participants

Environmental Protection Agency (EPA)

Eric Hall, Janet Labonte-Deshais, Matthew Liebman

Massachusetts Department of Environmental Protection (MADEP)

Steven Lipman, William Cashins, Catherine Coniaris

Massachusetts Department of Marine Fisheries

Jeff Kennedy, Stephanie Cunningham

Winthrop Board of Health

Virginia Wilder, Paul Frazier

Food and Drug Administration

Martin Dowgert

National Marine Fisheries Service

Salvatore Testaverde

Stellwagen Bank National Marine Sanctuary (SBNMS)

Craig MacDonald

Outfall Monitoring Science Advisory Panel (OMSAP), full membership

Massachusetts Water Resources Authority (MWRA)

Executive Office: Pam Heidell (primary), Kate Murray (secondary),

Douglas MacDonald (tertiary)

Public Affairs: Jonathan Yeo

Law Division: Nancy Kurtz (primary), Lauren Sloat (secondary),

Christopher John (tertiary)

Operations Division: Michael Hornbrook

Risk Management: Gerry Lima

Emergency Operations Center (EOC) members

Deer Island Treatment Plant Staff (DITP):

DITP Director: John Vetere

DITP Primary Operations staff

DITP Area Supervisor

DITP Shift Manager

Process Operations Manager (POM): William Waitt

Deputy Director of Maintenance: Gerry Gallinaro

Deputy Director of Operations: Anthony Kucikas

DITP Safety Manager: Nicholas Dematteo

Incident Commander

Program Manager, DITP Process Monitoring: David Duest

ENQUAD Staff:

ENQUAD Director: Andrea Rex

NPDES Compliance Manager: Grace Bigornia-Vitale

Outfall Monitoring Program Manager: Michael Mickelson

Water Quality Program Manager: Ken Keay

MWRA permit web page: Wendy Leo or Sally Carroll

Additional staff: Mark Sullivan, Kelly Coughlin

Laboratory Services staff: Lisa Wong, Ethan Wenger, Nicole O'Neill

Battelle Ocean Sciences (BOS), under contract with MWRA for Outfall Monitoring:

Carlton Hunt, Heather Trulli, Wayne Trulli
Winthrop Fire Department
U.S. Coast Guard, Marine Safety Office, Boston

2.4 Scenario for Loss of Disinfection

The scenario begins with a detection of a sodium hypochlorite leak at the plant.

Day 1:

Staff in the Primary Operations Control Room (Primary OPS) detect a chlorination problem when the Process Information and Control System sounds an alarm indicating that the amount of sodium hypochlorite in Tank 4, one of the four storage tanks in the disinfection area, is dropping rapidly. The other three tanks, Tanks 1, 2 and 3, are already nearly empty, awaiting refill. Tanks are lower than normal because the routine barge delivery of hypochlorite has been delayed because of severe weather. Primary OPS staff notify the Area Supervisor. **(Note: under normal circumstances, at least one tank is always full and available as backup. The conditions stated above are for simulation purposes.)**

- +15 min The Area Supervisor sends out an operator to examine the storage tank in question.
- +30 min The operator discovers a major rupture in Storage Tank 4; sodium hypochlorite is rapidly emptying into the surrounding containment area. He immediately contacts Primary OPS by radio or phone. The operator maintains communication with the Area Supervisor until the nature and location of the incident has been communicated.
- +35 min The Area Supervisor in turn contacts the on-duty Shift Manager to inform him of the problem.
- +45 min The Area Supervisor contacts the Process Operations Manager (POM) and informs him of the incident. The POM then calls or pages the DITP Director and all Deputies, and pages DITP Safety. The Director's office becomes the on-island Incident Command Center (ICC). The Director and Deputies are asked to meet in the ICC.
- +50 min The POM goes to the disinfection area to inspect the situation.
- +1hr The POM assesses the situation in the disinfection area: Tank 4 is almost completely empty (below the minimum quantity necessary to pump), and its containment area is full of sodium hypochlorite.

He determines that this is a Level 3 incident (threat to public health and safety, inter-agency coordination required), since there is loss of disinfection capability,

as well as a release of a hazardous chemical. He contacts the DITP Director's office, and the Director appoints a member of Operations Management staff to assume the responsibility of Incident Commander.

The Incident Commander requests that the Maintenance Deputy Director and the DITP Safety Manager join him at the disinfection area immediately.

+1hr, 5 min After arriving at the disinfection area, the Incident Commander considers the possibility of pumping hypochlorite directly from the containment area surrounding the storage tank into the disinfection basins. He dispatches an operator to inspect the line.

+1 hr, 10 min The operator visually inspects the line, and finds that pumping from the containment area is not feasible, because the line from the sump to the disinfection basin is out of service (an inspection revealed a break in the line). He reports this information back to the Incident Commander. **(Note: under normal circumstances, routine maintenance checks would prevent this failure.)**

The DITP Maintenance Deputy Director and the DITP Safety Manager arrive at the disinfection area.

+1hr, 15 min The Safety Manager determines that the release of sodium hypochlorite into the containment area has exceeded both the state and the federal Reportable Quantities. (State reportable quantity of sodium hypochlorite = 10 lbs.; Federal reportable quantity = 100 lbs.)

The POM contacts the Shift Manager and directs him to call EPA's National Response Center within the next 15 minutes, and then to contact Massachusetts DEP within the next 2 hours to report the sodium hypochlorite spill in the containment area. He also contacts the MWRA Executive Office, the Operations Division, Public Affairs and ENQUAD department contacts as listed in the MWRA Emergency Directory, advising them of the situation.

The Incident Commander and the Maintenance Deputy Director consider possible solutions to the problem. One suggestion is to set up a pump with a line over the wall of the containment area so that the sodium hypochlorite can be pumped to the disinfection basins. The Incident Commander and Maintenance Deputy Director determine that Maintenance should pursue this option and begin work as soon as possible.

+1 hr, 30 min The Incident Commander contacts the Shift Manager and learns that although a shipment of sodium hypochlorite is on the way (to fill Tanks 1, 2 and 3), the barge is not due to arrive for a few days because of weather delays. The Shift Manager, in consultation with the Incident Commander, decides to arrange for an emergency shipment of sodium hypochlorite via tanker trucks from the

nearest supplier. Given the circumstances, delivery by tanker trucks would be the most suitable option to obtain hypochlorite quickly and restore chlorination capability. The tankers would directly feed disinfectant into the basins until Maintenance can fix the line, or until barges arrive to fill the other three storage tanks. According to the contract with DITP's primary hypochlorite vendor it could take 24 hours for the tanker trucks to arrive. **(Note: normally tanker trucks could arrive within two hours of an emergency request, but for purposes of the simulation the closest supplier is not considered available and a worst-case delivery time is set at 24 hours.)**

+ 1hr, 35 min The Shift Manager phones DITP's primary sodium hypochlorite vendor and orders an emergency shipment of sodium hypochlorite via tanker truck. He explains the severity of the situation and requests that the sodium hypochlorite be delivered as quickly as possible. Each truck holds approximately one day's worth of sodium hypochlorite (considering disinfection uses only). Shipments of tanker trucks should continue every six hours until the incident is resolved. The first truck will arrive in about 24 hours. In addition, it is confirmed that the barge will be arriving at Deer Island in about 72 hours.

The Shift Manager phones a backup vendor of sodium hypochlorite to see if it can get trucks to DITP in less than 24 hours. The backup vendor informs him that it is unlikely that it would be able to deliver sodium hypochlorite within 24 hours, and so the Shift Manager decides not to order a shipment from the backup vendor.

The Incident Commander designates the Process Control Manager to contact Laboratory Services, informing Lab personnel of the disinfection failure so that they are aware of the problem when taking their samples. Routine bacteria sampling of the effluent will continue as scheduled (*which for purposes of this simulation will result in a permit violation for fecal coliform and therefore a Contingency Plan warning level threshold exceedance*). **(Note: during a real treatment disruption, DITP will request that the lab conduct additional bacteria sampling if problems with treatment are anticipated; for purposes of this simulation, the lab continues with their routine sampling, since in the case of a complete chlorination failure little information would be gained by additional bacterial sampling.)**

+1 hr, 40 min The Incident Commander ensures that the sodium hypochlorite spill is confined to the containment area surrounding the tank, and appoints an operator to continually monitor the spill in order to determine that no leakage occurs outside of the containment area. The DITP Safety Manager secures the spill area so that only necessary personnel may enter.

+1hr, 45 min The Deputy Director of Maintenance assesses the feasibility of setting up a spare pump and throwing a new line over the containment area wall to pump hypochlorite out of the containment area. He is unable to obtain a hypochlorite

resistant line long enough to be suitable for the transfer. The supplies must be ordered and the vendor cannot deliver them until the following day.

He also begins to coordinate the repair of the line from the sump pump to the disinfection basin. He estimates that the line should be back in order in approximately 48 hours (24 hours to fix the line, plus a 24 hour cure time.)

The Incident Commander heads for the Deer Island Incident Command Center.

+1 hr, 55 min The Incident Commander designates an ICC member to complete the Level 3 phone call list (after consulting with the Shift Manager, who has already begun notification), from the MWRA Emergency Directory. Those to be notified include the NPDES Compliance Manager and Risk Management (since property damage has occurred).

+2 hr, 15 min *[At Charlestown Navy Yard (CNY), MWRA Headquarters]* The NPDES Compliance Manager or her designee contacts the DITP Process Monitoring Manager to gather more detailed information about the disinfection problem so that she is better informed before contacting the regulatory authorities.

[At CNY] Based on the information received about the Deer Island incident, the Field Operations Director of the Operations Division (formerly Deputy Director of the Sewerage Division), in consultation with the Chief Operating Officer (formerly the role of the Sewerage Division Director) and Executive Director, decides to activate the Emergency Operations Center (EOC). The EOC will manage the flow of information to parties outside the Agency.

+2 hr, 25 min *[At CNY]* The NPDES Compliance Manager determines that it is not necessary to consult with the regulatory agencies on the best course of corrective action. She notifies the regulatory authorities (MADEP, EPA, Division of Marine Fisheries (DMF)) and the Winthrop Board of Health of the loss of disinfection in the plant and inform them of the actions being taken to correct the situation.

Since the disinfection upset will run longer than 24 hours, and therefore likely result in a Permit violation for effluent fecal coliform, the ENQUAD Director notifies MWRA management that a Contingency Plan warning level threshold is likely to be exceeded.

+3 hr The ENQUAD Director carries out preliminary notifications to the OMSAP chair, the National Marine Fisheries Service (NMFS), the Food and Drug Administration (FDA), and the National Ocean Service (NOS). These notifications state that a Contingency Plan warning level exceedance is likely but has not yet occurred, and that formal notification will be made when results of plant sampling verify the exceedance.

- +4 hr, 25 min *[At CNY]* NPDES Compliance staff confer with DMF and it is agreed that adverse conditions monitoring will be conducted to measure fecal coliform levels in shellfish bed areas, as specified in the Memorandum of Understanding (MOU) between MWRA and DMF. According to the MOU, these surveys should be conducted during and/or immediately following a chlorination failure exceeding (or expected to exceed) 6 hours. The NPDES Compliance Manager alerts the Outfall Monitoring Program Manager.

- +4 hr, 50 min *[At CNY]* The Outfall Monitoring Program Manager or his designee contacts MWRA's monitoring consultant (currently Battelle Ocean Sciences) to schedule an adverse conditions monitoring survey the following day. Such a survey will take precedence over any other scheduled monitoring survey, and the monitoring consultant is required to identify both a prime and several backup survey vessels to ensure availability. As a final backup MWRA's 28 foot research vessel is also reserved for the following day so that Laboratory Services staff can collect the samples for DMF. *For the purposes of this simulation weather permits sample collection the next day. As with any field sampling, inclement weather or sea conditions could delay an adverse conditions survey.*

Day 2:

- +22hr Adverse conditions sampling for fecal coliform is conducted in the vicinity of the outfall.

- +24 hr, 50 min The first emergency shipment of sodium hypochlorite arrives via tanker truck.

- +24 hr, 55 min The tanker truck is parked near the disinfection basins. DITP Operations staff set up a metering pump, and make manual adjustments of the sodium hypochlorite flow every half-hour, based on 30-minute chlorine residual readings and the flow. (The operator takes chlorine residual samples at the effluent conduit every 30 minutes.)

The Incident Commander ensures that all staff are aware of their roles and responsibilities during the next 24 hours, until the line is fixed.

- +25hr, 15 min Hypochlorite is being pumped to the disinfection basins. The disinfection shutdown has lasted nearly 25 hours.

- +25hr, 30 min The Primary OPS supervisor informs Laboratory Services that sodium hypochlorite is being pumped from the tankers into the disinfection basin. Laboratory staff will report the chlorine residual results to the Operations staff who are manually adjusting the pump. (Chlorine residual results are available immediately and fecal coliform results are available in 24 hours.)

- +26 hr The Shift Manager contacts NPDES personnel to inform them that disinfection capabilities have returned.
- The Incident Commander contacts the EOC to inform them that disinfection capabilities have returned.
- +26 hr, 45 min *[At CNY]* The NPDES Compliance Manager or her designee notifies the regulatory authorities that the chlorination problem is under control, and that disinfection capabilities have returned to DITP.
- +27 hr Laboratory Services analysts finalize the results of the second effluent fecal coliform sample collected during the upset. They notify the NPDES Compliance Manager or her designee. The NPDES Compliance Manager calculates that the daily geometric mean coliform limit has exceeded 14,000 colonies/100 ml, and therefore constitutes both a NPDES permit violation and a Contingency Plan warning level exceedance. She notifies the ENQUAD Director, who in turn notifies MWRA Senior Management.
- +28 hr *[At CNY]* The NPDES Compliance Manager institutes formal notification of the exceedance to EPA, MADEP, DMF, OMSAP, NMFS, FDA, and the public (via the EPA listserv and a notice on the MWRA website) that the chlorination upset has led to a Contingency Plan warning level exceedance, that effluent chlorination has resumed, and that MWRA was collecting data to document the environmental extent and duration of any impact of the coliform exceedance.
- +30 hr, 35 min The second tanker truck arrives at Deer Island. Other trucks continue to arrive at approximately 6-hour intervals.

Day 3:

- +45 hr, 30 min Laboratory Services analysts finalize the results of the third consecutive effluent fecal coliform sample collected during the upset. They notify the NPDES Compliance Manager or her designee.
- +49 hr, 25 min The Deputy Director of Maintenance reports to the Incident Commander that the line from the sump to the disinfection basin has been repaired. The repair process has taken approximately 48 hours. The Incident Commander arranges for the tanker trucks to stop transferring sodium hypochlorite to the disinfection basin. The sump pump then begins pumping chemical from the containment area to the disinfection basin. This will continue until the entire containment area is empty of chemical (even after the barge arrives to fill up Tanks 2, 3 and 4. Any unused chemical in tanker trucks will be off-loaded into one of the available storage tanks.

Day 4:

+72hr The barge arrives with enough sodium hypochlorite to fill the empty storage tanks. (Barge capacity: 377,000 gallons. Storage tank capacity: 250,000 gallons.)

The following week:

The POM and Shift Manager assemble along with the DITP Director and his Deputy Directors to assess and document the incident. This documentation is submitted to the NPDES Compliance Manager, who then produces a written report and mails letters to the regulatory authorities (MADEP, EPA, and DMF) and other interested parties. A summary of actions is later prepared for the subsequent quarterly Wastewater Performance Report.

Day 30:

MWRA submits a report on the Contingency Plan Warning Level Exceedance to EPA, MADEP, DMF, OMSAP (full membership), NMFS, FDA, NOS, and the public. The report evaluates whether the un-disinfected effluent had an adverse environmental impact, and details steps MWRA will follow to prevent additional chlorination upsets in the future.

2.5 Performance Measures

Following a dry run of the simulation, all MWRA personnel who participated in the exercise attend a meeting to evaluate the effectiveness of the response plan and to make necessary modifications. Such modifications may include altering notification procedures or staffing reassignments.

Since the initial development of this plan, a dry run and subsequent evaluations have been conducted. A summary of the discussion and recommendations are included in Section 4 of this document.

3 Massachusetts Bay Simulation Plan: Red Tide Event

3.1 Background

The NPDES permit requires that MWRA test its notification procedures by simulating a red tide event. The response demonstrated as part of this simulation plan would be similar for many environmental threshold exceedances described in the Contingency Plan.

3.1.1 Biology of red tide

In Massachusetts, common usage of the term “red tide” refers to a bloom of the dinoflagellate *Alexandrium tamarense* that can contain saxitoxin. Humans can experience paralytic shellfish poisoning (PSP) from eating filter-feeding bivalve mollusks that have fed on plankton

communities containing the toxic dinoflagellate, or from eating predatory gastropods that have fed on these mollusks. The term “red tide” is misleading because *A. tamarensis* can cause toxicity at levels as low as 300 cells/L, which is far below levels where it would actually discolor the water.

According to the plume-advection hypothesis (Franks and Anderson 1992), *A. tamarensis* blooms that have the potential to affect Massachusetts Bay typically originate in western Maine waters in April-May. They are brought toward Massachusetts Bay in May-June on wind-driven low-salinity surface currents. Sustained northeast winds can then transport surface waters and the organism into Massachusetts Bay. A southwest wind keeps the organism out of the Bay and transported toward Georges Bank. Blooms later in the year, or blooms in eastern Maine waters do not typically reach Massachusetts Bay (Anderson 1997, Cibik et al. 1998).

In the context of the plume-advection hypothesis, several oceanographic conditions must co-occur for an *A. tamarensis*-bearing coastal plume to enter the Massachusetts Bay system. Red tide events here are sporadic, sometimes occurring 3-4 years in a row and then disappearing for several years. The last outbreak of *Alexandrium*-related shellfish bed closures in the Massachusetts Bay system was in 1993 (Whittaker pers. comm.).

3.1.2 Regional monitoring of red tide

Knowledge of events outside of Massachusetts Bay provides an early indication of potential red tide events and causes the Massachusetts Division of Marine Fisheries (DMF) to increase its vigilance at key shellfish beds. The Maine Department of Marine Resources conducts the most extensive PSP monitoring program in the country (Shumway et al. 1988) and communicates every few days with DMF from April to November to provide an early indicator of the potential for an *A. tamarensis* bloom in Massachusetts Bay. This would place DMF on a “watch level” of alert leading to more frequent communications. Contingent upon funding, researchers at the Woods Hole Oceanographic Institution (WHOI) also participate strongly in the network of agencies that deal with this problem. WHOI analyzes the wind data to predict the path of any blooms from Maine that approach Massachusetts Bay, and conducts sophisticated studies to reveal the physical, chemical, and biological aspects of bloom development.

Massachusetts state agencies take steps to minimize the risk of PSP to humans. DMF carefully monitors for the presence of PSP toxicity in shellfish beds and, in the event of contamination, closes those beds. Mussels are collected on a weekly basis from April to November at 15 primary monitoring stations, with additional stations and additional species sampled depending on results from the primary stations (DMF 1999). Shellfish beds are closed when PSP toxicity reaches 80 µg saxitoxin-equivalents per 100 g of shellfish meat. The beds are reopened after 3 consecutive samples collected over a period of at least 2 weeks have demonstrated toxin levels less than 80 µg and are steadily decreasing. DMF may take more stringent steps, closing shellfish beds at levels below 80 µg/100g and conducting more extensive monitoring. An additional line of defense for consumers is that the Massachusetts Department of Public Health (DPH) monitors shellfish in the marketplace, including Massachusetts-grown as well as those

from out of state, and embargoes any that are contaminated. DPH as well as DMF conduct their PSP toxicity monitoring under strict guidelines mandated by the US Food and Drug Administration through the National Shellfish Sanitation Program.

The shellfish monitoring in Maine and in Massachusetts is supplemented by a pilot program of trained observers who qualitatively assess the relative abundance and distribution of *A. tamarensis* in nearshore waters (adjacent to shellfish beds) at numerous sites weekly throughout the year using instant-results microscopy. The phytoplankton measurements provide another warning of potential PSP problems and may trigger special shellfish measurements; the phytoplankton measurements collected by the pilot program do not in themselves lead to bed closure because they have not been strongly correlated with shellfish toxicity.

3.1.3 MWRA red tide monitoring

State agency and research institution efforts form the core of Massachusetts' response to red tides. However, because concerns were raised during MWRA's Outfall Monitoring Program development that effluent discharge from outfall T01 might somehow enhance or prolong red tide blooms in Massachusetts or Cape Cod Bays, MWRA includes *Alexandrium tamarensis* as one of the targets of its water column monitoring. MWRA's monitoring activities, detailed below, are designed to complement ongoing regional programs. MWRA has been regularly sharing ongoing monitoring information with that core group (and any other interested parties) and will continue to do so.

MWRA routinely collects water samples for enumeration of phytoplankton including *A. tamarensis*. Nearfield samples are collected at two depths at two stations (N04 and N18) during 17 surveys per year, and at a third Nearfield station (N16) during six of those 17 surveys per year. Ten Farfield stations sampled six times per year (Figure 2).

Two types of microscopy counts are routinely conducted (Albro et al. 1998). One water sample from the mid-depth at station N18 is sent to the laboratory for a rapid semiquantitative count (a quick scan of the microscope slide to get a subjective impression of relative abundance); results are e-mailed to MWRA, DMF and WHOI within one week of the completion of the survey. Counts on the remaining samples (including a replicate of the rapid-analysis sample) are fully quantitative; results are routinely delivered to MWRA within 60 days of the last survey in a season.

If there is an indication of a red-tide problem, MWRA takes steps to accelerate data analysis. Whenever the rapid-analysis sample from N18 shows abundant *A. tamarensis* or if DMF detects PSP toxicity in Massachusetts or Cape Cod Bays, MWRA accelerates reporting of selected quantitative results to 2 weeks after the end of a survey. MWRA is evaluating whether to incorporate the methods used in DMF's phytoplankton pilot program at a broad range of stations and to collect additional screened phytoplankton samples for quantitative analysis. Such a tiered approach to phytoplankton monitoring would facilitate decisions about sampling by MWRA, DMF, and WHOI; provide information relevant to transport of red tide into the Bay; and help determine if the outfall enhances abundance.

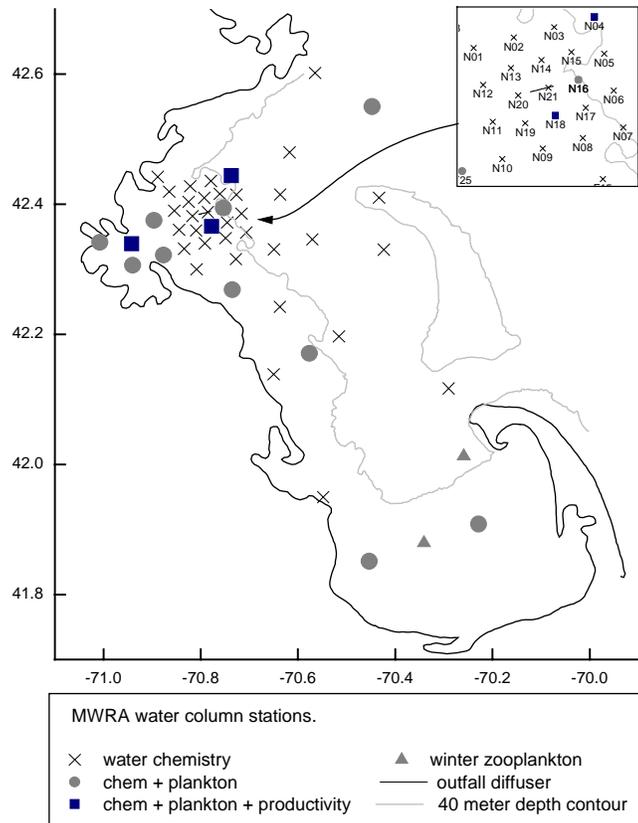
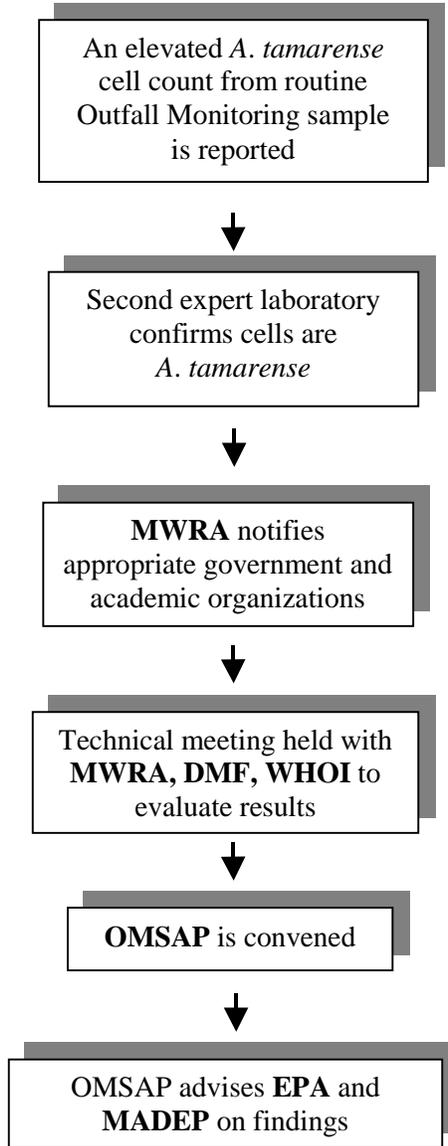


Figure 2. MWRA water column sampling stations.

3.2 Scenario Overview

1. MWRA's consultant for outfall monitoring (currently Battelle Ocean Sciences) notifies the MWRA Outfall Monitoring Program Manager (Figure 3) of an unusually high concentration of *A. tamarensis* in microscopically examined water samples.
2. The consultant sends a subsample of the sample in question to a second expert laboratory (currently WHOI) for corroboration of the taxonomic identification.
3. MWRA provides a notice of the elevated cell counts to the contact list (Section 3.3) as quickly as possible. The wording of the notice will emphasize that this is not a notice of closure of a shellfish bed, which is entirely the responsibility of DMF, but rather a report of MWRA's examination of the potential stimulation of an *Alexandrium* bloom by the outfall. A draft of such a notice appears in Appendix F of this plan.
4. MWRA convenes a technical meeting of its consultant monitoring team, DMF, and WHOI to evaluate retrospectively the results (i.e. to check the data and calculations) and to examine supporting data relevant to patterns and cause of the red tide. MWRA provides a summary of this meeting to those listed in Section 3.3.
5. MWRA participates in any meetings, workshops, or deliberations convened by OMSAP and the regulators to further evaluate the results.
6. OMSAP advises EPA and DEP on findings.

Figure 3. Flowchart for simulation of red tide event in Massachusetts Bay.



3.3 List of Expected Participants

Environmental Protection Agency (EPA)

Janet Labonte-Deshais, Matthew Liebman, and Eric Hall
(EPA may relay communications beyond this contact list via its listserver)

Maine Department of Marine Resources

John Hurst or Laurie Bean

Massachusetts Department of Environmental Protection (MADEP)

Steven Lipman and Cathy Coniaris

Massachusetts Department of Marine Fisheries (DMF)

Michael Hickey and David Whittaker, or Jeff Kennedy and Jack Schwartz

Massachusetts Department of Public Health (DPH)

Richard Waskiewicz or Paul Tierney

Food and Drug Administration (FDA)

Martin Dowgert

Massachusetts Water Resources Authority (MWRA)

Executive Office: Pam Heidell (primary), Kate Murray (secondary),
Douglas MacDonald (tertiary)

Public Affairs: Jonathan Yeo

Law Division: Nancy Kurtz (primary), Lauren Sloat (secondary),
Christopher John (tertiary)

Operations Division: Michael Hornbrook

ENQUAD staff

Outfall Monitoring Program Manager: Michael Mickelson

Water Quality Program Manager: Ken Keay

NPDES Compliance Manager: Grace Bigornia-Vitale

Battelle Ocean Sciences (under contract to MWRA): Carlton Hunt or Heather Trulli

MWRA permit web page: Wendy Leo or Sally Carroll

National Marine Fisheries Service (NMFS)

Salvatore Testaverde

Outfall Monitoring Science Advisory Panel (OMSAP), full membership

NOAA/NOS, Stellwagen Bank National Marine Sanctuary (SBNMS)

Craig MacDonald

Woods Hole Oceanographic Institution (WHOI)

Donald Anderson or Bruce Keafer

Notifications will be made by the Outfall Monitoring Program Manager or his designee

3.4 Scenario for Red Tide Event

3.4.1 An historical example

Conditions of this red tide scenario mirror those of 1993, a year when shellfish toxicity was quite high within Massachusetts Bay, and extended to some inner Cape stations.

During the 1993 red tide event, Maine DMR first detected PSP toxicity in mussels on May 3 in western Gulf of Maine. DMF detected PSP toxicity in some samples of mussels just north of Cape Ann from May 3 through October 11, peaking at 304 ug/100g on June 7 at Ipswich. Toxicity also peaked within Massachusetts Bay at that date, with even higher levels (393 ug/100g at Cohasset); toxicity was detected in the Bay from May 12 to September 20. The highest level in Cape Cod was 93 ug/100g at Sandwich on June 21 (DMF unpublished data). MWRA monitoring during this period detected 55 cells/L of *A. tamarensis* in the nearfield on May 21 and 163 cells/L in Cape Cod Bay on June 24.

WHOI then conducted surveys from Maine to Cape Cod on 4/12, 4/27, 5/12, 5/25, and 6/5 and measured abundances of *A. tamarensis* roughly corresponding to PSP toxicity in shellfish. In Massachusetts Bay the levels were highest (200 cells /L) during the last 2 surveys in western Massachusetts Bay. There was evidence of a coastally trapped buoyant plume from Maine entering Massachusetts Bay based on patterns of salinity, the track of one of 3 drifters, and the dominant northeast wind direction. The wind compressed the plume against the shore north of Cape Ann, along with its burden of *A. tamarensis* cells, and then pushed it into the Bay (Anderson and Keafer 1995).

After the plume entered Massachusetts Bay in 1993, the wind slackened and rain/runoff lessened, decreasing the driving forces behind the buoyant coastal current, and increasing the residence time of water in the Bay. *A. tamarensis* thus persisted in the Bay for two months - longer than seen in other years. The especially high cell concentrations in western Massachusetts Bay coupled with the high PSP toxicity at Cohasset suggested that there was some growth of the organism in the Bay or that the cells were physically concentrated there (Anderson and Keafer 1995).

3.4.2 The scenario

For the purpose of this simulation, the first indication of a red tide event begins with identification by DMF of PSP toxicity within the Bays system on May 12. DMF staff share the result with MWRA, which notifies its consultant to accelerate relevant analyses, emphasizing the need for rapid quantitation of *Alexandrium* levels in samples from upcoming surveys. Therefore for purposes of this exercise the cell count from May 21 in the nearfield will be assumed to be elevated, at 200 cells/L. On May 24, operating under the accelerated schedule requested by MWRA, MWRA's subcontracted phytoplankton taxonomist estimates the phytoplankton count in the qualitative rapid-analysis sample from station N18 and emails the results to MWRA, DMF, and WHOI. Because this sample contains approximately 200 cells/L of *A. tamarensis*, it confirms the need for rapid processing of the quantitative samples

from that survey (stations N18 and N04, surface and mid-depth). A sample split is sent to an independent laboratory to confirm the identification. Assume the identification is corroborated by a second laboratory.

MWRA routinely specifies a one-week settling time (to concentrate the phytoplankton cells) before performing quantitative microscopic counts. On May 28, the consultant taxonomist counts the four quantitative screened samples collected in the nearfield on May 21 and confirms that cell counts are elevated.

- May 28, 12:00 PM Preliminary analysis by MWRA's consultant taxonomist indicate elevated cell counts of *A. tamarensis* from samples collected in Massachusetts Bay. He notifies the manager of MWRA's Outfall monitoring consultant team, who verifies the calculations and notifies MWRA's Outfall Monitoring Program Manager.
- May 28, 3:00 PM The Outfall Monitoring Program Manager and the Water Quality Program Manager notify individuals on the contact list of the elevated results. The wording of the notice emphasizes that this is not a notice of closure of a shellfish bed, which is entirely the responsibility of DMF, but rather a report that MWRA is examining the potential for stimulation of a red tide by the outfall.
- May 30, 9:00 AM MWRA convenes a technical meeting of its consultant monitoring team, DMF, and WHOI to retrospectively evaluate the results (i.e. to check the data and calculations) and to examine supporting data relevant to patterns and cause of the red tide. They prepare a two-page summary including graphs and tables.
- May 31, 12:00 PM MWRA submits the two-page summary to those listed in Section 3.3.
- June 3, 10:00 AM OMSAP convenes a special meeting. MWRA briefs OMSAP on the results and includes all supporting information. OMSAP deliberates and advises EPA and MADEP as to the need for additional studies or monitoring.

3.5 Performance Measures

Following a dry run of the simulation, all MWRA personnel who participate in the exercise attend a meeting to evaluate the effectiveness of the response plan and to make necessary modifications. Such modifications may include altering notification procedures or staffing reassignments.

Since the initial development of this plan, a dry run and subsequent evaluations have been conducted. A summary of the discussion and recommendations are included in Section 4 of this document.

4 Summary of Simulation Plan Exercises

For each of the chlorination failure and red tide simulations, a draft scenario was written and reviewed by MWRA staff, EPA, MADEP, DMF and NMFS. A separate dry run of each scenario was then conducted. Following the exercises, a series of evaluation meetings were held, with participants of each simulation in attendance. MWRA staff, EPA, MADEP and NMFS participated in the evaluations. Sections 1, 2, and 3 of this document (in addition to separate MWRA notification plans) were then edited to incorporate comments received during the evaluation process.

4.1 Chlorination Failure Simulation

4.1.1 Summary of Events

Prior to the start of the simulation, each participating department was provided with a customized script informing staff members of details necessary to allow the simulation to proceed such that a Level 3 incident would occur, and so that a Contingency Plan threshold was exceeded. In order to test existing intra- and inter-department communication procedures, staff did not receive specific information concerning whom to contact or when to make notifications; they were informed of certain lab tests which must exceed limits, equipment/systems which must fail, etc. Other than the NPDES Compliance Manager and the Field Operations Director, participants did not know in advance when the simulation would occur.

The chlorination failure simulation was initiated on the morning of August 17, 2000. Deer Island staff followed the pre-existing Integrated Contingency Plan (the "Core Plan") once the simulation began (see Appendix B). All actions taken and notifications made by Deer Island staff were carried out according to the Core Plan. Although the chlorination failure was meant primarily to test communication between field staff, management, other departments, and regulatory agencies, Deer Island management took the opportunity to use this simulated incident as a plant-wide drill, actually deploying staff to the site of the incident to investigate, communicating with the Winthrop Fire Department and Coast Guard, and mobilizing staff to initiate repairs.

The simulation proceeded according to the chronology detailed in Section 2. A brief summary of the events follows.

1. The chlorination failure was initiated by a call from the Field Operations Director to Primary Operations on Deer Island at approximately 8:30 AM on Thursday, August 17, 2000. DITP Primary Operations staff "discovered" a rapid drop in sodium hypochlorite levels.
2. Staff were immediately dispatched to the site to investigate. They determined that there was a major rupture in one of the four sodium hypochlorite storage tanks, and the chemical was spilling out into the containment area. Per the simulation scenario, the three other

storage tanks were empty, awaiting refill from a barge that has been delayed due to severe weather off the mid-Atlantic coast.

3. Per the simulation scenario, it is subsequently discovered that the line from the containment area sump to the disinfection basin is out of service. Since there is no way for sodium hypochlorite to be transferred to the disinfection basin, there will be a temporary loss of disinfection.
4. At approximately 9:00 AM, Deer Island's Incident Command Center was activated, and the incident was classified as a Level 3 incident (a threat to public health and safety and interagency coordination required).
5. At approximately 9:30 AM, Deer Island Plant management initiated internal notification and contacts appropriate external parties, including the Winthrop Fire Department, the Coast Guard, EPA and MADEP (for hazardous spill notifications).
6. At approximately 10:00 AM, after being notified by Deer Island staff of the incident, ENQUAD carries out regulatory notification of the chlorination failure.
7. At approximately 10:30 AM, the Shift Manager ordered emergency shipments of sodium hypochlorite to arrive via tanker truck (as described in the simulation scenario in Section 2). The delivery was expected to arrive in 24 hours. *(The delay in hypochlorite delivery was for the purposes of the simulation only. On the day of the simulation, a tanker truck of hypochlorite could have arrived in two hours.)*
8. At about 10:30 AM, at the request of the Division of Marine Fisheries, the Outfall Monitoring Manager made arrangements with MWRA's outfall monitoring consultant (Battelle Ocean Sciences) to conduct bacteria sampling in the area of the outfall that afternoon.
9. The following day, August 18 at about 7:00 AM, the first shipment of hypochlorite arrived and the chemical was pumped from the truck directly into the disinfection basin. Chlorination of effluent resumes by 8:00 am.
10. Laboratory Services staff continued routine effluent sampling throughout the disinfection failure. Two samples collected on August 17 had no chlorine residual. On August 18, after contacting the lab for the bacterial counts of these two samples, the ENQUAD Director determined that the daily geometric mean coliform for the previous day violated the NPDES permit limit for fecal coliform, triggering a Contingency Plan warning level threshold exceedance.
11. Between 11:00 am and 1:00 PM on August 18, ENQUAD staff carried out notifications to regulators and to OMSAP of the warning level threshold exceedance.

Chlorination Failure Simulation, August 17, 2000: Exceedence of Fecal Coliform Threshold

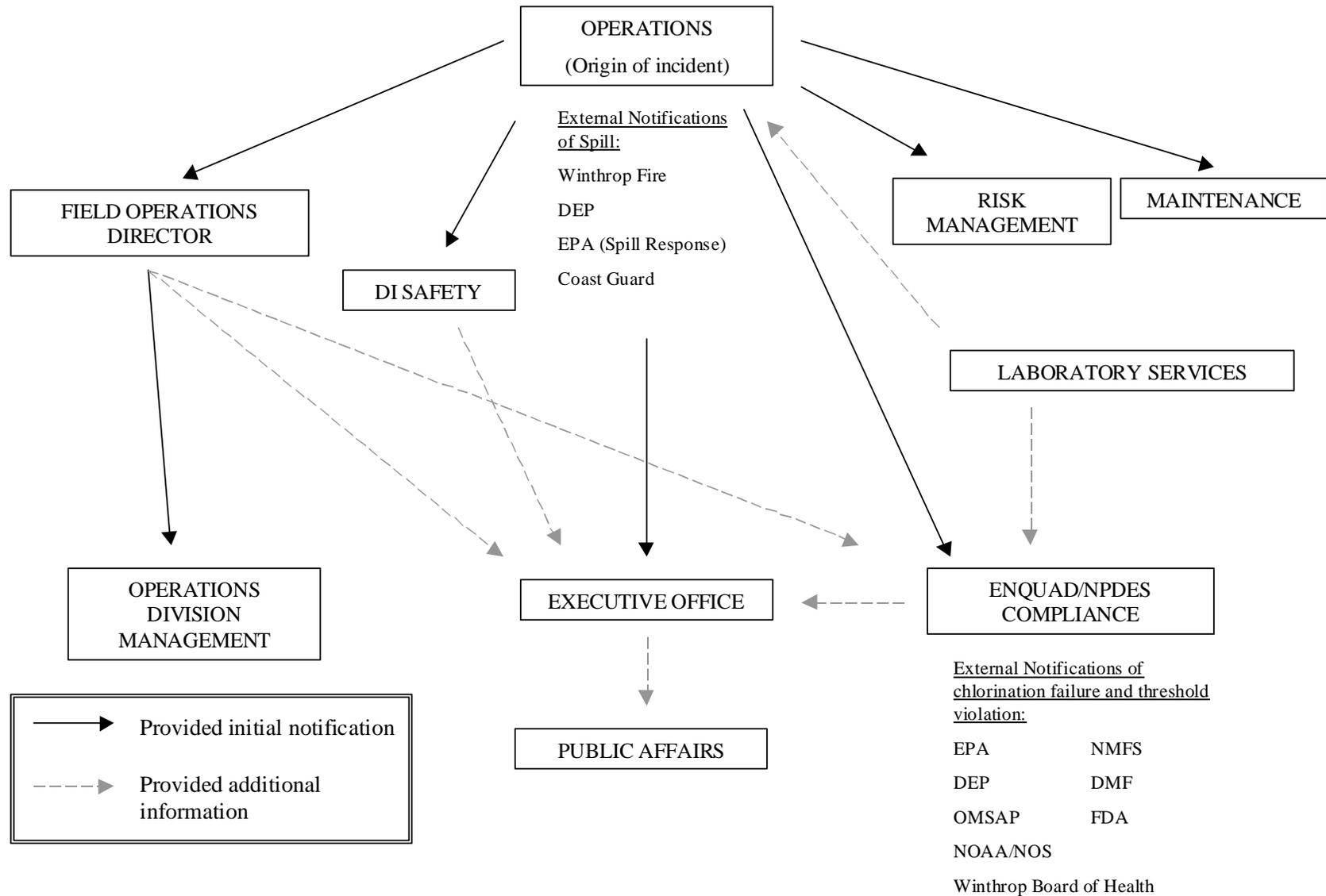


Figure 4. Communication flowchart for chlorination failure dry run

4.1.2 List of Participants

An agency-wide reorganization at the MWRA, as well as updated contact information from EPA and MADEP, resulted in some changes from those contacted for the chlorination failure dry run. The List of Participants in Section 2.5 was updated accordingly. An updated list of contacts is also provided in ENQUAD's Notification Plan, included as Appendix D of this document.

Environmental Protection Agency (EPA)

Eric Hall, Janet Labonte-Deshais

Massachusetts Department of Environmental Protection (MADEP)

William Cashins, Kevin Brander

Massachusetts Department of Marine Fisheries: Jeff Kennedy

Winthrop Board of Health: Virginia Wilder

Food and Drug Administration: Mary Yebba

National Marine Fisheries Service: Salvatore Testaverde

Stellwagen Bank National Marine Sanctuary (SBNMS): Anne Smrcina

Outfall Monitoring Science Advisory Panel (OMSAP): full membership (see Appendix D)

Massachusetts Water Resources Authority (MWRA)

Executive Office: Kate Murray

Law Division: Nancy Kurtz, Christopher John

Operations Division: Rick Trubiano

Risk Management: Gerry Lima

Emergency Operations Center (EOC) members: John Riccio, Mark Sullivan

Deer Island Treatment Plant Staff (DITP):

DITP Director: John Vetere

DITP Primary Operations staff

DITP Area Supervisor: Tim Carrignan

DITP Shift Manager (and Incident Commander): Arthur Smith

Process Operations Manager (POM): William Waitt

Deputy Director of Maintenance: Gerald Gallinaro

Deputy Director of Operations: Anthony Kucikas

DITP Safety Manager: Nicholas Dematteo, Michael Strangie

ENQUAD Staff:

ENQUAD Director: Andrea Rex

NPDES Compliance Manager: Grace Bigornia-Vitale

Outfall Monitoring Program Manager: Michael Mickelson

Water Quality Program Manager: Ken Keay

Laboratory Services staff: Lisa Wong, Ethan Wenger, Nicole O'Neill

Battelle Ocean Sciences (BOS), under contract with MWRA for Outfall Monitoring:

Carlton Hunt

Winthrop Fire Department

Coast Guard, Marine Safety Office, Boston

4.1.3 Evaluation of simulation

On September 15, 2000, participants of the chlorination failure simulation assembled to discuss the details of the simulation and evaluate its success.² Participants included representatives from DITP operations, the DITP laboratory, ENQUAD, the Law Division, and the MWRA Executive Office. Participants concluded that the simulation was successful, and agreed that the Deer Island Contingency Plan adequately provided guidance to staff in the event of a plant emergency. DITP staff noted that field inspections would have occurred in less time than was specified in the scenario. They also pointed out that in a real treatment emergency, communications would have been more rapid and more frequent than those specified in the Simulation Plan. Nevertheless, there were several communication problems that occurred during the simulation which were discussed during the debriefing. The issues were related primarily to inter-departmental communication. These issues were resolved during the meeting, and remedies are noted below.

Chlorination Failure Issue #1	Operations did not notify the laboratory or Process Monitoring Manager of the chlorination failure, as specified in the Simulation Plan.
Explanation:	This procedure was not part of the Deer Island Integrated Contingency Plan, the pre-existing emergency plan used by Operations staff during the simulation.
Remedy:	Deer Island's Integrated Contingency Plan is being modified to include notification of the laboratory and Process Monitoring.
Chlorination Failure Issue #2	The Laboratory and NPDES Compliance Manager, as members of the Pollution Prevention Team, were not notified of the spill by the Safety Department.
Explanation:	An oversight by the Safety Department. They knew that Operations had already notified NPDES Compliance and decided they did not need to call.
Remedy:	The Safety Department will ensure their notification lists include the Laboratory and NPDES Compliance.
Chlorination Failure Issue #3	The Environmental Quality Department (ENQUAD) was not verbally notified by the laboratory of high bacteria counts that resulted from the chlorination failure, only notified by a secondary email system used by the lab.
Explanation:	The current laboratory SOP specified notification by laboratory system email only.
Remedy:	The laboratory SOP has been modified to include notification of high bacteria counts in effluent by phone, as well as notification via MWRA's primary email system.
Chlorination Failure Issue #4	A formal Adverse Conditions Survey Plan had not been developed with consultant and Deer Island laboratory.
Remedy:	Consultant developed formal plan and it was accepted by MWRA in September 2000.
Chlorination Failure Issue #5	ENQUAD failed to notify the Public Affairs department
Remedy:	The ENQUAD notification plan has been modified to include verbal notification of Public Affairs regarding any permit compliance issues.

² Participants of the internal debriefing included: Executive Office: Victor L'Esperance; Operations: Richard Trubiano, David Duest, Nicholas Dematteo, Anthony Kucikas; ENQUAD: Andrea Rex, Grace Bigornia-Vitale, Mark Sullivan, Michael Mickelson, Ken Keay, Kelly Coughlin; Law: Christopher John; Laboratory Services: Steven Rhode.

4.2 Red Tide Simulation

4.2.1 Summary of Events

The red tide event simulation was primarily a test of the ability of ENQUAD staff to communicate information to regulatory agencies and OMSAP. The red tide simulation required less inter-departmental communication than the chlorination failure simulation. A partial draft of the ENQUAD notification plan was used as the primary guidance document to carry out notifications (an updated copy of the notification plan is in Appendix D). In addition, ENQUAD staff members were provided with customized scripts that informed staff members of details that would allow the simulation to proceed.

The red tide simulation was initiated on the morning of Friday, August 18, 2000. The simulation proceeded as described in Section 3. A brief summary of the events follows.

1. On the morning of August 18, MWRA's consultant for Outfall Monitoring (currently Battelle Ocean Sciences) notified the MWRA Outfall Monitoring Program Manager of an unusually high concentration of *A. tamarensis* in microscopically examined water samples.
2. The Outfall Monitoring Program Manager requested that the Consultant organize and convene a technical workshop as soon as possible. Attendees of the workshop will include WHOI, DMF, Battelle consultants, and MWRA. An acceleration of processing of remaining samples from that survey was also requested.
3. Deer Island was contacted by the NPDES Compliance Manager to determine if the plant had been functioning normally prior to and during the time of sample collection.
4. On the afternoon of August 18, MWRA provided a notice of the event to the contact list (Section 3.3) by telephone as quickly as possible. Organizations contacted included WHOI, DMF, FDA, Mass. DPH, EPA and MADEP.
5. On the afternoon of August 18, MWRA Operations Division managers determined that the Emergency Operations Center should be activated, to coordinate activities between MWRA departments, the public and regulatory agencies.

4.2.2 List of Participants

Since the red tide dry run was conducted, an agency-wide reorganization at the MWRA, as well as updated contact information from EPA and MADEP, resulted in changes in notification procedures. An updated list of contacts is provided in ENQUAD's Notification Plan, included as Appendix D of this document.

Environmental Protection Agency (EPA):

Janet Labonte-Deshais, Matthew Liebman

Maine Department of Marine Resources: John Hurst

Massachusetts Department of Environmental Protection (MADEP):

Russ Isaac, Tom Mehan

Massachusetts Department of Marine Fisheries (DMF)

Michael Hickey, Dave Whittaker, and Jack Schwartz

Massachusetts Department of Public Health (DPH): Richard Waskiewicz

Food and Drug Administration (FDA): Mary Yebba

Massachusetts Water Resources Authority (MWRA)

Executive Office: Doug MacDonald

Public Affairs: Jonathan Yeo

Law Division: Christopher John

MWRA Operations Division: Michael Hornbrook, Richard Trubiano

ENQUAD staff:

Outfall Monitoring Management: Michael Mickelson and Ken Key

NPDES Compliance: Grace Bigornia-Vitale

Battelle Ocean Sciences (under contract to MWRA): Carlton Hunt

National Marine Fisheries Service (NMFS): Salvatore Testaverde

Outfall Monitoring Science Advisory Panel (OMSAP): full membership (see Appendix D)

NOAA/NOS, Stellwagen Bank National Marine Sanctuary (SBNMS): Sandy Dentino

Woods Hole Oceanographic Institution (WHOI): Donald Anderson

4.2.3 Evaluation of simulation

On September 8, 2000, ENQUAD staff met to evaluate the simulation.³ Participants concluded that the simulation was a useful exercise, as it highlighted the need for detailed communication procedures, and the need to resolve notification issues with the regulators and OMSAP.

Problems discussed in this meeting are described below.

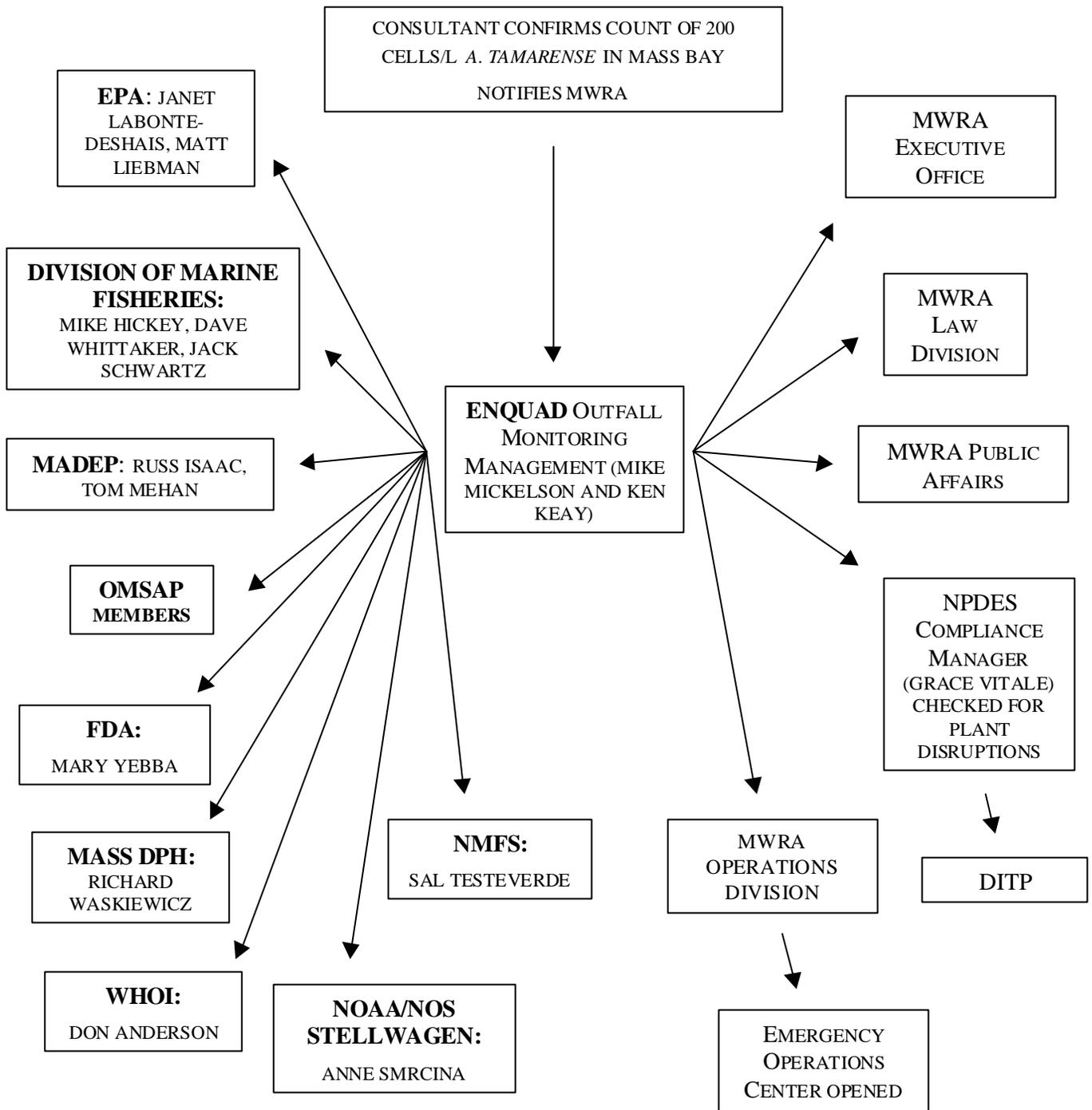
Red Tide Issue #1	The notification list was not up-to-date. Backup contacts were not specified for all agencies to be contacted.
Remedy:	Notification list was updated, but MWRA needs clarification regarding some regulatory agency contacts.

Red Tide Issue #2	The Emergency Operations Center, used by MWRA in the event of treatment system disruptions to coordinate between departments and the public, may not be appropriate to address less discrete, more long-term issues such as red tide.
Remedy:	MWRA departments will decide how to coordinate communication within and outside MWRA, especially with regard to public notification of Contingency Plan exceedances.

Since this meeting, Issue #1 has been resolved, and alternate contacts have been specified for all regulatory agencies in the ENQUAD Notification Plan. As of this writing, Issue #2 remains under discussion.

³ ENQUAD staff participated in the internal debriefing: Andrea Rex, Grace Bigornia-Vitale, Michael Mickelson, Ken Key, and Kelly Coughlin.

Red Tide Simulation, August 18, 2000



(Notifications are shown in no particular order)

Figure 5. Communication flowchart for red tide simulation dry run.

4.3 Issues pertaining to both simulations

Following the MWRA internal debriefing meetings for the red tide and chlorination failure simulations, a final debriefing meeting was held with EPA, MADEP, NMFS, the MWRA Executive Office and Law Division, and ENQUAD staff on October 24, 2000.⁴ In addition to those listed in Sections 4.1.2 and 4.2.2, the following issues were discussed:

Simulation Plan Issue #1	There is a need for a coordinated response among regulatory agencies, MWRA, and OMSAP to address public communication issues.
Remedy:	This problem will need to be addressed with regulatory agencies and OMSAP.

Simulation Plan Issue #2	ENQUAD needed to know the appropriate way to notify OMSAP members of threshold exceedances (<i>i.e.</i> whether to notify an OMSAP representative or to notify each member individually; what actions are appropriate if members cannot be reached by phone).
Explanation:	No formal notification procedure had been developed for OMSAP members.
Remedy:	This problem will need to be addressed at a future OMSAP meeting.

Simulation Plan Issue #3	OMSAP members, upon being contacted by MWRA of the threshold exceedance, wanted to know how to determine an appropriate response.
Explanation:	As above, no notification procedure had been developed for OMSAP members.
Remedy:	This problem will need to be addressed at a future OMSAP meeting.

Subsequent to the October 24 meeting, EPA and MADEP provided additional guidance to MWRA regarding alternate contacts and other procedural issues, which have been incorporated into the ENQUAD Notification Plan. At an OMSAP meeting held on November 16, OMSAP members discussed options for communication, but no final conclusions were made regarding communication procedures. One member pointed out that the level of response by OMSAP, when addressing Contingency Plan warning and caution level exceedance (e.g., in the form of technical meetings or conference calls), is dependent on the severity and type of exceedance. Communication procedures for OMSAP members will be discussed further at future OMSAP meetings.

5 References

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Anderson DM. 1997. Bloom dynamics of toxic *Alexandrium* species in the northeastern US. *Limnol. Oceanogr.* 42(5):1009-1022.

⁴ Participants of the debriefing meeting included: EPA: Janet Labonte-Deshais; MADEP: Steven Lipman and Catherine Coniaris; NMFS: Salvatore Testeverde; MWRA: Grace Bigornia-Vitale, Pamela Heidell, Christopher John, Jonathan Yeo, Michael Mickelson, Ken Keay, Mark Sullivan, and Kelly Coughlin.

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APPENDIX A: Operations Division Emergency Response Guide

Operations Division Emergency Response Guide is not available electronically; hardcopies available upon request.

APPENDIX B: Excerpt from Deer Island Integrated Contingency Plan

MWRA Deer Island Treatment Plant Integrated Contingency Plan, Section 7.0: Notification. Prepared for MWRA by Green Environmental. The Plan is not available electronically; hardcopies available upon request.

APPENDIX C: MWRA Emergency Directory

Not electronically available; hardcopies are available upon request.

APPENDIX D: ENQUAD Notification Procedures

Massachusetts Water Resources Authority Environmental Quality Department Notification Plan

December, 2000

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Massachusetts Water Resources Authority Environmental Quality Department Notification Plan

1. Purpose

The purpose of this plan is to enable Environmental Quality Department staff to notify all other MWRA departments, regulators, and others efficiently and effectively in the event of a permit violation, contingency plan violation, sewer system overflow, operational upset or public health threat.

2. Procedures

- a. Telephone and mailing lists to be used for notification appear in Appendices A through G. Section 3 below describes which contact list should be used, depending on the incident to be reported.
- b. Each staff member should keep a copy of this plan accessible.
- c. When notified of a reportable incident, forward the information to the ENQUAD staff member responsible for that type of incident. If the staff member is not or will not be available within the reporting deadline, proceed with notifications as specified in the plan.
- d. If you are unable to contact someone on the list by phone, leave an email message.
- e. Once notified, you (or the appropriate ENQUAD staff member assigned to a particular notification) are responsible to make notifications within 24 hours in the event of an operational upset, within 5 days in the event of a contingency plan exceedance.
- f. If the person you are attempting to contact has a phone answering machine, leave the message on their machine with the additional instruction to contact you to confirm that s/he has received the recorded message.
- g. If more than one staff member is making notifications of an incident, write up a brief script and share with all staff prior to making notifications to ensure consistency.

3. Reportable Incidents

A. Reportable Incidents, Treatment System

Calls received by ENQUAD staff members notifying them of reportable incidents must be logged in the Notification Logbook, located in the office of the Senior Program Manager, NPDES Compliance. The action taken must also be documented in the Logbook. An incident report may have to be prepared depending on the complexity of the incident. (Typically the incident reports are prepared by operations staff at the request of MWRA management or NPDES staff.) Regulators must be notified of treatment bypass or use of an emergency outfall by phone within 24 hours. DEP and EPA require that this be followed by written notification that must be received within 5 business days of the incident. The regulators to be notified in the event of one of these incidents are identified in Contact List B. **The following are not considered contingency plan exceedances.**

I. Operational upset

Operational upsets include: disinfection failure, equipment failure that effects effluent quality, or spills (or potential spills) of toxic chemicals into the sewer system. Deer Island Primary OPS will contact the NPDES Compliance Manager or her designee (see contact list, below).

Generally, for notification to occur, the upset should result in an actual or potential impact on effluent quality. The NPDES Compliance Manager will decide if and when regulators should be notified (notifications are usually carried out by Mark Sullivan).

II. Relief Outfall discharges

Deer Island: 005, 004, 002, 001; Nut Island: 101, 102, 103, Spillway

The NPDES Compliance Manager or her designee will be notified of activations of Deer Island relief outfalls by Deer Island Primary OPS (usually Mark Sullivan is notified by Primary OPS). Activations at Nut Island outfalls will be communicated by the Nut Island Headworks Operator.

III. Sanitary Sewer (SSO) discharges

A member of the Metering Unit will notify ENQUAD staff (usually Mark Sullivan or Grace Vitale) of any SSO activations.

B. Contingency Plan Exceedences

There are two types of Contingency Plan Exceedences: caution level and warning level exceedences. Warning level exceedences require MWRA to determine whether there are any adverse environmental impact from such exceedance, to evaluate the extent to which MWRA contributes to any such impacts, and to develop a plan to address the impacts. Caution level exceedences are slightly less stringent, and indicate the need for increased study, with the possible need for operational adjustments.

If any parameter listed below exceeds either the caution level or warning level, notifications must be carried out with 5 days after the result becomes available. The result MUST be approved by the Central Laboratory, or appear on an official deliverable approved by the consultant laboratory/field staff, before the 5-day deadline is initiated.

I. DITP Effluent Violations

Parameters listed in I.a, I.b and I.c constitute a violation of the NPDES Permit and a warning exceedance of the Contingency Plan. All individuals on Contact List A (Appendix A) must be notified by phone within 5 days. Those individuals on Mailing List A (Appendix F) must be notified in writing within 5 days. Grace Bigornia Vitale and/or Mark Sullivan are responsible for phone notifications; Mark Sullivan is responsible for writing notification letters.

All limits shown below also constitute Contingency Plan threshold exceedences (explained in Section 3.D). All individuals on Contact List C (Appendix C) must be notified in the event of a Contingency Plan exceedance.

a. Conventional Pollutants

CBOD: average monthly cannot exceed 25 mg/L; average weekly cannot exceed 40 mg/L

TSS: average monthly cannot exceed 30 mg/L; average weekly cannot exceed 45 mg/L

pH: cannot be less than 6 or greater than 9

- Fecal coliform: • The daily geometric mean exceeds 14,000 colonies/100 mL or
- Four or more consecutive samples exceed a fecal coliform count of 14,000 or
 - The geometric mean of all samples collected within a week exceed 14,000 or
 - Ten or more samples collected in a month (no more than 10% of all samples in a month) exceed 14,000

Chlorine residual: daily reading cannot exceed 0.631 mg/L; monthly average cannot exceed 0.456 mg/L

b. Toxicity

LC50 (acute toxicity test): cannot exceed 50% (i.e., a concentration of half effluent and half receiving water cannot cause mortality in more than 50% of the test population; species are mysid shrimp (*Mysidopsis bahia*) and inland silverside (*Meridi beryllina*))

C-NOEC (chronic toxicity test): cannot be greater than 1.5% (i.e., no effects (growth, reproduction, mortality) can be observed at an effluent concentration of 1.5% or less).

c. Additional effluent parameters (not permit violations, but Contingency Plan thresholds)

PCBs, arochlors (arochlors 1016, 1221, 1232, 1242, 1248, 1254, 1260): cannot exceed average monthly concentration of 0.000045 ug/L

Maximum Dry Day Flow: cannot exceed an average monthly dry day flow of 436 MGD. (This is a running 365 day average, calculated monthly.)

Annual Nitrogen Loading: To meet the caution level threshold, loading cannot exceed 12,500 metric tons per calendar year. For a warning level threshold, loading cannot exceed 14,000 metric tons per calendar year. (Loadings are calculated at the end of the year.)

Oil and Grease (PHC): cannot exceed weekly limit of 15 mg/L

Floatables: cannot exceed more than 5 gallons per day

Plant performance: no more than 5 permit violations per year

II. Ambient Threshold Exceedances

Parameters listed in Table 1 are measured in Massachusetts Bay as part of the Outfall Monitoring Plan which is required by the DITP NPDES permit. Notification of individuals on Contact List C must occur if any limit exceeds Caution or Warning levels.

Arrangements have been made for the Consultant to contact ENQUAD staff (either Mike Mickelson or Ken Keay) in the event that any of these parameters exceed the thresholds.

Table 1. Parameter List for Ambient Threshold Exceedances

<i>Fish/shellfish</i>		
Parameter	Caution Level	Warning Level
Liver disease incidence in flounder	Greater than harbor prevalence over time	--
Lead in mussels	2 ug/g wet	3 ug/g wet
PAH in mussels	Twice baseline PAH	--

Continued next page

Chlordane in flounder, lobster, mussels	Twice baseline chlordane	--
Dieldrin in flounder, lobster, mussels	Twice baseline dieldrin	--
DDT in flounder, lobster, mussels	Twice baseline DDT	--
Mercury in lobster, mussels	0.5 ug/g wet (or 50% of FDA level)	0.8 ug/g wet (or 80% FDA action level)
Mercury in flounder	1 ug/g wet (or 50% FDA action level)	1.6 ug/g wet (or 80% FDA action level)
<i>Nearfield Sediments</i>		
Parameter	Caution Level	Warning Level
Benthic Diversity	<ul style="list-style-type: none"> • Appreciable change in total species • Appreciable change in Shannon-Wiener H' • Appreciable change in Pielout's 'J' 	--
Benthic opportunists	Cannot represent more than 25% of nearfield fauna	Cannot represent more than 50% of nearfield fauna
Redox potential discontinuity	Half of baseline	--
Cadmium	--	9.6 ppm dry
Chromium	--	370 ppm dry
Copper	--	270 ppm dry
Lead	--	218 ppm dry
Mercury	--	0.71 ppm dry
Nickel	--	51.6 ppm dry
Silver	--	3.7 ppm dry
Zinc	--	410 ppm dry
Acenaphthene	--	550 ppb dry
Anthracene	--	1100 ppb dry
Fluorene	--	540 ppb dry
Napthalene	--	2100 ppb dry
Phenanthrene	--	1500 ppb dry
Sum LMWPAH	--	3160 ppb dry
Benz(a)anthrcene	--	1600 ppb dry
Benz(a)pyrene	--	1600 ppb dry
Chrysene	--	2800 ppb dry
Dibenzo(a, h)anthracene	--	260 ppb dry
Fluoranthene	--	5100 ppb dry
Pyrene	--	2600 ppb dry
Sum HMWPAH	--	9600 ppb dry
Total PAH	--	44792 ppb dry
P, p'-DDE	--	27 ppb dry
Total DDTs	--	180 ppb dry
EPA sediment criteria	90% EPA sediment criteria	EPA sediment criteria

Continued on next page

Table 1, continued

<i>Farfield Water Column</i>		
PSP extent	New incidence	--
<i>Nearfield Water Column</i>		
Parameter	Caution Level	Warning Level
Bottom Dissolved Oxygen	<ul style="list-style-type: none"> • 6.5 mg/L for any one month during stratification • 80 % saturation for any one month during stratification 	<ul style="list-style-type: none"> • 6 mg/L for any one month during stratification • 75% saturation for any one month during stratification
Bottom Dissolved Oxygen depletion	1.5 X baseline for any one month during stratification	Twice baseline for any one month during stratification
Chlorophyll	<ul style="list-style-type: none"> • 1.5 X baseline annual mean • 95th percentil of baseline seasonal distribution, Jan – Apr. • 95th percentile of baseline seasonal distribution, Sept – Dec. 	Twice the baseline annual mean
Nuisance Algae	<ul style="list-style-type: none"> • 95th percentile of the baseline seasonal mean for <i>Alexandrium</i>, Sept – Dec • 95th percentile of the baseline seasonal mean for <i>Pseudonitzchia</i>, May – Aug. • 95th percentile of the baseline seasonal mean for <i>Pseudonitzchia</i>, Sept – Dec • 95th percentile of the baseline seasonal mean for <i>Phaeocystis</i>, May – Aug • 95th percentile of the baseleing seasonal mean for <i>Phaeocystis</i>, Sept – Dec. 	--
Zooplankton	Shift towards inshore community	
<i>Stellwagen Basin Water Column</i>		
Parameter	Caution Level	Warning Level
Bottom Dissolved Oxygen	<ul style="list-style-type: none"> • 6.5 mg/L for any one month during stratification (June – Oct.) • 80% saturation for any one month during stratification 	<ul style="list-style-type: none"> • 6 mg/L for any one month during stratification (June – Oct.) • 75% saturation for any one month during stratification
<i>Initial Zone of Dilution</i>		
Parameter	Caution Level	Warning Level
Area of initial dilution	--	Effluent dilution predicted by EPA as basis for EPA NPDES permit

C. CSO Effluent violations

This section is included *for information only*. No verbal notifications are required for CSO effluent violations; a letter explaining the violation(s) will accompany the monthly DMR sent to DEP and EPA.

Conventional Pollutants

Total Chlorine Residual: 0.1 mg/L per discharge event; 0.25 mg/L maximum hourly limit
pH for 201 (Cottage Farm), 205A (Somerville/Fellsway): cannot be less than 6.5 nor greater than 8.3 at any time

pH for 203 (Prison Point), 205 (Somerville Marginal), 207 (Constitution Beach), 209 (Fox Point), 211 (Commercial Point): cannot be less than 6.5 nor greater than 8.5 at any time

Fecal coliform: shall meet MA water quality standards (cannot exceed 200 colonies/100 mL)

Toxicity (formal notification is not required, but additional evaluation may be necessary)

LC50 (acute toxicity test): Cannot be less than 50% (i.e., a concentration of half effluent and half receiving water cannot cause mortality in more than 50% of the test population; species are daphnids (*Daphnia pulex*) and fathead minnow (*Pimaphelus promelas*)); if test fails two times in a row, toxicity assessment and reduction plan must be submitted within 6 months.

D. Clinton Treatment Plant: NPDES Permit Violations and operational upsets

I. Operational Upsets

The Clinton Treatment Plant is permitted under a separate NPDES permit, with different monitoring parameters and notification procedures than for the Deer Island Treatment Plant. Outside of routine DMR reporting, no notifications are required for violations of the Clinton Permit. However, notifications of operational upsets at Clinton Treatment Plant must be carried out within 24 hours of the incident. Refer to Appendix E for the contact list. An operational upset is any incident that may negatively impact receiving waters, such as a chlorination failure or release of a toxic chemical into the waste stream.

II. Clinton NPDES Permit Violations

The information shown below is for information only. No external verbal notifications are required for Clinton permit violations, however Clinton Treatment Plant should be notified in the event of a permit violation. A letter explaining the violation(s) will accompany the monthly DMR sent to DEP and EPA.

Parameters listed in D.II.a through D.II.c constitute a violation of the Permit. Grace Bigornia Vitale and/or Mark Sullivan are responsible for assembling monthly DMR reports and writing notification letters.

a. Conventional Pollutants

Flow: average monthly value cannot exceed 3.01 MGD.

BOD: average monthly cannot exceed 20 mg/L; average weekly cannot exceed 20 mg/L

TSS: average monthly cannot exceed 20 mg/L or 500 lbs/day; average weekly cannot exceed 20 mg/L.

pH: cannot be less than 6

Fecal coliform: The monthly geometric mean cannot exceed 200 cfu/100 ml, and the maximum daily count cannot exceed 400 cfu/100 ml

Chlorine residual: monthly average cannot exceed 0.176 mg/L, maximum daily result cannot exceed 0.304 mg/L

b. Toxicity

LC50 (acute toxicity test): cannot exceed 100% (i.e., a concentration of 100% effluent cannot cause mortality in more than 50% of the test population; species are daphnids (*Ceriodaphnia dubia*) and fathead minnow (*Pimapheles promelas*).

C-NOEC (chronic toxicity test): cannot be less than 62.5% (i.e., no effects (growth, reproduction, mortality) can be observed at an effluent concentration of 62.5% or less). Species are daphnids (*Ceriodaphnia dubia*) and fathead minnow (*Pimapheles promelas*).

c. Additional effluent parameters

Total Ammonia Nitrogen:

- April 1 to April 30: monthly average cannot exceed 10 mg/L
- May 1 to May 31: monthly average cannot exceed 5 mg/L
- June 1 – October 31: monthly average cannot exceed 2 mg/L, maximum daily cannot exceed 3 mg/L
- November 1 – March 31: monthly average cannot exceed 10 mg/L, maximum daily cannot exceed 35.2 mg/L

Total Phosphorus: monthly average cannot exceed 1.0 mg/L

Appendix A: Notification List for Contingency Plan exceedances for DITP Effluent

Contact List A

Backup contacts are specified for each regulatory agency. If ENQUAD is unable to reach anyone on the contact list or backup lists, then leave voicemail messages and send an email requesting individuals to acknowledge the receipt of the information.

Contact List A should be used for a violation or contingency plan exceedance of pH, fecal coliform, total chlorine residual, TSS, total annual nitrogen loading, annual dry day flow, or toxicity.

All DITP effluent permit violations are automatically Contingency Plan exceedances. For Contingency Plan exceedances, external notifications should be carried out within 5 days of an official report of the incident (i.e., results approved by the Central Laboratory). In general, as a courtesy to provide preliminary information, EPA and DEP are notified within 24 hours of the incident. Internal notifications should be carried out as soon as possible – refer to list below for guidelines.

I. MWRA notifications (notify BEFORE any external parties)

The Director of ENQUAD (Andrea Rex) or the Senior Program Manager of NPDES Compliance (Grace Vitale) will carry out these internal notifications. If Grace or Andrea is absent, the most senior member of the department available should make these notifications.

Operations Division (notify IMMEDIATELY after receiving preliminary notification)

Mike Hornbrook 788-4359

AND

Bill Brutsch 788-4604

Executive Office (notify immediately upon confirmation of incident)

Pam Heidell (primary contact) 788-1102

Kate Murray (first alternate) 788-1104

Doug MacDonald (second alternate) 788-1103

Law Division (notify immediately upon confirmation of incident)

Nancy Kurtz (primary contact) 788-1145

Lauren Sloat (first alternate) 788-1150

Chris John (second alternate) 788-1125

Public Affairs (notify immediately upon confirmation of incident)

Jonathan Yeo (primary contact) 788-1178

David Gilmartin (alternate) 788-1183

II. External notifications

In general (except for OMSAP notifications), staff members with NPDES Compliance responsibilities should make external notifications (usually Grace Vitale and Mark Sullivan). If neither Grace nor Mark are available, the NPDES Compliance staff making the notifications should confirm with the Director of ENQUAD (Andrea Rex) or the next most senior member of the department before making these calls.

Calls to OMSAP should be made by Andrea, Ken Keay, Mike Mickelson or Grace Vitale only. If these individuals are unavailable, the most senior member of the department present should carry out OMSAP notifications.

Environmental Protection Agency, Region I (EPA)

Eric Hall	(617) 918-1880	hall.eric@epa.gov
AND		
Janet Labonte	(617) 918-1667	labonte.janet@epa.gov
AND		
Matthew Liebman	(617) 918-1626	liebman.matt@epa.gov

Alternate contacts (contact ONE individual below if you cannot reach AT LEAST ONE individual above):

Dave Tomey (first alternate)	(617) 918-1627	tomey.david@epa.gov
Brian Pitt	(617) 918-1875	pitt.brian@epa.gov
Ron Manfredonia	(617) 918-1511	manfredonia.ronald@epa.gov
Roger Janson	(617) 918-1621	janson.roger@epa.gov

Massachusetts Department of Environmental Protection (MADEP)

Steve Lipman	(617) 292-5698	steven.lipman-EQE@state.ma.us
AND		
Cathy Coniaris	(617) 348-4026	catherine.coniaris@state.ma.us

Alternate contacts (contact ONE individual below if you cannot reach AT LEAST ONE individual above):

Russ Isaac (first alternate)	(508) 767-2876	russell.isaac@state.ma.us
OR		
Dave Ferris	(978) 661-7740	david.ferris@state.ma.us
OR		
Paul Hogan	(508) 767-2796	paul.hogan@state.ma.us

If notifying after 5 pm and on weekends, call both numbers below and leave a message:

Wilmington office: (978) 661-7677

Boston office: (617) 292-5500

For EXTREME emergencies/violations only (during non-business hours), also call the 24-hour Spills/Releases Hot Line: (888) 304-1133 or (617) 556-1133

Outfall Monitoring Advisory Panel (OMSAP)

Cathy Coniaris (DEP) can forward subsequent notifications and make arrangements for emergency meetings, if necessary. If OMSAP members cannot be reached directly by phone, leave a voicemail message, send an email message, and request an acknowledgment of receipt.

[OMSAP members' phone numbers and email addresses have been removed for public distribution of this document]

Andrew Solow (Chair)
Telephone (XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

Cathy Coniaris (assistant)
Telephone (XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

Norb Jaworski
Telephone (XXX) XXX-XXXX
(XXX) XXX-XXXX

Robert Kenney
Telephone (XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

Scott Nixon
Telephone (XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

Judy Pederson
Telephone (XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

Michael Shiaris
Telephone (XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

James Shine
Telephone (XXX) XXX-XXXX
(XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

Juanita Urban-Rich
Telephone (XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

(continued)

National Marine Fisheries Service (NMFS)

Although not a permit requirement, NMFS should be notified in the event of a red tide exceedance.

Salvatore Testaverde (978) 281-9368 salvatore.testaverde@noaa.gov
Fax Number (978) 281-9301

Alternate contact:
Chris Mantzaris (978) 281-9346

Stellwagen Bank National Marine Sanctuary (SBNMS), NOAA/NOS

Craig MacDonald (781) 545-8026
Fax Number (781) 545-8036

Notification in the event of a fecal coliform violation only (see contact list B for chlorination failure notifications):

Massachusetts Division of Marine Fisheries (DMF)

On weekends, the Plum Is. facility is staffed and will accept calls.

Jeff Kennedy, Dave Roach (617) 727-3036 (Plum Is.)
OR
Stephanie Cunningham (978) 727-3958 Ext 133 (Gloucester)

Email notifications to distribution list: Newburyport.Shellfish@state.ma.us

Food and Drug Administration, Northeast Regional Office (FDA)

Martin Dowgert (781) 279-1675 x1778

Alternate contacts (contact ONE individual below if you cannot contact Martin Dowgert):

Ira Somerset (781) 279-1783
Mary Yebba (781) 279-1758 myebba@ora.fda.gov

Appendix B: Notification List for Treatment System Incidents

Contact List B

Backup contacts are specified for each regulatory agency. If ENQUAD is unable to reach anyone on the contact list or backup lists, then leave voicemail messages and send an email requesting individuals to acknowledge the receipt of the information.

Contact List B should be used for treatment system incidents including: relief outfall discharges at Deer or Nut Island, SSOs, and operational upsets which occur within the Deer Island treatment plant or transport system. Section B-III lists the parties that should be notified in the event that the upset may endanger public health or the environment.

Notifications need to be carried out with 24 hours of the incident.

I. MWRA notifications (notify BEFORE any external parties)

Internal notifications will be carried out by Mark Sullivan or Grace Vitale. If neither Mark nor Grace is available, check with the Director of ENQUAD (Andrea Rex) before making the notifications.

Operations Division

Mike Hornbrook	788-4359
AND	
Bill Brutsch	788-4604

II. External notifications

Staff members with NPDES Compliance responsibilities should make external notifications (usually Mark Sullivan, but also Grace Vitale). If neither Grace nor Mark are available, the NPDES Compliance staff making the notifications should confer with Andrea Rex or the most senior member of the department available before making these calls.

Environmental Protection Agency, Region I (EPA)

Eric Hall	(617) 918-1880	hall.eric@epa.gov
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Alternate contacts (contact ONE individual below if you cannot reach Eric Hall):

George Harding (first alternate)	(617) 918-1870	harding.george@epa.gov
Brian Pitt	(617) 918-1875	pitt.brian@epa.gov

(continued)

Massachusetts Department of Environmental Protection (DEP)

Bill Cashins (978) 661-7741 william.cashins@state.ma.us

AND

Steve Lipman (617) 292-5698 steven.lipman-EQE@state.ma.us

Alternate contact (if you cannot reach AT LEAST ONE individual above):

Dave Ferris (978) 661-7740 david.ferris@state.ma.us

If notifying after 5 pm or on weekends, call both numbers below and leave a message:

Wilmington office: (978) 661-7677

Boston office: (617) 292-5500

For EXTREME emergencies only (during non-business hours), also call the 24-hour Spills/Releases Hot Line: (888) 304-1133 or (617) 556-1133

Winthrop Board of Health

Notify only if discharge through Deer Island outfalls 004 or 005, or of a hazardous waste spill at DITP.

! Typically Deer Island Primary OPS will call the Winthrop Board of Health in the event of a treatment upset or relief outfall discharge. Contact the Board of Health if you have not already received notification from Primary OPS.

Virginia Wilder (617) 846-1852

Paul Frazer (617) 846-1740

Fax Number (617) 846-5458

Quincy Board of Health

Notify only if discharge through Nut Island (NI) outfall 103 or the NI Spillway.

! Typically Nut Island Headworks will call the Quincy Board of Health in the event of a treatment upset or relief outfall discharge. Contact the Board of Health if you have not already received notification from Nut Island staff or Primary OPS.

Jane Gallahue (primary contact) (617) 376-1273

Mary Cash (secondary contact) (617) 376-1274

Fax Number (617) 376-1271

III. Public Health notifications

Massachusetts Division of Marine Fisheries (DMF)

Notify only if incident may impact marine receiving waters.

On weekends, the Plum Is. facility is staffed and will accept calls.

Jeff Kennedy, Dave Roach (617) 727-3036 (Plum Is.)

OR

Stephanie Cunningham (978) 727-3958 Ext 133 (Gloucester)

Email notifications to distribution list: Newburyport.Shellfish@state.ma.us

Massachusetts Department of Public Health, Food Protection Program (DPH)

Notify only if the incident may be a threat to public health or impact the harvest of shellfish.

Richard D. Waskiewicz (617) 983-6759
Fax Number (617) 983-6770
Paul Tierney (617) 983-6760

DPH Hotline Number (available 24 hours a day): 617-522-3700

Food and Drug Administration, Northeast Regional Office (FDA)

Notify if the incident may impact the harvest of shellfish.

Martin Dowgert (781) 279-1675 x1778

Alternate contacts (notify ONE of the individuals below if you cannot contact Martin Dowgert):

Ira Somerset (781) 279-1783
Mary Yebba (781) 279-1758 myebba@ora.fda.gov

Appendix C: Notification List for Contingency Plan exceedances, ambient parameters

Contact List C

Contact List C should be used for a contingency plan exceedance of ambient thresholds for fish/shellfish, red tide, sediments, nearfield water column, Stellwagen Basin water column, or initial dilution.

Backup contacts are specified for each regulatory agency. If ENQUAD is unable to reach anyone on the contact list or backup lists, then leave voicemail messages and send an email requesting individuals to acknowledge the receipt of the information.

Notifications should be carried out within 5 days of an official report of the incident (i.e., results must be officially reported by the Central Laboratory or by the Consultant).

I. MWRA notifications (notify BEFORE any external parties)

The Director of ENQUAD (Andrea Rex) or the Senior Program Manager of NPDES Compliance (Grace Vitale) will carry out these internal notifications. If Grace or Andrea is absent, the most senior member of the department available should make these notifications.

Operations Division (notify IMMEDIATELY after receiving preliminary notification)

Mike Hornbrook	788-4359
AND	
Bill Brutsch	788-4604

Executive Office (notify immediately upon confirmation of incident)

Pam Heidell (primary contact)	788-1102
Kate Murray (first alternate)	788-1104
Doug MacDonald (second alternate)	788-1103

Law Division (notify immediately upon confirmation of incident)

Nancy Kurtz (primary contact)	788-1145
Lauren Sloat (first alternate)	788-1150
Chris John (second alternate)	788-1125

Public Affairs (notify immediately upon confirmation of incident)

Jonathan Yeo (primary contact)	788-1178
David Gilmartin (alternate)	788-1183

II. External notifications

For external notifications of ambient threshold exceedances, Andrea Rex, Mike Mickelson or Ken Key should carry out the notifications. Grace Vitale, followed by Maury Hall, are the backups. If none of these individuals is available, staff members with NPDES Compliance responsibilities can make these notifications, after conferring with the most senior member of the department.

Calls to OMSAP should be made by Andrea Rex, Ken Keay, Mike Mickelson or Grace Vitale only. If these individuals are unavailable, the most seniormember of the department present should carry out OMSAP notifications.

Environmental Protection Agency, Region I (EPA)

Matthew Liebman	(617) 918-1626	liebman.matt@epa.gov
AND		
Janet Labonte	(617) 918-1667	labonte.janet@epa.gov
AND		
Eric Hall	(617) 918-1880	hall.eric@epa.gov

Alternate contacts (contact ONE individual below if you cannot reach AT LEAST ONE individual above):

Dave Tomey (first alternate)	(617) 918-1627	tomey.david@epa.gov
Brian Pitt	(617) 918-1875	pitt.brian@epa.gov
Ron Manfredonia	(617) 918-1511	manfredonia.ronald@epa.gov
Roger Jansen	(617) 918-1621	jansen.roger@epa.gov

Massachusetts Department of Environmental Protection (DEP)

Steve Lipman	(617) 292-5698	steven.lipman-EQE@state.ma.us
AND		
Cathy Coniaris	(617) 348-4026	catherine.coniaris@state.ma.us

Alternate contacts (contact ONE individual below if you cannot reach AT LEAST ONE individual above):

Russ Isaac (first alternate)	(508) 767-2876	russell.isaac@state.ma.us
Dave Ferris	(978) 661-7740	david.ferris@state.ma.us
Paul Hogan	(508) 767-2796	paul.hogan@state.ma.us

If notifying after 5 pm and on weekends, call both numbers below and leave a message:

Wilmington office: (978) 661-7677

Boston office: (617) 292-5500

(continued)

Massachusetts Division of Marine Fisheries (DMF)

For notification in the event of a fecal coliform violation in Mass Bay only.

Jeff Kennedy, Dave Roach	(617) 727-3036 (Plum Is.)
<i>Alternate contact (generally voicemail only):</i>	
Stephanie Cunningham	(978) 727-3958 Ext 133 (Gloucester)
Email all notifications to distribution list: Newburyport.Shellfish@state.ma.us	

For notification in the event of a red tide exceedance ONLY.

David Whittaker	(617) 727-0394 x126
AND	
Michael Hickey	(617) 727-0394 x122
<i>Alternate contacts (contact BOTH individuals below if you cannot contact AT LEAST ONE individual above):</i>	
Jack Schwartz	(978) 282-0308 x122
AND	
Jeff Kennedy	(617) 727-3036

Outfall Monitoring Advisory Panel (OMSAP)

Cathy Coniaris (*MADEP*) can forward subsequent notifications and make arrangements for emergency meetings, if necessary. If OMSAP members cannot be reached directly by phone, leave a voicemail message, send an email message, and request an acknowledgment of receipt.

[OMSAP members' phone numbers and email addresses have been removed for public distribution of this document]

Andrew Solow (Chair)
Telephone (XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

Cathy Coniaris (assistant)
Telephone (XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

Norb Jaworski
Telephone (XXX) XXX-XXXX
(XXX) XXX-XXXX

Robert Kenney
Telephone (XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

(continued)

Scott Nixon
Telephone (XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

Judy Pederson
Telephone (XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

Michael Shiaris
Telephone (XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

James Shine
Telephone (XXX) XXX-XXXX
(XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

Juanita Urban-Rich
Telephone (XXX) XXX-XXXX
Fax (XXX) XXX-XXXX

Food and Drug Administration, Northeast Regional Office (FDA)

Notify ONLY in the event of a fecal coliform violation or red tide exceedance.

Martin Dowgert (781) 279-1675 x1778

Alternate contacts (contact ONE individual below if you cannot contact Martin Dowgert):

Ira Somerset (first alternate) (781) 279-1783

Mary Yebba (781) 279-1758 myebba@ora.fda.gov

Department of Public Health, Food Protection Program (DPH)

Notify ONLY in the event of a fecal coliform violation or red tide exceedance.

Richard D. Waskiewicz, (617) 983-6759

Fax Number (617) 983-6770

Paul Tierney (617) 983-6760

DPH Hotline Number (available 24 hours a day): 617-522-3700

Woods Hole Oceanographic Institution (WHOI)

Notify in the event of a red tide exceedance ONLY.

Notify one of the members listed below in the event of a red tide threshold exceedance

Donald Anderson (primary contact) (508) 289-2351

Fax Number (508) 457-2169

Bruce Keafer (alternate) (508) 289-2509

Fax Number (508) 457-2169

(continued)

Maine Department of Marine Resources

Notify in the event of a red tide exceedance ONLY.

Marine Biotxin Monitoring Program, Boothbay Harbor facility

Contact EITHER:

John Hurst (207) 633-9570 john.hurst@state.me.us

OR

Laurie Bean (207) 633-9555 laurie.bean@state.me.us

(continued)

National Marine Fisheries Service (NMFS)

Although not a permit requirement, NMFS should be notified in the event of a contingency plan exceedance.

Salvatore Testaverde (978) 281-9368 salvatore.testaverde@noaa.gov

Fax Number (978) 281-9301

Alternate contact:

Chris Mantzaris (978) 281-9346

Stellwagen Bank National Marine Sanctuary (SBNMS), NOAA/NOS

Craig MacDonald (781) 545-8026

Fax Number (781) 545-8036

Appendix D: Clinton Permit operational upset notifications

Contact List D

This contact list should be used for a an operational upset occurring at Clinton Treatment Plant, such as chlorination failure, SSO, or any incident that would negatively impact receiving waters.

If the contacts are not available, leave a voicemail message describing the incident and request s/he to acknowledge receipt of the information.

For an operational upset, notifications should be carried out within 24 hours of the incident. Written notification must follow within 7 days. Refer to Appendix I for sample notification letters.

I. MWRA notifications

Notify John Riccio in the event of a NPDES permit violation.

Clinton Treatment Plant

John Riccio (978) 365-7024

II. External notifications

Notify by phone in the event of an operational upset or SSO ONLY. Permit violations are explained in a cover letter that accompanies the monthly DMR.

Environmental Protection Agency, Region I (EPA)

Suproakash Sarker (617) 918-1693

Massachusetts Department of Environmental Protection (MADEP)

Bob Kimball (617) 292-5793

Appendix E: Mailing List for Contingency Plan threshold exceedances

Mailing List A

Mailing List A should be used for any Contingency Plan exceedance (which includes DITP permit violations).

Written notifications for permit violations and Contingency Plan exceedances should be postmarked within five business days of an official report of the violation (i.e., results have been approved by the Central Laboratory or QA/QC approved results have been received from the Consultant).

ALL internal MWRA notifications must be carried out before written notifications are sent.

Written Notifications

Addressees

Linda Murphy, Director
U.S Environmental Protection Agency
Water Technical Unit (SEW)
P.O. Box 8127
Boston, MA 02114

Arleen O'Donnell, Assistant Commissioner
Bureau of Resource Protection
Department of Environmental Protection
Commonwealth of Massachusetts
One Winter Street
Boston, MA 02108

Cc List

Matt Liebman
U.S. Environmental Protection Agency
1 Congress St. Suite 1100 (CWQ)
Boston, MA 02114-2023

Department of Environmental Protection
Division of Watershed Management
Central Regional Office
627 Main Street
Worcester, MA 01608

Eric Hall
U.S Environmental Protection Agency
Water Technical Unit (SEW)
1 Congress St. Suite 1100
Boston, MA 02114-2023

Department of Environmental Protection
Division of Watershed Management
Northeast Regional Office
205A Lowell Street
Wilmington, MA 01887

Janet Labonte-Deshais
U.S. Environmental Protection Agency
1 Congress St. Suite 1100 (CNH)
Boston, MA 02114-2023

Steve Lipman
Boston Harbor Coordinator
Mass. Department of Environmental Protection
1 Winter St.
Boston, MA 02108

Cathy Coniaris
MADEP, 1 Winter St., 6th Floor
Boston, MA 02108

Andy Solow
WHOI
Crowell House, MS-41
266 Woods Hole Road
Woods Hole, MA 02543-1049

Norbert Jaworski
202 Wordens Pond Rd.
Wakefield, RI 02879-4411
or:
2004 S. Magnolia Ave.
Sanford, FL 32771

Judy Pederson
MIT E38-300
292 Main St.
Cambridge, MA 02139

Robert Kenney
University of Rhode Island
South Ferry Rd.
Narragansett, RI 02882-1197

Mike Shiaris
University of Massachusetts
100 Morrissey Blvd.
Boston, MA 02125

Scott Nixon
University of Rhode Island
South Ferry Rd.
Narragansett, RI 02882-1197

James Shine
Harvard School of Public Health
Bldg. 1, Room G19
665 Huntington Ave.
Boston, MA 02115

Juanita Urban-Rich
U Mass Boston, ECOS
100 Morrissey Boulevard
Boston MA 02125

Amanda Sullivan (PIAC)
Save the Harbor/Save the Bay
Suite 304
59 Temple Pl
Boston, MA 02111-1307

Steve Tucker
Cape Cod Commission
P.O. Box 226
3225 Main St.
Barnstable, MA 02630

****SEND COVER LETTER ONLY****

Salvatore Testaverde
NOAA/NMFS
Habitat Conservation Branch
1 Blackburn Drive
Gloucester, MA 01930-2298

Craig MacDonald
NOAA/NOS
Stellwagen Bank National Marine Sanctuary
175 Edward Foster Road;
Scituate MA 02066-4399

(continued)

Bcc List (MWRA internal)

Mike Hornbrook
Chief Operating Officer
39-2

David Duest
Process Monitoring
Deer Island

William Brutsch
Operations
39-3

John Vetere
Deer Island

Pamela Heidell
Executive Office
36-3

Jonathan Yeo
Public Affairs
36-3

Nancy Kurtz
Law
36-2

Andrea Rex
ENQUAD
39-3

Lauren Sloat
Law
36-2

Grace Vitale
ENQUAD
39-3

Christopher John
Law
36-2

NPDES file

Distribution to Libraries

External:

Ann-Louise Harries
Library Director
Hyannis Public Library
401 Main Street
Hyannis, MA 0260

Internal:

Mary Lydon
MWRA Library
100 First Ave
Boston, MA 02129
Bldg 34-1

APPENDIX E: DMF/MWRA Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING

To classify and manage the coastal waters of Massachusetts, the Massachusetts Division of Marine Fisheries (DMF) must determine that shellfish growing areas maintain the National Shellfish Sanitation Program (NSSP) criteria for a given classification. For any shellfish growing area to be managed under conditional classification, the NSSP requires that an area meet approved or restricted criteria under certain predictable conditions and that performance standards be established by the shellfish control agency (DMF).

DMF has determined that performance standards for shellfish growing areas in greater Boston Harbor depend on the operation of Massachusetts Water Resources Authority's (MWRA) Deer Island Wastewater Treatment Plant and the associated sewage collection system. In addition, performance standards for greater Massachusetts Bay depend on the operation of the Deer Island Plant and its discharge through the new outfall. The NSSP requires that a plan exist between the shellfish control agency and the operators of any wastewater treatment facility that may impact shellfish areas. The attached sampling and reporting procedures include performance standards, notification procedures and conditional area monitoring commitments and represent such a plan. In addition, the plan is to be reviewed annually by DMF and MWRA and may be updated as needed by written amendments to the plan. This document acknowledges that, in accordance with MWRA's National Pollutant Discharge Elimination System (NPDES) permit issued by the Massachusetts Department of Environmental Protection (MADEP) and the United States Environmental Protection Agency (EPA) and subject to MADEP and EPA concurrence, DMF may determine that effluent coliform limits will revert to those specified in Part I.1.a.16 of the permit to ensure protection of public health.

DMF and the MWRA agree to cooperate in protecting the quality of shellfish growing waters potentially impacted by MWRA discharges. This MOU is designed to assure continued adequate communication between MWRA and DMF, and should allow both agencies to work efficiently toward the shared goal of protecting the public health. This cooperative agreement supports maintaining the waters of Massachusetts Bay and Boston Harbor for the harvest of shellfish to the maximum extent possible.

Doug MacDonald
Executive Director
Massachusetts Water Resources Authority

Date

Philip G. Coates
Director
Massachusetts Division of Marine Fisheries

Date

Notification Procedures

Whereas the Massachusetts Water Resources Authority (MWRA) operates and maintains the Deer Island Sewage Treatment Plant and the associated collection system and whereas there exists the potential of an adverse change in these pollution sources, the MWRA agrees to notify the Massachusetts Division of Marine Fisheries (DMF) in the event of the following:

1. Discharge under the following conditions:
Deer Island Treatment Plant
Any discharge at the future outfall (T01) in violation of the NPDES permit limits for fecal coliform;
2. Discharge from any of the following outfalls or areas:
Deer Island Treatment Plant
Emergency outfalls 001, 002, 004, or 005;
Nut Island Headworks
Emergency outfalls 101, 102, 103, or the Nut Island Spillway;
Combined Sewer Overflows Permitted to MWRA
Any dry weather activations;
Sanitary Sewer Overflows
Any overflow or bypasses through MWRA's sewage collection system that impact or have a reasonable potential to impact receiving waters in the vicinity of shellfish growing areas;
Sludge Pelletizing Plant
Any major spill that impacts or has a reasonable potential to impact receiving waters.
3. Foreseeable events that have the potential to affect the performance of the treatment facilities and/or sewage collection system to the extent that shellfish growing areas may be adversely impacted.

Notifications for incidents listed above will include the following available information where applicable:

- a. Start and stop times
- b. Estimated volume of discharge
- c. Status of disinfection
- d. Cause of discharge
- e. Analytical data (fecal coliform counts)

DMF will be notified by phone at (617) 727-3036 between 7:00 AM and 4:00 PM Monday through Friday as soon as possible for any of the above events. If an event occurs or data becomes available after 4:00 PM, notification should be made the

following business day. MWRA will make a reasonable attempt to notify DMF after 4:00 PM on weekdays and on weekends by leaving a message on the answering machine at (508) 465-5947. Analytical data, including chlorine residual and coliform counts, will be reported as soon as they become available.

DMF will be included in the distribution list for Deer Island Sewage Treatment Plant Discharge Reports, Operations Summary Reports, and Activation Notification Letters.

Monitoring

MWRA agrees to provide field sampling and laboratory services to assist DMF in the classification of shellfish growing areas in the vicinity of the future outfall. MWRA will follow a mutually agreed upon monitoring plan (Attachment A) in partnership with DMF to provide analytical data both prior to and following the discharge at the future outfall (T01). The monitoring plan will follow DMF protocols for fecal coliform sampling and analysis. MWRA and DMF agree that the monitoring plan may be changed under mutual agreement as relevant data becomes available, and that these changes will be documented in writing and included in the Monitoring agreement. MWRA also agrees to provide laboratory services to document improvements to shellfish growing areas previously impacted by MWRA discharges.

Receiving Water Quality

MWRA acknowledges that, subject to the approval of the Massachusetts Department of Environmental Protection and the United States Environmental Protection Agency, DMF may direct MWRA to modify its treatment processes to ensure that the effluent from the new Deer Island Wastewater Treatment Plant will meet all state water quality standards for fecal coliform and total chlorine residual upon discharge to the receiving water at the new outfall location.

Attachment A

Fecal Coliform Monitoring Plan

The monitoring plan shall have the following components:

Pre-discharge monitoring to establish a baseline to compare to post-discharge levels

MWRA will collect and analyze samples for fecal coliform along four transects from the future outfall shoreward to Devereaux Beach, Nahant, Hull, and Cohasset Harbor. Samples will be collected from the surface. Samples will also be collected from the water below the pycnocline during periods of stratification. All samples will be processed at MWRA's Central Laboratory according to United States Food and Drug Administrations (FDA) approved methods for shellfish growing waters. MWRA will conduct four transect monitoring surveys after the discharge of wastewater from the future outfall commences. The monitoring stations for the transect surveys are listed in Table 1.

Post-discharge monitoring for Conditional Zone Classification

MWRA will collect and analyze samples for fecal coliform from twelve locations for conditional zone classification. Samples will be collected from the surface. Samples will also be collected from the water below the pycnocline during periods of stratification. All samples will be processed at MWRA's Central Laboratory according to FDA approved methods for shellfish growing waters. Samples will be collected each month following the commencement of discharge from the future outfall. The monitoring stations for the conditional zone classification surveys are listed in Table 2.

Post-discharge monitoring during adverse conditions

MWRA will collect and analyze samples for fecal coliform from the same twelve conditional zone classification locations listed below during and/or immediately following adverse conditions. Adverse conditions are events that have a reasonable potential to cause MWRA to discharge wastewater with high levels of bacteria including extremely high flows due to heavy rain, treatment plant failures, and unforeseen events. Criteria that determine what constitutes adverse conditions appear in Attachment B. Given that these criteria are met, it is anticipated that MWRA will conduct approximately five adverse conditions surveys per year. The sampling and analytical procedures for the adverse condition surveys are the same as the procedures for the conditional zone classification surveys.

Table 1
Transect Monitoring Stations

Station ID ¹	Latitude	Longitude	Station Description
GC1	42-22.56	70-47.88	#1-COHASSET TRANSECT
GC2	42-22.08	70-47.76	#2-COHASSET TRANSECT
GC3	42-21.06	70-47.64	#3-COHASSET TRANSECT
GC4	42-20.10	70-47.52	#4-COHASSET TRANSECT
GC5	42-19.14	70-47.34	#5-COHASSET TRANSECT
GC6	42-17.10	70-47.04	#6-COHASSET TRANSECT
GD1	42-23.52	70-48.48	#1-DEVERAEUX TRANSECT
GD2	42-24.00	70-48.66	#2-DEVERAEUX TRANSECT
GD3	42-24.96	70-49.08	#3-DEVERAEUX TRANSECT
GD4	42-26.88	70-49.86	#4-DEVERAEUX TRANSECT
GH1	42-22.44	70-48.78	#1-HULL TRANSECT
GH2	42-21.84	70-49.26	#2-HULL TRANSECT
GH3	42-20.64	70-50.34	#3-HULL TRANSECT
GH4	42-18.42	70-51.48	#4-HULL TRANSECT
GN1	42-23.28	70-49.02	#1-NAHANT TRANSECT
GN2	42-23.46	70-49.62	#2-NAHANT TRANSECT
GN3	42-24.42	70-52.02	#3-NAHANT TRANSECT
N16	42-23.64	70-45.20	OUTFALL DIFFUSER #1
N20	42-22.90	70-49.03	OUTFALL DIFFUSER #55

¹ Station IDs are followed by an “S” or a “P” to represent surface sample or sub-pycnocline sample respectively.

Table 2
Conditional Zone Classification/Adverse Conditions Monitoring Stations

Station ID ²	Latitude	Longitude	Station Description
F10	42-14.45	70-38.24	NE OF SCITUATE HARBOR
F13	42-16.10	70-44.10	ENE OF COHASSET HARBOR
F14	42-18.00	70-48.50	ENE OF NANTASKET BEACH (~3NM)
F17	42-20.75	70-34.23	ENE OF NANTASKET BEACH (~4.2NM)
F18	42-26.53	70-53.30	NAHANT BAY S. OF LITTLES PT (1.5 NM)
F22	42-28.79	70-37.06	UPPER MB SSE OF EASTERN PT (~6.5NM)
F24	42-22.50	70-53.75	INNER MB, NE OF DI
F25	42-19.30	70-52.58	INNER MB, NE OF NANTASKET BEACH
N02	42-25.65	70-49.31	E. OF DI, S. OF SALEM SND
N09	42-20.39	70-47.48	E. OF DI, S. OF SALEM SND
N16	42-23.64	70-45.20	OUTFALL DIFFUSER #1
N20	42-22.90	70-49.03	OUTFALL DIFFUSER #55

¹ Station locations were selected from far field and near field monitoring locations currently monitored by MWRA under its Outfall Monitoring Plan. The station IDs are followed by an “S” or a “P” to represent surface sample or sub-pycnocline sample respectively.

Attachment B

Criteria for Adverse Conditions Monitoring

Adverse conditions monitoring will occur under conditions that may result in elevated pathogen levels in Massachusetts Bay, as described in Attachment A. This attachment establishes the criteria that will trigger an adverse monitoring survey. These triggers may be modified once baseline information regarding operation of the new outfall is established. Adverse conditions monitoring will not commence until after the new outfall is online.

An adverse conditions survey will be triggered by: 1. A reduction in secondary treatment, when the effluent consists of 60% secondary treated flows or less for more than six hours; or 2. Complete loss of chlorination for more than six hours.

- Once it is determined that operational upset/high flow conditions qualify for adverse conditions monitoring, the survey should take place between 10 and 30 hours following the trigger, weather and logistics permitting. If an operational upset is prolonged, DMF, in consultation with MWRA, may decide to extend this time window.
- Every effort shall be made to sample all conditional monitoring stations in a survey; if a survey is abbreviated or cancelled because of weather conditions or equipment problems, the survey should be completed as soon as possible. Locations closest to the outfall have the highest priority of any of the monitoring stations.
- When secondary treatment is reduced as defined above, one of MWRA's Massachusetts Bay virus surveys should be rescheduled to coincide as closely as possible with the reduction, should the reduction last for more than one week.
- If adverse conditions persist, MWRA (in consultation with DMF) should make an effort to conduct more than one survey over the course of the event.

APPENDIX F: Sample Notice of Red Tide Event

To: Chair of OMSAP
From: Andrea Rex, director MWRA ENQUAD
Cc: OMSAP liaison, OMSAP members, IAAC, PIAC, EPA, MADEP, DMF, NMFS, FDA, NOAA/NOS, other EPA listserv recipients.
Date: May 28, 20xx
Re: Notice of a red tide event –**SIMULATION ONLY**

The following notice concerns an imaginary red tide event, and has been prepared as part of the Outfall Contingency Plan Simulation required in MWRA's NPDES Permit.

MWRA's Ambient Monitoring Program has identified elevated levels of a toxic algae based on analysis of water samples collected near the MWRA outfall in Massachusetts Bay.

On May 20, 20xx, one sample from an MWRA near-field monitoring survey, in the vicinity of MWRA's offshore outfall, contained cell counts of *Alexandrium tamarense* of 200 cells per liter. Cell counts were completed today.

A. tamarense is the toxic alga associated with paralytic shellfish poisoning (PSP). However, the exceedance of an *A. tamarense* caution level threshold in a water sample does not imply a PSP closure of any shellfish bed, or that any shellfish in the marketplace are unsafe. Decisions on shellfish bed closures are made by the Massachusetts Division of Marine Fisheries based on frequent direct analyses of shellfish for the PSP toxin. For further information on PSP closures or the Division's shellfish monitoring program, contact Mike Hickey or Dave Whittaker at telephone (617) 727-0394 or email David.Whittaker@state.ma.us or visit <http://www.state.ma.us/dfwele/dmf/dmfpsp.htm>. For information regarding the status of individual shellfish beds, please contact your local shellfish warden.

Further information regarding MWRA's Ambient Monitoring Program, Contingency Plan, and Monitoring thresholds can be found at MWRA's website, www.mwra.state.ma.us, by contacting the MWRA library at (617) 788-4175, or at the document repository at the Hyannis Public Library. This notice will be available at all 3 locations.

APPENDIX G: Reportable Quantities

The following table lists the reportable quantities for chemicals stored on Deer Island:

**Reportable Quantities for Chemical and Products
Stored at Deer Island Treatment Plant⁵**

Material	MA – DEP (lbs.)	MA – DEP (gals.)	Federal – EPA CERCLA/CWA (lbs.)	Federal – EPA CERCLA/CWA (gals.)
Sulfuric Acid	50 lbs.	N/A	1,000 lbs.	N/A
93% Sulfuric Acid	N/A	764 gal.	N/A	15,270 gal.
Sodium Hydroxide	50 lbs.	N/A	1,000 lbs.	N/A
50% Sodium Hydroxide	N/A	634 gal.	N/A	12,680 gal.
25% Sodium Hydroxide	N/A	543 gal.	N/A	10,850 gal.
Sodium Hypochlorite	10 lbs.	N/A	100 lbs.	N/A
15% Sodium Hypochlorite	N/A	109 gal.	N/A	1,085 gal.
Ferrous Chloride	50 lbs.	N/A	100 lbs.	N/A
Methane	10 lbs.	N/A	N/A	N/A
Sodium Bisulfite	100 lbs.	N/A	5,000 lbs.	N/A
38% Sodium Bisulfite	N/A	1,235 gal.	N/A	61,750 gal.
Ferric Chloride	50 lbs.	N/A	1,000 lbs.	N/A
#2 Fuel Oil	N/A	10 gal.	N/A	N/A
Waste Oil	N/A	10 gal.	N/A	N/A
#4 Fuel Oil	N/A	10 gal.	N/A	N/A
Diesel Fuel	N/A	10 gal.	N/A	N/A
Lubricating Oil	N/A	10 gal.	N/A	N/A
Hydraulic Fluid	N/A	10 gal.	N/A	N/A

United States EPA

Notify EPA's National Response Center immediately (within 15 minutes)

Phone: 1-800-424-8802 (24 hour line)

Massachusetts DEP

Notify the Northeast Regional Office of the MADEP (within two hours)

Phone: 1-617-556-1133 or

1-888-304-1133 (24 hour line)

⁵Massachusetts Water Resources Authority. MWRA Deer Island Treatment Plant Integrated Contingency Plan, Section 7.0: Notification. Prepared for MWRA by Green Environmental, Draft, September 1998. page 7-8, Table 7-1.