



RHODE ISLAND

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

235 Promenade Street, Providence, RI 02908-5767

TDD 401-222-4462

May 18, 2007

Mr. David Pincumbe  
U.S. Environmental Protection Agency  
NPDES Permits Unit - CPE  
One Congress Street - Suite 1100  
Boston, MA 02114-2023

**Re: Draft National Pollutant Discharge Elimination System (NPDES) Permit  
MA0102369 for the Upper Blackstone Water Pollution Abatement District  
(UBWPAD) Wastewater Treatment Facility (WWTF)**

Dear Mr. Pincumbe:

The Rhode Island Department of Environmental Management (DEM) has reviewed the permit limits contained in the draft permit referenced above and does not object to the limits on nitrogen and phosphorus. Available information and analyses indicates it is likely that superior performance will be required in the future and EPA should ensure that the technology selected to comply with the permit can be modified to provide further treatment with minimal disruption of the selected treatment process. At this time, however, DEM has also determined that limits for other pollutants will result in violations of Rhode Island Water Quality Standards in RI waters.

The Environmental Protection Agency (EPA) established all water quality-based permit limits using background pollutant concentration of zero. This assumption is not reflective of actual conditions and when coupled with allocation of the entire criteria, results in permit limits that cause violations of the downstream RI Water Quality Standards. In addition, EPA utilized an instream hardness value of 65 mg/l, while DEM has determined that 50 ug/l is appropriate for the RI portion of the Blackstone River. The use of this hardness value further exacerbates the violation of the downstream RI Water Quality Standards. Finally, EPA should use effluent data collected as part of the bioassay testing to determine whether reasonable potential exists for the UBWPAD WWTF to cause or contribute to water quality violations for additional pollutants that are monitored as part of the existing permit's bioassay testing requirements.

Specific comments are noted below:

### Metals Limitations

The table below compares the instream concentrations at the MA/RI state line that result from the draft permit limits, to the RI Water Quality Standards calculated using a hardness of 50 mg/l at the state line. Although EPA has utilized an instream hardness value of 65 mg/l the DEM has determined that 50 ug/l is appropriate for the RI portion of the Blackstone River and has used this hardness to develop permit limits for RI permittees. The concentrations that will result at the state line were computed from a mass balance using a 7Q10 flow at the state line of 102 cubic feet per second and the WWTF flows and pollutant concentration limits contained in the draft permit. It should be noted that the resulting in-stream concentrations are artificially low as the EPA assumption of zero pollutant concentrations upstream of the UBWPAD WWTF and the assumption of no other sources to the River were used. Enclosed is an CD that contains the details of this analysis.

	Blackstone River Concentration at the RI Border <sup>1</sup>	RI Water Quality Standard	% Exceedance of RI Water Quality Standards
Copper	6.1 ug/l	5.2 ug/l	18 %
Zinc	77.5 ug/l	66.6 ug/l	16 %
Cadmium	0.17 ug/l	0.16 ug/l	5 %

<sup>1</sup>As noted above predicted concentrations are artificially low since the EPA assumption of zero pollutant concentrations upstream of the WBWPAD WWTF was utilized.

In addition, the Fact Sheet indicates that MADEP has submitted revised site-specific water quality criteria for dissolved copper of 18.1 ug/l chronic and 25.7 ug/l acute. The fact sheet also stated that, "if EPA approves these criteria, the limits in the final permit will be based on the revised criteria, the available dilution at 7Q10 flow, and the upstream concentration of copper under low flow conditions." It is the DEM's understanding that EPA has recently approved the revised criteria. Using these new criteria and EPA's monthly average permit limit calculation procedures, the copper concentration at the state line will be 17.6 ug/l, or 241% over the RI criteria of 5.2 ug/l. Therefore, DEM strongly objects to establishment of permit limits using the site specific criteria. The metals limits in the draft permit must ensure that RI water quality criteria will be met at the state line.

Finally, EPA should utilize effluent data collected as part of the bioassay testing to determine whether reasonable potential exists for the UBWPAD WWTF to cause or contribute to water quality violations for additional pollutants. It should be noted that the Woonsocket WWTF has a much greater dilution factor than the UBWPAD WWTF and

exhibits reasonable potential to exceed Cadmium, Copper, Cyanide, Lead, Silver and Zinc. Since EPA does not enter pollutant data collected as part of bioassay testing into ICIS, DEM was unable to evaluate reasonable potential for the following pollutants: Chromium, Lead, Nickel and Aluminum. At a minimum, based on typical lead levels seen in effluent at RI WWTFs, it appears that the UBWPAD would have “reasonable potential” for lead and, therefore, would require lead limits. To ensure that bioassay pollutant monitoring data is readily available for review, DEM requests that EPA list the pollutants monitored during the bioassay testing in Part I.A.1 of the permit.

The table below is excerpt from the Final 2006 Rhode Island List of Impaired Waters (“303(d) list”) and lists several waterbody segments that are impaired due to excessive metals and Phosphorus concentrations. As noted above the limits proposed by EPA would result in continued violation of many of these criteria even under the assumption that no other pollutant sources are present.

Waterbody ID	Waterbody Name	Cause	Group
<b>BLACKSTONE RIVER BASIN</b>			
RI0001003L-01	Scott Pond	LOW DO, EXCESS ALGAL GROWTH/CHL-A, Phosphorus	Group 1
RI0001003L-02	Valley Falls Pond	BIODIVERSITY IMPACTS, Lead (Pb), PATHOGENS, EXCESS ALGAL GROWTH/CHL-A, LOW DO, Phosphorus	Group 1
RI0001003R-01A	Blackstone River	Copper (Cu), PATHOGENS, BIODIVERSITY IMPACTS, Lead (Pb)	Group 1
		AMMONIA (UNIONIZED), NUTRIENTS, LOW DO	Group 5
RI0001003R-01B	Blackstone River	Lead (Pb), PATHOGENS, Copper (Cu), BIODIVERSITY IMPACTS	Group 1
		AMMONIA (UNIONIZED), NUTRIENTS, LOW DO	Group 5

As you know, pursuant to the NPDES regulations at 40 CFR 122.44(d) and 33USC Sec.1341(a)(2), NPDES limits must achieve compliance with water quality standards and limits must be included in permits where pollutants will cause, have reasonable potential to cause, or contribute to an exceedance of the State’s water quality. As noted above the limits contained in the draft permit will result in violations of RI water quality standards and therefore, the limits must be revised using a Waste Load Allocation (WLA) strategy that includes an appropriate margin of safety to account for any lack of knowledge concerning the relationship between effluent limits and water quality, ensures an equitable distribution of pollutant loads and that at a minimum meets all Rhode Island water quality criteria at the state line.

**Nitrogen Limitations**

DEM is pleased that the fact sheet associated with the draft permit acknowledges that a significant portion of the overall nitrogen loading that discharges to Narragansett Bay originates from WWTF effluents in Massachusetts, and that EPA believes that limits on total nitrogen must be considered at the Massachusetts WWTFs to protect the downstream uses in Rhode Island. The nitrogen limit and the requirement to operate the

treatment facility to reduce the discharge of total nitrogen during the months of November - April to the maximum extent possible, using all available treatment equipment in place at the facility contained in the draft permit is comparable to those required of RI WWTFs.

The Seekonk River is the most nutrient impacted area of Narragansett Bay. This segment currently receives nitrogen loads at a rate 24 times higher than the average loading to Narragansett Bay (24X). Application of the Marine Ecosystem Research Laboratory (MERL) nutrient enrichment gradient studies conducted at the University of Rhode Island indicates that reduction to the 2X to 4X level is required to meet water quality standards. The Ten Mile and Blackstone Rivers both receive discharges from WWTFs and flow into the Seekonk River.

DEM has determined that five MA WWTFs contribute 43% of the WWTF nitrogen loading to the Seekonk River. This evaluation considers nitrogen uptake along the Blackstone and Ten Mile Rivers, based on work completed at the University of Rhode Island<sup>i</sup>, that specifically addressed comments that the EPA Science Advisory Board raised in connection with the modeling effort used for the 1997 MA, USEPA and DEM Blackstone River WLA for ammonia and phosphorus<sup>ii</sup>. Another analysis of nitrogen attenuation in the Blackstone River from the MA/RI state line was also recently completed using data collected on 11 occasions between April 7 and August 25 of 2004<sup>iii</sup>. "The simple interpretation of these results is that we see no direct evidence of DIN attenuation or removal in the lower Blackstone."<sup>iv</sup>

RI has developed a phased implementation plan to reduce the discharge of nitrogen from RI and MA WWTFs to the Providence and Seekonk Rivers. The first phase of the nitrogen reduction plan, which includes comparable reductions from Massachusetts WWTFs, will reduce the 95-96 seasonal loading to the Seekonk River by 59%, from the 24X to the 10X level. As a result of this plan, the MA WWTFs contribution would represent 59% of the allowable load to the Seekonk; UBWPAD alone would represent 37%. While it is anticipated that further reductions will be necessary, a substantial reduction will be achieved.

During the public comment period for the RI WWTF Rhode Island Pollutant Discharge Elimination System (RIPDES) permit modifications, MADEP commented that it is opposed to the establishment of permit limits but is willing to work with WWTFs to optimize existing operations to reduce nitrogen in their effluent to the extent practicable and has proposed the collection of additional data to evaluate environmental impacts. The MADEP proposal (assuming total nitrogen of 10 mg/l) would only result in a 31% reduction in WWTF loading (the 17X loading condition). This reduction will not be sufficient since the Fields Point Reach of the Providence River exhibits significant signs of impairment from nutrient over enrichment and is currently at the 18X condition. Furthermore, if the MADEP proposal were adopted, MA WWTFs would contribute 76% of the load to the Seekonk River, the UBWPAD WWTF alone, would represent 59% of the loading to the Seekonk River.

After consideration of this information, it is even more apparent that implementation of the loading reductions proposed by DEM are necessary to ensure substantial progress toward achieving water quality criteria in the Seekonk River and should not be delayed.

The DEM strongly supports the nitrogen limitations that EPA has proposed in the draft NPDES permit for the UBWPAD WWTF which are consistent with Rhode Island's strategy for improving the water quality of the Blackstone, Providence and Seekonk Rivers and protecting Narragansett Bay. The limits are based on sound science and are necessary to compel further reductions in pollutant loadings to move us closer to achieving the goals of the Clean Water Act. Rhode Island has demonstrated its commitment to achieving its targets for reducing nutrient pollutant loadings. It is clearly time for Massachusetts to do the same. As the implementing authority in this matter, the DEM urges EPA to ensure the expeditious implementation of the WWTF modifications necessary to comply with the limitations.

### **Phosphorus Limitations**

DEM supports the limits for Total Phosphorus listed in the draft permit and as noted below, has determined that these limits are necessary to achieve compliance with RI Water Quality Standards. However, pursuant to footnote 10 of the permit, compliance with the phosphorus limitation is evaluated based on a 60-day rolling average. Use of a 60 day average is not consistent with the fact sheet which explains "Accordingly, based on the current record, the Region has determined that a monthly average total phosphorus limit no higher than 0.1 mg/l (100 ug/l) is necessary in order to achieve the applicable water quality standards." The permit does not provide an explanation of how it was determined that the 60-day average will ensure compliance with water quality standards. The fact sheet notes that the national ambient criteria recommendations range from 24 ug/l (based on the Ecoregional Nutrient Criteria) to 100 ug/l (based on the Gold Book Criteria) and the proposed limit will result in River concentrations just below 100 ug/l. Therefore, the permit should evaluate compliance based upon a 30-day average.

Rule 8.D.(2) of the Rhode Island Water Quality Regulations establishes the following criteria for Nutrients:

*"Average Total Phosphorus shall not exceed 0.025 mg/l in any lake, pond, kettlehole or reservoir, and average Total P in tributaries at the point where they enter such bodies of water shall not cause exceedance of this phosphorus criteria, except as naturally occurs, unless the Director determines, on a site-specific basis, that a different value for phosphorus is necessary to prevent cultural eutrophication."*

Scott Pond, in Lincoln, RI, receives the majority of its flow from the Blackstone River and, therefore, the criterion of 25 ug/l must be met in the Blackstone River at the point in which it enters Scott Pond. It should be noted that Scott Pond is listed on the Rhode

Island 2006 303(d) List as being impaired due to excess algal growth, low DO, and excess phosphorus. In addition to the 25-ug/l phosphorus water quality criterion for lakes, ponds, and reservoirs, the Rhode Island Water Quality Regulations contain narrative, but not numeric, nutrient water quality criteria for streams that do not impact a lake, pond, or reservoir. As noted in the fact sheet EPA's national ambient criteria recommendations range from 24 ug/l to 100 ug/l.

The previous permits for municipal WWTFs discharging to the Blackstone River contained Total Phosphorus monthly average limits based on the WLA for the Blackstone River that was completed in November of 1997 (USEPA et. al 1997). Scott Pond was identified as impaired based on data collected prior to all WWTFs achieving compliance with the WLA requirements, therefore, the results of the WLA model were reviewed. The WLA model predicts that the following in-stream conditions will exist after compliance with the WWTF limits established by the WLA:

	Chlorophyll a (ug/l)	Phosphorus (ug/l)
RI portion downstream of Woonsocket WWTF	Range from 15 – 22	Range 120-170
Entrance to Scott Pond	17	120

As can be seen from the above table, the in-stream phosphorus concentrations for both the RI portion of the Blackstone River downstream of the Woonsocket WWTF and at the entrance to Scott Pond will exceed the applicable water quality criteria (100 ug/l for the River and 25 ug/l at the entrance to Scott Pond). Thus, the discharge from the Woonsocket WWTF and the WWTFs located in Massachusetts clearly contribute to the eutrophic conditions and impairment of the Blackstone River and Scott Pond, and effluent limits for total phosphorous below those imposed based on the WLA must be included in the permits to assure compliance with the Rhode Island Water Quality Regulations.

DEM has used the more recent Blackstone River model, which was developed with funding from the Army Corps of Engineers ("BAC") for the MA portion of the River (Michaelis 2005) coupled with the WLA model for the RI portion to predict the impact of various levels of phosphorus reduction from WWTFs on the Blackstone River's phosphorus concentrations. The BAC model was calibrated using the detailed sampling conducted specifically to address concerns the EPA Science Advisory Board raised in connection with the MA portion of the modeling effort used for the 1997 Blackstone River WLA (USEPA et. al 1997). It has been determined that effluent limits of 100 ug/l for the Woonsocket WWTF and the Upper Blackstone Water Pollution Abatement District, Grafton and Uxbridge WWTFs are necessary to achieve compliance with the Gold Book criterion for free flowing streams and to ensure the Blackstone River does not cause a violation of the RI Water Quality criteria in Scott Pond (note: the model predicts 30 ug/l at the entrance to Scott Pond as rounded to precision level of the model-the nearest 10 ug/l). Attached are copies of the model output files for the MA and RI portions of the River. In the future, lower phosphorus limits may be required upon receipt of new

information, including but not limited to the development of a State numeric nutrient criterion or assessment of the response of the Blackstone River and Scott Pond to WWTF phosphorus discharges

**In addition below are a few suggested clarifications to language contained in the permit.**

The language in Footnote 7 is not consistent with other footnotes regarding minimum levels. It should be revised to read that "sample results less than 20 ug/l" rather than "sample results of 20 ug/l or less" shall be reported as zero on the DMR.

Footnote 8 regarding the use and reporting of a total residual chlorine analyzer is somewhat confusing since these analyzers are not approved under 40 CFR Part 136 for reporting on compliance with NPDES permits. EPA should consider using language similar to the following footnote, which EPA included in the 2006 permit modification issued to the Newbury port WWTF:

*"Total Residual Chlorine (TRC) shall be monitored continuously both before and after dechlorination of the effluent, however, the permittee shall continue to report the results of grab samples on its DMRs for compliance determination. The permittee must collect two (2) TRC grab samples daily, one (1) before dechlorination and one (1) after dechlorination before mixing with other waters. The TRC samples must be collected concurrent with the daily Fecal Coliform Bacteria sample. Only the TRC sample taken after dechlorination will be used to determine compliance with the effluent limit. The TRC sample taken before dechlorination is a 'report only' requirement.*

*Results of the grab samples shall be compared with data from the continuous analyzers. The date and time each grab sample is taken shall also be recorded. The permittee shall also submit four (4) continuous recording charts or their equivalent, one chart per week showing weekly data from the post-dechlorination continuous chlorine analyzer. All of this required information shall be attached to the monthly Discharge Monitoring Reports (DMRs).*

*The permittee shall install a low TRC level alarm on the pre-dechlorination TRC analyzer. The alarm shall be set at a level that ensures an adequate kill of fecal coliform bacteria. The alarm will be connected to the Wastewater Treatment Facility (WWTF) alarm pager system. Once notified of low TRC levels, the WWTF staff shall visit the plant to investigate the cause of the alarm. All alarms must be recorded in the operator's log book including the time of alarm, time of system investigation, duration and magnitude of the event, the cause for the alarm and how the event was resolved.*

*If the alarm-triggering event resulted in the discharge of un-disinfected effluent, the permittee must immediately sample the effluent for TRC and fecal coliform bacteria.*

*After one year of reporting the results of its continuous chlorine monitoring, the permittee may request reduction or elimination of the continuous chlorine reporting requirements. Any requested reduction must be submitted to EPA and MassDEP in writing and must demonstrate that the previously reported data support such a reduction. Any reduction in reporting frequency must be approved by EPA in a certified letter to the City before the reduction becomes effective. The City may only request a reduction or elimination of the continuous chlorine monitoring reporting frequency; reductions of monitoring frequency*

*will not be allowed . If a reporting frequency reduction is allowed, the permittee must maintain the continuous chlorine monitoring records on site."*

Thank you for the opportunity to comment on the draft permit. If you have any questions please contact me at 401-222-4700 Extension 7225.

Sincerely,



Angelo Liberti  
Chief of Surface Water Protection

enclosures

cc: Paul Hogan, MADEP

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<sup>i</sup> Michaelis, B. (2005). Dissolved oxygen dynamics in a shallow stream system. Dissertation in Civil and Environmental Engineering at the University of Rhode Island (URI).

<sup>ii</sup> USEPA, MADEP and RIDEM, November 1997, Blackstone River Watershed Dissolved Oxygen Wasteload Allocation for Massachusetts and Rhode Island.

<sup>iii</sup> Nixon, S., B. Buckley, S. Granger, L. Harris, A. Oczkowski, L. Cole and R. Fulweiler, 1995, Draft Report: Anthropogenic Nutrient Inputs to Narragansett Bay: A Twenty-five Year Perspective., A report to the Narragansett Bay Commission and Rhode Island Sea Grant.

<sup>iv</sup> Nixon, S., B. Buckley, S. Granger, L. Harris, A. Oczkowski, L. Cole and R. Fulweiler, 1995, Draft Report: Anthropogenic Nutrient Inputs to Narragansett Bay: A Twenty-five Year Perspective., A report to the Narragansett Bay Commission and Rhode Island Sea Grant.