

**Appendix B2**



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February 11, 2004

Mr. Joseph B. Haberek, P.E.  
RIDEM  
235 Promenade Street,  
Providence, Rhode Island, 02908-5767

Re: *RIDEM Permits and Modifications to Permits (PN04-15), and Documents in Support of Permit Limits including, "Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers"*.

Dear Mr. Haberek:

The MA Department of Environmental Protection (MADEP) wishes to thank you for the opportunity to comment on the proposed RIDES permits and documents upon which the proposed permit limits were based. MADEP understands the importance of the overall goals of preserving, protecting and restoring the water quality of the Providence and Seekonk Rivers and Narragansett Bay. Based upon past and present information, MADEP is in agreement that significant effects have been well established in these receiving waters. Observations by RIDEM have documented high levels of increased algal productivity, low dissolved oxygen, and additional violations of water quality standards that translate into detrimental effects on fishing and shellfishing and the overall health of the Rivers and Bay.

MA DEP also supports RIDEM's statements that an adaptive management approach is needed to set forth a nutrient reduction and cleanup plan that is technically sound, environmentally responsive, and economically achievable. Overall, our goal is to limit and reduce the nutrient impacts in the Blackstone River system and achieve water quality compliance. Although MADEP is in agreement on the approach and overall goals outlined in the various documents provided, we believe that the information and data upon which the permit limits are based are insufficient to justify specific reductions from Massachusetts' facilities. To address these areas the MA DEP is providing the following recommendations and actions for your consideration:

- Monitor and establish MA Wastewater Treatment Facility (WWTF) loadings, and loading at the state line to define MA contribution. (MADEP)

This information is available in alternate format. Call Donald M. Gomes, ADA Coordinator, at 1-617-556-1057. TDD Service - 1-800-298-2207.

DEP on the World Wide Web: <http://www.state.ma.us/dep>

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- Optimize existing operations at the Upper Blackstone Water Pollution Abatement District, Attleborough and North Attleborough wastewater treatment facilities to reduce nitrogen in their effluent to the extent practicable (MADEP).
- Determine loadings for all potential sources. (RI with MA input)
- Expand upon the evaluation in this report to include the additional sources including CSOs, local nonpoint sources, atmospheric inputs, etc. along with wet weather inflows and their respective and relative contributions to the Bay. (RI)
- Define a target concentration in the Bay and/or river needed to meet load reductions predicted by the analysis. (RI with MA input)
- Determine nitrogen attenuation in the MA portion (and to the Bay) of the rivers. (MA joint effort with RI)
- Based on the loading analyses, evaluate the necessity of load reductions at MA facilities after the completion of RI's WWTF upgrades, as sources closest to the problem need to be dealt with first. (RI joint effort with MA)
- Re-evaluate the loadings from UBWPAD facility now under design once the WWTF is constructed and on-line (MADEP).

As previously noted, our review of the data and other supporting documents have raised a number of concerns and issues that we believe need to be resolved to justify pushing limit of technology permitting decisions in MA. These concerns fall into several categories, which can be summarized as follows:

1. The analysis completed by RIDEM did not account for non-POTW loadings and their potential impacts including, but not limited to, combined sewer overflows (CSO's) and storm water contributions.
2. The analysis treated all POTW contributions equally rather than consider greater reductions for those facilities located closer to the receiving water where impacts have been observed.
3. The model used by RIDEM didn't account for all sources and sinks of nitrogen to the impacted water bodies nor did it consider the importance of detention time and hydrodynamics of both the river and embayment systems.

A more detailed explanation of each of these, as well as other issues, is attached to this letter. However a brief explanation follows.

MA DEP believes, the identification of all sources and their relative importance have not been well established in the RI DEM documents, which is the basis for the proposed permit limits. Major omissions not identified in the documents include, but are not limited to, nitrogen loads from local contributing non-point sources such as groundwater (i.e. septic system) and combined CSOs, atmospheric deposition, effect of sediments on nitrogen flux, and effects of tidal ranges and currents within the Bay and River systems on dispersion, dilution, and effective retention time. Without a complete, consistent, and logically progressed evaluation of the sources and their contributions, financially expensive solutions are being proposed in these documents for implementation without confidence that the projected benefits will be obtained once construction is completed and the solutions are implemented.

The present analyses are also based on extrapolation from a series of laboratory tank studies (MERL) to a dynamically active river and bay system. These laboratory experiments replaced the computer model, which had been discarded due to an inability to calibrate the model in the shallow areas where impacts are documented and in the deep channel where stratification occurs. If the results of a computer model cannot be used to replicate this complex system, MA DEP questions if a static laboratory study and desktop analysis could justify the proposed specific permit limits. In addition, while the unique aspects of the Seekonk and Providence Rivers currently preclude representing them in a mathematical model, it seems likely that the open water portion of Narragansett Bay could be modeled and such a model would be a useful tool to addressing water quality issues and alternative control strategies.

Among loading models, those based on area alone, although useful, are the most uncertain. For example, in the case of the Providence and Seekonk Rivers, area-loading rates were used to estimate impacts using the URI MERL experiments however the MERL experiment used a dramatically different residence time (27 days) than is likely experienced in the two river systems (on the order of hours or a couple of days). Such a discrepancy is at best inconsistent and not representative of the actual condition in the rivers. This strongly suggests the need to approach controls through adaptive management, a major component of which has to be a technically sound monitoring program. Such a program must recognize that natural systems are highly variable and more than one data set is needed to characterize such systems. Rhode Island does indicate it has plans to track the changes resulting from the reductions in N loads required in the proposed NPDES permits to its major wastewater treatment plants. MA DEP supports this effort, and recommends that the monitoring be expanded to also document the impacts of those changes in both the riverine and marine waters. We also note that funding seems to be for only one year (2005) right now.

These issues aside, the one remaining and potentially most detrimental to the Providence and Seekonk Rivers and possibly the Bay, which is not discussed in the report, are the significant quantity of CSOs in this highly urbanized area. CSOs typically discharge large quantities of nitrogen over short periods of time into these confined river channels. No mention or related analyses is included in the documentation provided. MA DEP is under the impression that there is a plan to increase the Bucklin Point Facility to discharge up to 116 mgd in part to help address the CSO problem. This number far dwarfs any contribution from upstream MA WWTFs, which are moderated by distance through instream and sediment attenuation. Since CSO discharges are a significant contributor to nitrogen loads in the River and Bay, DEP believes that any analysis of cause and effect on these waterways without the inclusion of wet weather and CSO effects is a major omission. In the permits, these large nutrient pulses are being regulated using monthly average loads with no regard to daily maximum concentrations or total daily loads, the time period over which the CSOs discharge, into these confined and shallow waterways.

MA DEP would also like to note that our review of the supporting documents indicates that final decisions as to the level of nitrogen reduction required at each facility appear to be based on both the size of the facility and the cost to achieve the desired limits rather than the proximity and combined impact these facilities have on the receiving waters. For example, RIDEM has proposed that the larger facilities of Bucklin Point, Fields Point and Upper Blackstone WPAD achieve a permit limit of 5.0 mg/l total nitrogen while the remaining RI facilities, as well as the MA facilities in Attleboro and North Attleboro, would have a proposed limit of 8.0 mg/l. MA DEP questions the validity of this approach for several reasons. First, a footnote to RIDEM's cost analysis clearly states that cost evaluation incorporated should not be used for facilities over 30.0 mgd yet it appears it was for the three larger facilities. Second, MA DEP believes RIDEM needs to justify why the UBWPAD needs to achieve a discharge of 5.0 mg/l TN when it is 50 miles away and receives significant dilution and possibly significant attenuation before getting to RI while the remainder of the facilities in RI, that total well in excess of the UBWPAD (more than 50 mgd) and discharge directly to the impacted waters only have to achieve 8.0 mg/l.

Although MA DEP believes the above issues, as well as others raised in our attached comments, need to be addressed in greater detail; MADEP still believes that an adaptive management approach is justified. MADEP has a long history in both studying the Massachusetts Rivers, which are a part of this system, and in designing and implementing controls to the sources. Upgrades are being completed at a number of WWTFs in Massachusetts including the Upper Blackstone Water Pollution Abatement District (UBWPAD), and the associated City of Worcester CSO, at costs ranging to 120 million dollars for these two facilities, which will further limit the discharge of pollutants to the Blackstone River including nitrogen. MADEP involvement in comprehensive studies such as the multi-year, multi-agency, inter-state Blackstone River Initiative were all in support of improvements. Given this fact, it seems reasonable that an appropriate adaptive management plan would consist of allowing the significant upgrades in Worcester to occur, address all local sources to the impaired waters in RI, and monitor the results of these actions prior to requiring additional severely restrictive and costly upgrades in MA.

MADEP also believes that concurrently with the evaluation of the RI upgrades during the first phase, the following unresolved issues need to be addressed prior to any additional changes: What is the actual concentration of nitrogen which will protect and restore the bay? What loading reduction will meet that concentration? What is the relative contribution from the other sources (e.g. air deposition, stormwater, other local nonpoint sources and runoff, septic, etc.)? What is the attenuation of nitrogen in Massachusetts' waters, and how much nitrogen is actually leaving Massachusetts over the state line?

To assist with this effort MADEP has been working with the Blackstone "data team" to identify existing data gaps and recently committed to the development of work plans to address data needs associated with nitrogen releases and impacts as well as other important gaps including the following:

1. Determining the total load of nitrogen leaving Massachusetts and entering Rhode Island.
2. Determining how much nitrogen originating from the UBWPAD is being attenuated before it leaves Massachusetts.
3. Determining nutrient flux in Massachusetts' impoundments.

This data and other information jointly developed by RIDEM and MADEP during the adaptive management approach will provide much more detailed data upon which future decisions can be made.

Finally, the recommendations previously outlined in this letter are based on the recognition that MA treatment plants are not going to be persuaded (nor could permit limits easily be defended) to undertake expensive treatment upgrades without solid evidence that the level of control is necessary to achieve water quality standards in the Rivers and Bay. In our opinion, the data we have seen thus far does not provide enough support to justify specific permit limits. In addition, even if load reductions that took account of all the above issues could be recommended, it is not evident that every plant would be required to undertake the same level of control; it might be equally effective, and more cost effective, to require different levels of treatment at different plants based upon size and nearness to the rivers and Bay. MA DEP believes it is scientifically appropriate to first control the sources that are closest to the point of impact (see Figure 1).

Attached in the following pages, please find our specific review comments with regard to the proposed permits, documents, and other analyses upon which the permit numbers are based.

I would like thank you for the opportunity to review these documents. If you have any further questions concerning these comments, please contact Rick Dunn of my staff at 508-767-2874.

Sincerely.

Glenn Haas  
Director, Division of Watershed Management

Cc's: Arleen O'Donnell, Deputy Commissioner, DEP  
Martin Suuberg, Regional Director, CERO  
Paul Hogan, Supervisor, MADEP NPDES Program  
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**Appendix B3**

**GUIDANCE ON DEVELOPING NUTRIENT CRITERIA FOR PROTECTING  
DESIGNATED USES OF WATER BODIES**

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September 1, 2005



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