



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

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BOSTON, MASSACHUSETTS 02114-2023

June 3, 2009

OPERATIONS

Michael J. Hornbrook
Chief Operating Officer
Massachusetts Water Resources Authority
Charlestown Navy Yard
100 First Avenue
Charlestown, MA 02129

'09 JUN -5 P2:51

Re: Massachusetts Water Resources Authority, Permit Number MA0103284
Proposed Ambient Monitoring Plan Modifications

Dear Mr. Hornbrook:

In your letter of April 15, 2009, you proposed interim modifications to the *Ambient Monitoring Plan for the Massachusetts Water Resources Effluent Outfall, Revision 1, March 2004*. In our letter responding to that request, dated April 24, 2009, we declined to allow the proposed modifications as interim modifications pursuant to Part I.7.c.iii. of your NPDES permit, but agreed to consider them as annual modifications pursuant to Part I.7.c.i. of the permit. Pursuant to Part I.7.i of the permit, the review process for modifications to the monitoring plan includes review by the Outfall Monitoring Science Advisory Panel (OMSAP) and the public, followed by the final decision by EPA and MassDEP.

This letter transmits EPA's preliminary comments and questions on the proposed modifications. We look forward to also having further discussions on these matters with the MWRA as we work through the review and approval process.

First, EPA agrees that it is an appropriate time to review and modify the ambient monitoring plan. MWRA has been monitoring the impact of the ocean outfall since it was placed into operation in 2000, and the ambient monitoring program was last modified in 2004. We expect that the modified ambient monitoring plan resulting from this process will form the basis for the ambient monitoring plan in the reissued permit.

The following is a short summary of the history of the ambient monitoring plan requirements, the proposed modifications and EPA's preliminary comments and questions on the proposed modifications.

Original Ambient Monitoring Program

The ambient monitoring requirements in the current permit are found in Part 1.7., and include the implementation of the ambient monitoring plan in Attachment N (*Massachusetts Water Resources Authority effluent outfall monitoring plan: Phase II*

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post-discharge monitoring, December 1997). As stated in the Fact Sheet accompanying the current NPDES permit, the purposes for collecting ambient data was to:

1. attempt to address significant environmental and human health concerns with regard to Boston Harbor, Massachusetts Bay and Cape Cod Bay;
2. attempt to answer resource questions;
3. evaluate compliance with water quality standards;
4. assess whether the impact of the discharge on the receiving water is within the bounds projected in the SEIS;
5. assess whether the assumptions made in the planning process, including any assumptions based on modeling continue to be valid; and
6. assess compliance with the Endangered Species Act.

The specific objectives of the ambient monitoring plan in Attachment N were described as: 1) test compliance with NPDES permit requirements, 2) test whether the impact of the discharge on the environment is within the bounds projected by the SEIS, and 3) test whether changes within the system exceed the Contingency Plan thresholds (note - the Contingency Plan is included in the permit as Attachment O). The plan generally divides the monitoring program into two categories of sampling: nearfield and farfield.

Water column nearfield stations were located within a 120 square kilometer (38 square miles) area centered on the outfall. Only one of the 21 nearfield stations was within the zone of initial dilution (ZID), the area beyond which the plume ceases to be controlled by mechanics of the outfall and achieves the natural buoyancy level or equilibrium level.¹ This station was subsequently eliminated in the 2004 ambient monitoring program modifications.

Water column farfield stations were outside of the nearfield, with stations as far as 40 miles from the outfall.

2004 Ambient Monitoring Program Modification

The ambient monitoring plan was significantly modified in 2004. The major changes to the monitoring plan were:

Water Column

- Reduction in the number of nearfield monitoring stations from 21 to 7 (including the elimination of Station N21, the only nearfield station within the ZID)
- Reduction in the number of nearfield surveys from 17 to 12

¹ The fact sheet for the current permit explains that a mixing zone is allowed for this discharge and that it is defined as a zone of initial dilution (ZID). The ZID, in this case, is described as approximately 197 feet from the diffuser;

Benthic/Seafloor

- Reduction in the number of nearfield and farfield soft-bottom community monitoring stations monitored annually. (The original plan included 31 stations monitored annually, which was reduced to 2 stations monitored annually plus 33 stations monitored in alternating years (16 one year and 17 the next))
- Better integration of ongoing sediment chemistry studies
- Reduction in the frequency of sampling for the full suite of pollutants from annually to every three years
- Relocation of two hard bottom stations and addition of a reference station
- Elimination of some measurements from the benthic nutrient flux special study

Fish and Shellfish

- Reduction in the frequency of sampling of fish for chemical constituents
- Deletion of one flounder sampling station in Broad Sound

As can be seen, the major change made in the 2004 modification was the reduction of sampling, particularly nearfield monitoring stations and surveys. The nearfield reductions were supported primarily by the findings of two plume tracking studies done over five days in 2001 [April 19-20, 2001 and July 16-19, 2001] that measured the dilution in the hydraulic mixing zone (the hydraulic mixing zone as defined by MWRA is generally the same area defined as the ZID by EPA) and found that it was in substantial agreement with the prediction of the physical model done for the outfall.

In its review of the 2004 modification, OMSAP recommended that the MWRA examine the feasibility of continuous monitoring to compensate for the reduction in surveys. In the joint approval letter, dated March 4, 2004, EPA and MassDEP also expressed their belief that “a reduction in the nearfield water column monitoring should be accompanied by a firm effort to establish a continuous monitoring measurement program.”² A workshop was held on technical options for remote monitoring of the MWRA outfall in 2004, but no remote monitoring equipment has yet been installed by MWRA in the nearfield, although we understand that chlorophyll and dissolved oxygen sensors are to be installed on NOAA buoy 44013 this June. This NOAA buoy is within the water column nearfield, but far from the ZID.

2009 Proposed Modifications

The proposed modifications to the plan are significant and summarized below.

Effluent

- End effluent floatables monitoring

² Letter from EPA and MassDEP to MWRA, Re: MWRA, NPDES Permit No MA0103284, Proposed Revision to Ambient Monitoring Plan, March 4, 2004.

- Change special study metals and organic chemicals sampling frequency from weekly to 4 times per month

Water Column

- Reduce the total number of water column stations from 34 to 10
- Reduce the number of surveys from 12 nearfield and 6 farfield to 9 surveys which will include all ten sampling locations.
- End all water column monitoring in Cape Cod Bay and Stellwagen Bank.
- End productivity measurements
- End some water chemistry testing
- End net tows for floatables
- End whale observation reporting
- Added instrumentation to buoys off Cape Ann and at NOAA Buoy 44013, located about 4.5 nm southeast from the outfall diffusers

Seafloor/Benthic

- Reduce soft-bottom community monitoring stations from 33, monitored in alternating years (16 one year, 17 the next) to 13, but returning to annual testing.
- Reduce sediment contaminant monitoring stations (same stations and reductions as described above for soft-bottom community monitoring stations)
- End annual sediment contaminant sampling at 2 nearfield stations
- Reduce sampling frequency for hard bottom study to once every three years
- End nutrient flux study

Comments and Questions on 2009 Proposed Modifications

General Comments

A. EPA preliminarily agrees that an appropriate reduction of far field monitoring is supported by the data, but may not agree with all of the specific proposed reductions. We would like to have further discussion regarding whether sufficient monitoring parameters and stations have been maintained to support MWRA's modeling and responsive strategy and to track regional changes in water quality for comparison with changes in the nearfield.

B. Having already agreed to a significant reduction in nearfield monitoring in the 2004 modification, EPA preliminarily does not believe that a general reduction in nearfield sampling is warranted, especially in light of the fact that continuous monitoring stations near the outfall, supported by EPA, MassDEP and OMSAP, have not been established. EPA also wishes to discuss re-focusing the nearfield sampling to confirm that water quality standards are being achieved in the vicinity of the outfall, at the edge of the ZID. (See specific comments Nos. 2, 3, and 4 regarding monitoring near the boundary of the ZID.)

C. MWRA should provide an evaluation of whether the proposed sampling reductions will ensure that its proposed monitoring program (including the number and location of stations, and the parameters sampled) is sufficient to meet the information requirements of the Contingency Plan.

D. It is not clear from the proposal that MWRA is continuing to maintain sampling at stations that have shown changes or trends for certain parameters. Marine environmental parameters should be monitored at areas expected, based on previous modeling and monitoring, to have impacts from the outfall discharge. For example, both the phytoplankton and zooplankton communities appear to be changing³ in the nearfield area and it is important to both maintain sampling at these stations, but to also incorporate farfield stations to discriminate between outfall-related effects and regional processes. Another example is that the benthic monitoring shows occasional increases in anthropogenic contaminants (e.g. copper) in the nearfield soft bottom sediments.⁴ Are the proposed stations located in areas expected by modeling to experience elevated sediment accumulation?

E. The monitoring plan should include measures of living resources, such as winter flounder. Continued observations of diseases or external conditions⁵ potentially attributed to contaminants discharged by the outfall needs to be maintained.

F. Some adjustments to the presentation of material that would facilitate review of the proposed modification by the public and other reviewers not familiar with all of the underlying reports include:

- Map(s) showing the overall changes in sampling locations from the baseline program to the present proposal. EPA requests that the MWRA provide a 1:100,000 scale map showing 1) the baseline sampling locations in the 1991 sampling plan; 2) the post-discharge sampling locations (Phase II Plan); 3) the sampling locations in the 2004 Revision; and 4) the sampling locations proposed in the 2009 modification. All locations should be shown on one map (if possible) with symbols that identify the locations by monitoring plan and sampled constituents. If it is not possible to clearly show both water column and benthic stations on one map, separate maps may be prepared.

The map(s) should also show the location of the outfall, the location of the ZID as defined in the 1998 Fact Sheet, and the nearfield as defined by MWRA in their technical reports, for both water column and benthic sampling.

³ Specifically, diatoms are declining in the nearfield, and *Phaeocystis* is increasing, especially in the winter/spring period. Libby, et al., 2009. Water column monitoring in Massachusetts Bay 1992-2007: focus on 2007 results. Boston,: MWRA. Report 2009-04.

⁴ Maciolek et al. 2008. Outfall benthic monitoring interpretive report: 1992-2007 results. Boston: MWRA. Report 2008-20.

⁵ Moore et al. 2009. 2008 Report for flounder monitoring. Boston:MWRA. Report 2009-01.

- A summary evaluation for each sampling location to be eliminated. The summary should include an overview of the sampling data collected over the period of record including any samples results exceeding water quality standards, or that caused or contributed to exceedances of contingency plan thresholds or warning levels. The summary should also describe the original purpose for the site's selection, an explanation why the site is no longer necessary, and justification for why eliminating the station will not impact the ability to detect future changes.

Specific Comments

Effluent

1. MWRA proposes to eliminate effluent floatables monitoring. EPA recognizes that the sampling requirement is unusual. However, given that visible fat particles have been reported in the ambient net tows, and SA water quality standards require that these waters "...shall be free from oil and grease and petrochemicals," EPA believes that further investigation into the process by which oil and grease particles are released into the receiving water may be necessary. This may require further effluent data collection and/or ambient tows (also see comment 7 below).

Water Column

2. We are particularly concerned that the nearfield stations that MWRA is proposing to eliminate are N10, N16, and N20. Stations N16 and N20 are two of only three stations inside the boundary of the nearfield, and data from N10 appears to show values higher than from the stations at the other corners of the nearfield. All of these stations have, to varying degrees, indicated effects from the outfall discharge plume, including relatively high total nitrogen concentrations at N16 (see comment 4). Retaining these specific stations, where changes have been observed, is also important for purposes of having a continuous record of changes over time.

3. In the current monitoring plan, the nearfield water column monitoring station (N20) closest to the outfall is located approximately 3,600 feet west of the diffuser, and approximately 3,400 feet west of the ZID. The next closest nearfield location is more than twice that distance from the outfall. EPA believes that MWRA should evaluate establishing at least one new monitoring location at the boundary of the ZID to monitor the effect of plume constituents on water quality. Such a station would help to provide a confirmation of plume dilution, especially the extent to which pollutants build up near the outfall, which was not a component of the dye studies done in 2001. The specific location of the station(s) should be based on the best understanding of the movement of the plume.

4. While the discharge of total nitrogen is within the limit established by the contingency plan, the DITP effluent concentrations (avg = 24.4 mg/l⁶, range 16.0-36.2 mg/l, n=100) are relatively high compared to other secondary treatment facilities in Massachusetts,

⁶ Based on Discharge monitoring reports (DMRs) submitted by MWRA from September 2000-December 2008.

which average 19.6 mg/l total nitrogen. Sampling at current nearfield stations, which are all farther than 2 kilometers from the outfall, has shown concentrations as high as 0.36 mg/l, 2007. Suggested water quality criteria for total nitrogen in estuarine waters are about 0.4 mg/l total nitrogen⁷. While data suggests that the stratification in the water column typically prevents the discharge from reaching the surface during the critical summer months, we believe that collection of measures of eutrophication near the ZID is appropriate. Such monitoring could consist of a combination of continuous remote monitoring stations and periodic sampling stations, both perhaps augmented by aerial surveys and intensive response monitoring should blooms be detected.

MWRA has notified us that it has made arrangements to have chlorophyll and dissolved oxygen sensors installed on NOAA buoy 44013, located about 4.5 nautical miles southeast of the outfall, and that this installation is scheduled for June 2, 2009. Comparing the NOAA buoy data with data collected close to the ZID would give further insight into whether blooms are local or regional.

5. MWRA should evaluate shifting at least a limited number of water column and/or benthic monitoring stations. It appears that there are few, if any, stations where both water column and benthic data are collected. It would seem that aligning some of the water column and benthic stations may be useful in determining the relationship between water column and sea floor effects (also see comment 9 regarding the location of benthic stations).

6. The water quality monitoring data and the continuous measurement instrumentation should be employed to improve the water quality model to be operated in a forecast mode. For example, the MWRA should provide additional information on how results from the water quality instrumentation on the NOAA weather buoy 44013 will assist interpretation of water quality parameters between monitoring events. The location of this buoy should also be justified in terms of its proximity to the outfall (i.e. was the use of this buoy merely convenient or is it the best location for the purposes envisioned by MWRA?).

7. The characterization in the proposal of effluent floatables quantities as "...only low (parts per billion) levels of floatables..." is at odds with observations and sampling results presented by MWRA in previous reports, most notably those presented in the recent reports, "*Summary of "floatables" observations in Deer Island Treatment Plant effluent and at the discharge site in Massachusetts Bay: 2000 – 2007 (ENQUAD 2008-08)*" and "*2007 outfall monitoring overview RESULTS (ENQUAD 2008-17)*". While the "concentration" of floatables calculated as a percentage of total discharge volume may be low, as reported by MWRA, the presence of visible fat particles in nearly 70% of the net tows since 2004 should be examined further as to whether MWRA's assertion that the particles "...do not have a significant aesthetic impact" (ENQUAD 2008-08) is accurate, and whether such observations are in compliance with water quality standards. MWRA's analysis should further determine whether such discharges are typical of other ocean

⁷ See http://www.oceanscience.net/estuaries/report/WestFalmouth/WestFalmouth_Executive_Summary.pdf

outfalls. While the overall number of debris tows may be reduced, they should not be eliminated and MWRA must provide some form of analysis of cause and prevention.

Seafloor

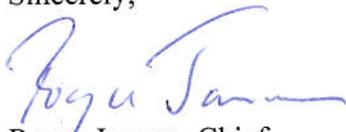
8. EPA is concerned with the reduction in the frequency of hard-bottom station monitoring. MWRA should evaluate the utility of coupling a reduction in hard bottom sampling with a program to conduct some hard bottom monitoring as rapid response monitoring – in response to elevated TSS discharges from the DITP - to determine if there is a link between plant discharge and hard bottom characteristics.

9. In General Comment F, EPA asked that MWRA provide enhanced mapping of ambient monitoring stations and summaries of monitoring data. Such enhanced mapping should include gradient diagrams of sea floor concentrations for both pre-startup and current conditions of such parameters as silver, copper, *Clostridium perfringens* spores, chlordane, and other compounds as appropriate. This information would help provide accurate spatial understanding of the plume footprint. Such information must be presented at a scale that allows detailed understanding of the plume footprint with respect to both nearfield and farfield monitoring locations and would be very helpful in determinations of benthic and water column monitoring locations (see comment 5). The information should be presented in such a manner that is readily understood by members of the public and all other reviewers.

Please note that this letter represents the preliminary views of EPA only. We are not speaking for MassDEP or for any of the other federal and state agencies that have an interest in this matter. We specifically expect that the National Marine Fisheries Service may have comments on this proposal pursuant to the Endangered Species Act.

If you have any questions regarding this letter, please call me at (617) 918-1621.

Sincerely,



Roger Janson, Chief
Municipal Permit Branch
Office of Ecosystem Protection

cc: Glenn Haas, Acting Assistant Commissioner, MADEP
Andrew Solow, Chair, OMSAP
Chris Mantzaris, National Marine Fisheries Service