

August 23, 2002

Mr. Glenn Haas, Director
Division of Watershed Management
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 Mr. Haas and Ms. Murphy:

One of the parameters used to monitor the efficacy of wastewater treatment at the Deer Island Treatment Plant (DITP) is Total Suspended Solids (TSS) in the effluent. MWRA's discharge permit and Contingency Plan limit MWRA's discharge of TSS to a weekly average of 45 mg/l. On August 19, 2002 MWRA confirmed that the average weekly TSS for the period August 11 to 17 was 45.7 mg/l. This exceeds the permit limit, and is also a Contingency Plan exceedance, triggering a notification requirement under the Contingency Plan. This letter constitutes that notification. As described below, elevated TSS in the effluent was associated with an "upset" of the treatment plant secondary process, caused by overgrowth of filamentous bacteria. The bacteria growth is believed to be related to a discharge of sulfate-rich industrial effluent to the DITP through MWRA's Alford Street Pump Station.

Background: MWRA allowed the discharge of high sulfate wastewater through the Alford Street Pump Station as part of a study to determine the effect of a particular industrial discharge on odor and corrosion in MWRA's Framingham Extension Sewer (FES) and downstream sewers. The objective of the study was to measure whether removing this discharge would remediate the levels of hydrogen sulfide and sulfuric acid in the FES, which cause odor and corrosion. The plan was to stop the discharge into the FES, and haul the industry's wastewater for discharge to a location closer to DITP. Sampling the sewers downstream of the industry and downstream of the Alford Street Pump Station would be done during the industry's normal operating conditions to obtain a baseline set of data and then during the hauling phase to observe the changes in the system. Discharge of the wastewater through the Alford Street Pump Station began on August 13, 2002.

Upset of secondary treatment process: Before August 13, the TSS in DITP effluent was normal and well within permit limits. As shown in the table below, the TSS in DITP's effluent test results began to rise on August 13. The rise in TSS corresponded in time to the industrial discharge activities, indicating a cause and effect relationship. Visual and microscopic examinations of wastewater were consistent with overgrowth of filamentous bacteria that grow using sulfur compounds. These bacteria are typically present in secondary reactors but can disrupt the secondary process if they become too

abundant. The additional loading of sulfate from the hauled waste was a substantial increase over the normal daily load to DITP, and was received as an intense “slug” over a relatively brief period of time, approximately an hour, on three consecutive days. It is likely that the sudden increase of sulfate and sulfide concentrations in the wastewater, along with the low flow and hot weather, provided very favorable conditions for the rapid growth of the filamentous bacteria. The bacteria form mats that float in clumps on the surface of the wastewater; these clumps do not settle out during the secondary clarification process, thereby impeding the removal of TSS. When the problem became apparent on August 15, the industry was directed to immediately cease the field study, and DITP operators began remedial action.

Total suspended solids in DITP effluent

	TSS (mg/l)
August 11	14.7
August 12	16.0
August 13 ¹	22.5
August 14 ²	41.0
August 15 ³	49.0
August 16	74.7
August 17	102
Weekly average⁴	45.7
August 18	132
August 19	100
August 20	62
August 21	56

¹ 5535 gal. 3,047 lbs sulfate

² 8113 gal. 4,601 lbs sulfate

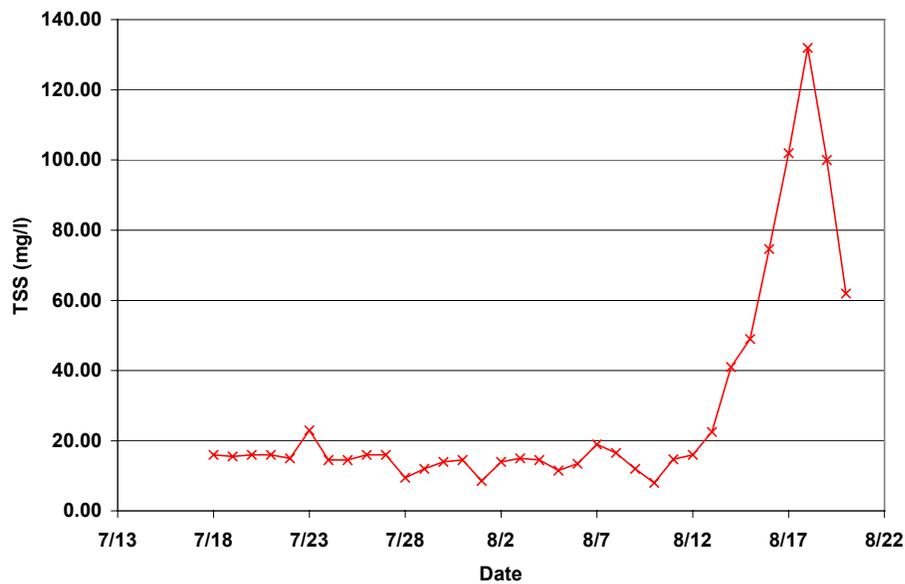
³ 8405 gal. 4,767 lbs sulfate

⁴ Permit limit = 45 mg/l

Note: The sample time for a given date is a composite collected from approximately 7:30am on that day to approximately 7:30am on the following day. The sample results become available mid-afternoon the following day. For example, the August 17 sample was collected from approximately 7:30am on the 17th, to 7:30am on the 18th, the data were available on the afternoon of the 18th.

Final effluent TSS data for mid-July through August 21 are presented graphically on the next page. The graph illustrates how stable the process was in the weeks preceding the exceedance, and how rapidly process performance degraded, beginning August 13.

Final Effluent TSS (mg/l)



Corrective Action: Over the course of several days, MWRA staff made operational adjustments including increasing pre-treatment with hydrogen peroxide to reduce the aqueous sulfide load to the plant, operating adjustments to process flow schemes, and increases in disinfection chlorine residuals to reduce TSS in the effluent and to ensure effective pathogen kill during this period of high TSS. Chlorination of process microorganisms to kill off the filamentous bacteria began August 19. These efforts resulted in improvements in treatment by August 20, as Battery C was functioning well, and effluent TSS began to drop. However, Battery B was still impacted, and further chlorination to kill off most of the microorganisms in the Battery B was deemed necessary. The biological process in Battery B has been restarted, but will take several days to become fully functional. Although the system is recovering, we expect that the weekly average TSS permit limit will be exceeded again, for the period August 18 to 24, because the effluent TSS was relatively high on August 18 and 19. It is possible that the permit monthly average limit of 30 mg/l TSS may be exceeded for August.

Environmental Effects: Primary treatment has been normal, and bacteria and total chlorine residual permit limits have been met throughout this upset. The treatment plant upset has not been lengthy, with one battery of secondary restored to normal after three days. Therefore, we do not anticipate adverse environmental impacts. However, if there are any impacts in the water column or in the sediment, MWRA expects that it will be able to detect them because its ocean monitoring program in the vicinity of the outfall discharge is especially intensive in August. The monitoring includes August 19-22 nearfield/farfield water quality and pathogen surveys; August 26-29 harbor and nearfield sediment profile imaging; and mussel bioaccumulation arrays, which have been in the water at the outfall site since late June. Also, the U.S. Geological Survey's (USGS) mooring at the outfall site collects time-series suspended sediment samples over successive nine-day intervals.

In addition, USGS collected nearfield and farfield sediment samples for biology and chemistry the week before the upset. A subset of the nearfield stations will be sampled again in October or November for sewage tracer and sediment contaminant analyses.

Staff are fully focused on returning DITP to its full secondary capacity as quickly as possible.

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)

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