

December 13, 2000

Ms. Arleen O'Donnell, Assistant Commissioner
Bureau of Resources Protection
Department of Environmental Protection
1 Winter Street
Boston, MA 02108

Ms. Linda Murphy, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency
Water Technical Unit "SEW"
P.O. Box 8127
Boston, MA 02114

Re: Massachusetts Water Resources Authority, Permit Number MA0103284
Notification Pursuant to Part I.8. Contingency Plan

Dear Ms. O'Donnell and Ms. Murphy:

One effluent quality parameter that MWRA monitors for Permit Compliance and Contingency Plan purposes is pH--that is the degree to which the final effluent is alkaline (high pH) or acidic (low pH). MWRA's Permit and Contingency Plan specify that the pH of the final effluent, monitored daily, be not less than 6.0 nor greater than 9.0, measured in standard units.

On December 7, 2000, the effluent pH at Deer Island measured 5.8, which is slightly lower than the permitted limit. This result triggers a notification requirement under the Contingency Plan. This letter and its attachments constitute that notification.

MWRA has explored potential causes of this excursion and has found no reason to believe that there was a treatment plant upset or evidence of unusual industrial discharges that impacted the pH of the influent. Since December 7, pH measurements have been within permit limits (Attachment A).

A pH slightly lower than the permit limit in the discharge would not change the pH of the receiving water more than 0.2 standard units outside the normally occurring pH range, in accordance with standards for class SA waters. This is because at MWRA's outfall, the large dilution afforded by the diffuser (immediate dilution at the outfall is at least 50-fold) and the great buffering capacity of seawater means that a pH effect on the receiving water of a slightly acidic discharge would be so slight as to be undetectable. Experiments conducted by MWRA to measure the effect of Deer Island effluent on the pH of seawater show that even with a dilution factor of only 10-fold, the discharge would not change the pH of the receiving water more than 0.2 standard units, therefore with a dilution of 50-fold the discharge will not change the pH of the receiving water outside the normally occurring pH range.

As data from its secondary treatment at Deer Island have accumulated, MWRA has become aware that the technology it uses might occasionally cause the pH of the final effluent to measure lower than 6.0.

MWRA's secondary treatment process uses pure oxygen. Pure oxygen causes the microbes which carry out secondary treatment to respire very quickly, producing very large quantities of carbon dioxide faster than it can diffuse from the wastewater into the air. Until it finishes this "outgassing," the carbon dioxide lowers the pH of the wastewater. At Deer Island, the pH of secondary-treated effluent at the final measurement location is on average about 0.2 pH units lower than the influent pH. In reality, though, pH will rise as carbon dioxide outgasses from the effluent as it travels down the drop-shaft to the outfall tunnel, increasing the pH over what can be actually measured because it is not logistically possible to sample within the drop shaft or tunnel.

MWRA is in the process of preparing a request to EPA and DEP for a permit modification to its pH limit. As part of this preparation, MWRA presented the pH issue to the Outfall Monitoring Science Advisory Panel (OMSAP) at its November 16, 2000 meeting (Attachment B). OMSAP voted to support MWRA's request for a modification to the permit either by expanding the lower range of acceptable effluent pH, or by adding standard language to the permit which allows for excursions of the pH limit under certain well-defined conditions.

There are two attachments to this letter:

[Attachment A:](#)

November 1- December 10 Influent and Effluent pH Data, Deer Island Treatment Plant

[Attachment B:](#)

Information Briefing Document to Outfall Monitoring Science Advisory Panel "Modification of permit requirement for pH"

Please let me know if any of MWRA's staff can give you additional assistance regarding this notification.

Sincerely,

Michael J. Hornbrook
Chief Operating Officer

Cc:

Environmental Protection Agency, Region I (EPA)

Matthew Liebman

Janet Labonte-Deshais

Eric Hall

Massachusetts Department of Environmental Protection (DEP)

Steve Lipman

Cathy Coniaris

Outfall Monitoring Science Advisory Panel

Andrew Solow

Robert Beardsley
Norb Jaworski
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National Marine Fisheries Service
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Stellwagen Bank National Marine Sanctuary
Craig MacDonald

Cape Cod Commission
Steve Tucker

Hyannis Public Library
Ann-Louise Harries

MWRA Library
Mary Lydon