April 7, 2004

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

Mr. Glenn Haas, Director
Division of Watershed Management
Department of Environmental Protection
1 Winter Street
Boston, MA 02108

RE: Massachusetts Water Resources Authority
NPDES Permit Number MA 0103284
Deer Island Treatment Plant Power Failure and Bypass, April 3, 2004

Dear Ms. Murphy and Mr. Haas:

In accordance with Part II.D.1.e. of MWRA's NPDES Permit Number MA 0103284, the Massachusetts Water Resources Authority ("MWRA") is submitting this written notification, which is a follow-up to its verbal notification made on April 3, 2004, regarding an electrical power failure and subsequent pumping failure at MWRA's Deer Island Treatment Plant ("DITP") during a major storm.

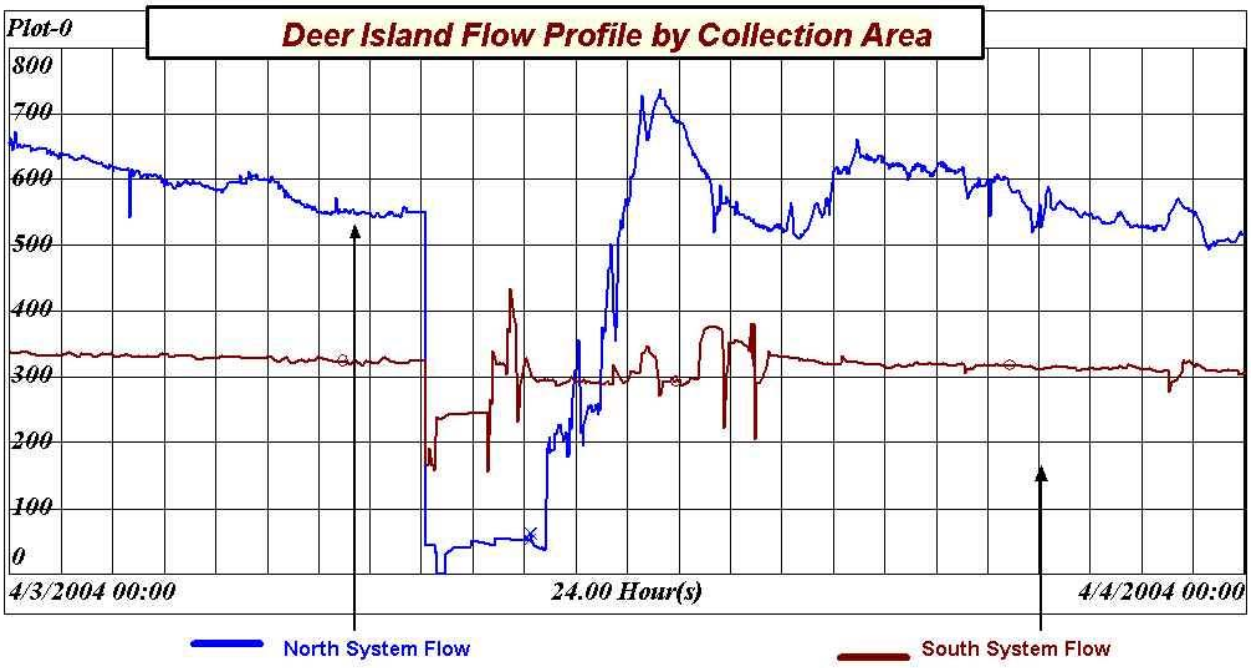
From March 31 to April 2 a major storm (approximately 50-year storm, with a total 6 to 7 inches) occurred in the greater Boston area causing widespread flooding, overflows and sewer surcharges. The most significant consequence of the heavy rains to MWRA was a power and subsequent pumping failure at DITP on Saturday, April 3 which was caused by a rain water leak in NStar's power substation on Deer Island. Water leaking through the roof caused a short-circuit within NStar's power substation and the failure of a breaker control switch for a transformer in the Deer Island electricical system, during the high flow period at 7:54 a.m. As a direct result of the control switch failure, the North Main Pump Station (NMPS) temporarily lost all pumping capability and the Winthrop Terminal Facility (WTF) and South System Pump Station (SSPS) lost some pumping capacity.

NStar supplies power to Deer Island through one cross-harbor submarine cable to NStar's substation located on the northern end of Deer Island. Deer Island's electrical distribution system consists of two electrical feeders from the NStar substation, the "A bus" and the "B bus." The use of two feeders ensures redundancy in the event of an electrical problem on either side of the system. For example, if a problem occurs in the A bus, the B bus will continuously provide power to half the treatment process. In the event of a power interruption, power needs to be transferred manually from the affected bus to the other bus. The system is designed to protect DITP electrical equipment from problems related to the NStar power supply.

At the time of the NStar power failure, DITP was operating some pumps from the NMPS, SSPS, and WTF on the A bus and some on the B bus. The power failure affected the B bus, causing the loss of three of five active pumps at SSPS, and one of two pumps at the WTF. However, at NMPS all of the pumps, including pumps on both the A bus and B bus, shut down.

Power was restored by MWRA staff within minutes. MWRA was able to immediately bring on an additional pump at WTF, and began the process of increasing pumping at SSPS. However, none of the pumps at NMPS could be restarted. Upon investigation, staff discovered that a control panel that provides status updates to the NMPS pumps was not energized. The control panel signals "permissives" to each of the NMPS pumps to start the units ensuring that the pumps start safely. Power is supplied to the control panel through an Uninterruptible Power Supply (UPS). Staff found that the UPS had failed during the outage period, and that the automatic bypass for the UPS unit also failed. Staff manually bypassed the UPS and reestablished power to the control panel at 10:15 a.m. NMPS pumps were then systematically brought back on line. North Main pumping was fully restored by 12:15 p.m.

The figure below shows the flow to DITP from the North and South Systems for the period surrounding the power and pumping failure.



NStar replaced the shorted control switch Saturday evening and power was restored to the B bus on Saturday night at approximately 8:00 p.m. NStar staff placed tarps over the control switches for protection against additional water damage from the leaking roof on their substation. This will temporarily ensure additional control switches are not affected until the roof is repaired by NStar.

NStar had been previously notified to repair all leaks in their Station 132 and to inspect all other switches to ensure that no water damaged occurred.

North System Impacts

As a result of the shutdown of the NMPS, the three remote headworks – Ward Street, Columbus Park and Chelsea Creek – had to shut their influent gates to protect the facilities from flooding. Because of the heavy rains, there was limited storage in the MWRA and local sewer systems upstream of the headworks. Some influent to Ward Street Headworks was redirected to the Cottage Farm CSO facility where it was treated before discharge. Some MWRA overflow sites which were active during and after the storm reactivated on April 3. MWRA is still evaluating data to determine whether the reactivations were caused by the loss of pumping and/or other environmental factors such as diurnal flow or tidal fluctuations.

South System Impacts

During the power failure, staff temporarily isolated Nut Island Headworks to protect the facility. A portion of the South System flow was bypassed around the headworks facility to the Inter-Island Tunnel. To prevent flooding, staff temporally re-opened the Archdale Diversion to provide some relief to the High Level Sewer. Also, flow at the Smelt Brook site in Weymouth, which was still active from the storm, may have been increased.

The pumping failure required MWRA to close the influent gates to four headworks facilities to prevent loss of life, personal injury, and severe property damage to the headworks facilities and the personnel working at the facilities. There were no feasible alternatives to the bypass. MWRA used available in-system storage and relief points to prevent injury and property damage to residents, homes and businesses in the communities it serves.

MWRA is currently carrying out a more detailed analysis of the event, including the cause(s) of the power and pumping failures, estimates of the volumes bypassed, environmental impacts, and short- and long-term measures to address the parts of the system that failed. As soon as this analysis is available, MWRA will provide a detailed report to EPA and DEP.

If you have questions about this notification, please do not hesitatate to call me at (617) 788-4359.

Sincerely,

Michael J. Hornbrook
Chief Operating Officer

cc: E. Hall, EPA
B. Pitt, EPA
K. Honkonen, EOEA
C. Coniaris, DEP
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