UBWPAD RESPONSE TO COMMENTS

On March 23, 2007, the United States Environmental Protection Agency began the public comment period for a draft permit for the Upper Blackstone Water Pollution Abatement District (UBWPAD). A public meeting and a public hearing were held in Worcester, MA on May 9, 2007. At the public hearing, EPA extended the public comment period until May 25, 2007. Comments were received from UBWPAD, its consultant Camp Dresser and McKee and its attorneys, as well as from numerous other organizations and individuals. After review of the comments, EPA has determined to issue a final National Pollutant Discharge Elimination System (NPDES) permit for the UBWPAD facility.

The final permit is issued only by EPA. The permittees should contact the Massachusetts Department of Environmental Protection regarding authorization to discharge pursuant to the requirements of the Massachusetts Clean Water Act, as amended, Mass. Gen. Laws ch. 21, §§ 26-53. In addition, EPA has determined that Massachusetts has waived certification pursuant to Section 401(a)(1) of the Clean Water Act (CWA), 33 U.S.C. § 1341(a)(1) and 40 C.F.R. Section 124.53.[1]

The following responses address both written and oral comments provided to EPA during the comment period. Where comments are similar, we have cross-referenced rather than repeated relevant responses. This document also describes changes and clarifications EPA has made to the final permit.

This response is generally organized as follows:

Part A responds to comments from the following individuals and organizations: Massachusetts Department of Fish and Game, Riverways Program; Mark A. Briggs Blackstone River Watershed Council; Trout Unlimited; Mass Audubon; Blackstone River Valley National Heritage Corridor Commission; Blackstone Headwaters Coalition; Stephanie D. Matheny; Blackstone River Watershed Association; Narragansett Bay Estuary Program; Blackstone River Coalition; Rhode Island Bays, Rivers, & Watersheds Coordination Team; Senator Richard T. Moore; Save The Bay; Donald Pryor; Conservation Law Foundation; The Smart Growth Task Force, Bristol, Rhode Island Preserve Bristol; and Jan Reitsma.

Part B addresses comments received from Grace Ross; Tatnuck Brook Watershed Association; and City Councilor Frederick Rushton**.**

Part C addresses comments from Dr. Mauri S. Pelto.

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[1] The final permit reflects that the permit is issued solely by EPA pursuant to its authority under the CWA. Please note we have modified footnote 4 of the permit which relates to limits for DO, pH range and seasonal fecal coliform to make clear that the limits are consistent with historical state certification requirements and are required by antibacksliding requirements.

Part D responds to comments from the Rhode Island Department of Environmental Management.

Part E responds to comments submitted by the Massachusetts Department of Environmental Protection.

Part F addresses comments received from the Upper Blackstone Pollution Abatement District, including from its technical consultants and legal counsel.

Part G responds to comments received from the following: New England Plating Co., Inc.; Town of Holden; City of Worcester (City Manager); Town of West Boylston; Worcester Regional Chamber of Commerce; City of Worcester (DPW); UBWPAD Board of Directors; Town of Leicester; and Pepe & Hazard

PART A.

Comments were received from many organizations and individuals noting the significance of the UBWPAD permit relative to water quality in the Blackstone River and/or Narragansett Bay and expressing support for the nutrient limits in the draft permit. These organizations and individuals include:

Massachusetts Department of Fish and Game, Riverways Program
Mark A. Briggs
Blackstone River Watershed Council
Trout Unlimited
Mass Audubon
Blackstone River Valley National Heritage Corridor Commission
Blackstone Headwaters Coalition
Stephanie D. Matheny
Blackstone River Watershed Association
Narragansett Bay Estuary Program
Blackstone River Coalition
Rhode Island Bays, Rivers, & Watersheds Coordination Team
Senator Richard T. Moore
Save The Bay
Donald Pryor
Conservation Law Foundation
The Smart Growth Task Force, Bristol, Rhode Island
Preserve Bristol
Jan Reitsma

Other comments from the above individuals and organizations include the following:

Comment #A1: The Narragansett Bay Estuary Program, and Rhode Island Bays, Rivers,

& Watersheds Coordination Team commented that the available science supports the conclusion that attenuation of nitrogen in the Blackstone River is low.

Response #A1: Attenuation is defined as the difference between the amount of nitrogen released to the river and the amount delivered to the mouth of the river. We agree that the available science indicates that the majority of nitrogen discharged from the UBWPAD is delivered to the Providence and Seekonk River system (Upper Narragansett Bay). *See also* Response #F17 below.

Comment #A2: Several commenters, including Blackstone River Watershed Council, Trout Unlimited, Blackstone River Valley National Heritage Corridor Commission, Blackstone River Coalition, Stephanie D. Matheny, Senator Moore, Mark A. Briggs, and Save The Bay indicated that compliance with the permit limits should be pursued with urgency. A few specifically commented that the Massachusetts Department of Environmental Protection (MassDEP) proposed schedule (*see* MassDEP Comment #E2) is too long.

Response #A2: EPA recognizes the severity of the water quality impacts in the Blackstone River and Upper Narragansett Bay and the contribution of the UBWPAD discharge to these impacts. Consequently, we intend to establish a compliance schedule that is reasonable but that also ensures compliance with the permit limits as soon as possible. We believe that the UBWPAD can achieve compliance with its total nitrogen limit in the same time frame as the Rhode Island facilities, which will expedite the process of assessing the water quality response in Upper Narragansett Bay.
See also Response #E2.

Comment #A3: The Blackstone Headwaters Coalition, Mark A. Briggs, and the Blackstone River Coalition all commented that a phosphorus total maximum daily load (TMDL) for the Blackstone River should be completed but that the current permit limits are necessary and should not wait for the TMDL.

Response #A3: Pursuant to 40 CFR §130.7(c), States are required to prepare TMDLs for impaired waters. While we believe that a TMDL can be a useful tool for ensuring that all sources of phosphorus are adequately addressed, EPA has a clear obligation to establish water quality based limits that will ensure attainment of water quality standards even in the absence of a TMDL. In fact, the relevant regulations require that EPA include an effluent limit for any pollutants which EPA determines "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." 40 CFR §122.44(d)(1)(i). Where a TMDL has been established, EPA is required to ensure that the effluent limits are "consistent with the assumptions and requirements of any available wasteload allocation" applicable to the discharger. 40 CFR §122.44 (d)(1)(vii)(B).

Comment #A4: The Riverways Program commented that the infiltration/inflow removal requirements are important to minimize partially treated discharges.

Response #A4: We concur that the infiltration/inflow (I/I) removal requirements are important. A large percentage of the annual flow to the UBWPAD is a result of infiltration/inflow in the system. In its NPDES permit re-application, UBWPAD indicated that I/I is approximately 15 million gallons per day. *See* NPDES Permit Application at page 7. Improved control of I/I would minimize discharges that do not receive full treatment and would also reduce energy and chemical use associated with the transport and treatment of the extraneous flow. *See also* Response #F8 below.

Comment #A5: The Riverways Program commented that continuous chlorine monitoring is an important addition to protect aquatic life.

Response #A5: We agree that continuous chlorine monitoring is an important addition to the permit's monitoring requirements and will help to protect aquatic life by providing instantaneous detection of equipment or operational problems with the disinfection system. We do not believe that the use of grab samples alone to measure chlorine is sufficient where wastewater flow and chlorine demand vary significantly throughout the day. The fluctuation of flow at this facility is of particular concern in light of CSO contributions and the high volume of I/I in the sewer system.

Comment #A6: The Riverways Program commented that whole effluent toxicity testing of outfall 001A is appropriate.

Response #A6: We concur. Because discharges through outfall 001A will receive only primary treatment and disinfection, whole effluent toxicity testing during periods when outfall 001A is activated is necessary to ensure that the resulting discharge does not have a toxic effect on the receiving water.

Comment #A7: Trout Unlimited commented that the permit should address concerns with aluminum toxicity.

Response #A7: We agree that aluminum toxicity is a potential concern. The final permit contains a monitoring requirement in order to obtain more information relative to the potential to violate receiving water criteria for aluminum. If the data indicate that there is a reasonable potential to violate receiving water criteria, future permit actions will include an aluminum limit.

Comment #A8: The Blackstone Headwaters Coalition and the Blackstone River Coalition commented that the proposed limit of 0.1 mg/l total phosphorus may not be sufficiently low because the upstream water contains some phosphorus. Several commenters (Blackstone Headwaters Coalition, Congressman McGovern, City Councilor Frederick Rushton, John Reed) noted that impoundments should be considered.

Response #A8: The calculations assuming zero upstream phosphorus were included to demonstrate that both the limit of 0.75 mg/l in the expired permit or a limit of 0.2 mg/l (as MassDEP has interpreted the "highest and best practicable treatment" requirement in

its standards in the context of certain other permitting decisions) are insufficient to ensure that the downstream concentration of phosphorus does not exceed 0.1 mg/l. Because the available dilution is very small relative to the design flow of the treatment facility, and because the upstream dilution water will contain some phosphorus, we have established the effluent limit at 0.1 mg/l to ensure that the discharge does not cause or contribute to a downstream exceedance of the 0.1 mg/l target.

We agree that downstream sediments may be a source of phosphorus. While the improved treatment required by this permit will have a beneficial effect relative to the accumulation of phosphorus in downstream sediments, we believe that this issue warrants further evaluation upon completion of the treatment upgrades. If sediment sources of phosphorus are demonstrated to be causing or contributing to non-attainment of water quality standards, then either sediment remediation and/or lower permit limits may be pursued. In addition, the permit includes a winter phosphorus limit from November through March to ensure that the higher level of phosphorus discharged in the winter period does not result in the accumulation of phosphorus in downstream sediments. MassDEP has indicated its intent to develop a phosphorus TMDL (*see* Comment #E3 below). A better understanding of the role of downstream sediments should be an important component of any TMDL effort.

Comment #A9: The Blackstone River Coalition, Save The Bay, Conservation Law Foundation, and Stephanie D. Matheny all commented that cost is not an appropriate basis for establishing permit limits. Save The Bay also commented that the limits do not represent an unfair and disproportionate burden to sewer ratepayers. Donald Pryor commented that water and sewer costs in Worcester are a lower percentage of median household income than costs in Rhode Island. Mass Audubon noted that the costs of the current upgrade are primarily to address CSO issues rather than nutrient reduction and that, while we do need to be mindful of Worcester's sewer fees, we also need to note that other communities are doing more than their share to improve water quality by paying $750 million to address CSO issues. Mark A. Briggs commented that necessary funding to bring the facility up to current standards must be supplemented from sources beyond Worcester and the Blackstone Valley. The Blackstone River Valley National Heritage Corridor Commission commented that a number of downstream communities are strenuously working to achieve higher water quality standards and that the UBWPAD also must achieve improved water quality discharge.

Response #A9: We agree that cost and technological considerations are not appropriate factors to consider in establishing water quality-based effluent limits. *United States Steel Corp. v. Train*, 556 F.2d 822, 838 (7th Cir. 1977); *see also In re City of Moscow*, 10 E.A.D. 135, 168 (EAB 2001). We also recognize, however, that the improvements necessary to meet the new permit limits will result in sewer rate increases. As discussed earlier, if a permittee cannot immediately meet new water quality-based limits because of the need to design and construct additional treatment facilities, EPA may establish a compliance schedule, which we intend to do for this discharge (*see* Response #A2).

State regulations also include provisions for allowing a revision or variance from water quality standards under specific conditions. One of the conditions is if the cost of controls necessary to attain the existing water quality standards would result in widespread economic and social impact. If such a condition were shown to exist, relief could be granted through a revision or variance to water quality standards (*see* Massachusetts Surface Water Quality Standards, 314 CMR 4.03(4); Rhode Island Water Quality Regulations, Rules 19 and 20. *See also* EPA's Use Attainability Analysis regulations at 40 CFR §131.10(g) and Interim Economic Guidance for Water Quality Standards, March 1995.

For additional discussion regarding evaluation of cost impacts in the context of setting water-quality based effluent limitations, *see* Responses #F1, #F2 and #F4 below.

Comment #A10: The Conservation Law Foundation (CLF) commented that the warm weather total nitrogen limit should be no higher than 3 mg/l (limit of technology as defined by Rhode Island Department of Environmental Management) and that the warm weather total phosphorus limit should be no higher than 0.1 mg/l. CLF further indicated that the permit must quantify any further contribution of nitrogen and phosphorus to the present water quality standards violations and must include further conditions and limitations designed to ensure that there is no remaining contribution from the UBWPAD to the violations. CLF commented that such additional conditions and limitations should be an offset to known discharges from the plant.

Response #A10: While RIDEM's nitrogen reduction analysis (referenced in the comment) suggests that permit limits for nitrogen based on the limit of technology may be necessary to achieve water quality standards, there are uncertainties associated with use of a physical model such as the MERL tank experiments. As noted in the Fact Sheet and further detailed in this response to comments, the MERL tank experiments cannot completely simulate the response of chlorophyll a and dissolved oxygen to nitrogen loadings in a complex, natural setting such as the Upper Narragansett Bay. These differences may overestimate the impact that a given nitrogen load would have on the Seekonk and Providence River system. *See* Response #F18A. Consequently, we believe that the significant nitrogen reductions required by the permit, as well as other permits in the watershed, are consistent with achieving water quality standards. Further limitations (including offsets) are not warranted at this time. We also recognize the importance of monitoring the receiving water response to these nitrogen reductions; as noted in the Fact Sheet at page 14, RIDEM has, in partnership with several research and academic institutions in Rhode Island, established an extensive monitoring network in order to provide the data necessary to evaluate compliance with water quality standards upon implementation of the recommended nitrogen reductions. If warranted, further reductions will be required.

The final permit includes a phosphorus limit of 0.1 mg/l. We concur it cannot be higher and ensure attainment of water quality standards. The phosphorus limit in the permit is based on an analysis of the limit necessary to achieve water quality standards. It is not a

technology-based limit nor does it reflect the limits of available technology. Available technology is capable of achieving phosphorus limits lower than 0.1 mg/l.

Comment #A11: CLF commented that, in addition to the currently documented dissolved oxygen stress in Narragansett Bay, the NPDES permit should consider the added impacts that will result from global warming over the life of the permit. CLF argues that this supports that no higher TN limit than that technically achievable should be permitted.

Response #A11: We agree that this is a concern that needs further consideration in the future. While temperature changes in Narragansett Bay are expected to be small over the life of this permit (five years), increasing temperatures are a significant concern over the longer term. EPA will work with RIDEM to ensure that the post nitrogen reduction monitoring and evaluation effort includes consideration of the effects of global warming on water quality standards attainment.

Comment #A12: CLF commented that the seasonal CBOD of 10 mg/l should be required year round. Acknowledging that the 10 mg/l limit is of maximum benefit in the warm months, CLF comments that the River system should benefit year-round from UBWPAD's investment to achieve 10 mg/l.

Response #A12: Treatment plants designed to meet a CBOD limit in the summer period may not be able to meet the same limit in the winter period due to the effects of colder temperatures on treatment efficiencies. In addition, the dissolved oxygen waste load allocation used to establish the effluent limits for CBOD in both the previous permit and this reissued permit indicates that minimum dissolved oxygen criteria will be met in the receiving water during the winter period. (Note that the CBOD limits are the same in the expired permit and this reissued permit).

Comment #A13: CLF commented that the limited flushing capacity of this system, combined with the persistence of phosphorus and nitrogen in the system, warrant consideration of year round application of nutrient controls.

Response #A13: In typical wastewater treatment plant effluent, both phosphorus and nitrogen are present in the dissolved phase. Typical effluent also includes particulate phosphorus, but very little particulate nitrogen. The predominate form of nitrogen in municipal wastewater discharges is dissolved inorganic nitrogen (primarily ammonia, nitrite and nitrate). Also, dissolved inorganic N forms, especially nitrite and nitrate, are highly soluble and do not precipitate easily or sediment out when freshwater enters the brackish zone of estuaries as inorganic P is likely to do. *See* Nutrient Criteria Technical Guidance Manual, Estuarine and Coastal Marine Waters (EPA-822-B-01-003, October 2001).

The RIDEM nitrogen reduction analysis and supporting scientific documentation indicates that the winter contribution is not significant. *See, e.g.*, RIDEM Response to Comments on Total Nitrogen Permit Modifications, June 27, 2005, page 26. However,

in light of the uncertainties with the fate and transport of winter contributions of nitrogen through the system and the potential that these contributions will add to the pool of nitrogen available during critical periods, the permit requires that UBWPAD optimize the treatment facilities in the winter period in order to minimize the potential for higher winter loadings to prevent attainment of water quality standards.

For phosphorus, we agree that there is a significant potential for particulate phosphorus loadings to settle and accumulate in downstream impoundments during non-growing seasons and to contribute to impairments in the Blackstone River during the summer growing period. Consequently, the permit includes a winter phosphorus limit of 1.0 mg/l to ensure that the particulate fraction of the phosphorus is removed prior to discharge to the River. The limit assumes that the vast majority of the phosphorus discharged will be in the dissolved fraction and that dissolved phosphorus will pass through the system and not accumulate in the sediments. The limitation is higher than the seasonal limit of 0.1 mg/l because EPA has assumed, based on experience with other treatment facilities, that achieving a limit of 1.0 mg/l will result in the removal of the majority of the particulate fraction of phosphorus in the discharge. For instance, water quality surveys conducted in the Assabet River indicate that 90% of the total phosphorus in the discharge of four wastewater treatment facilities was in the dissolved form. *See* Assabet River TMDL for Total Phosphorus, Report Number: MA82B-01-2004-01. To verify the dissolved fraction of phosphorus discharged, a dissolved orthophosphorus monitoring requirement is included in the permit; if water quality monitoring indicates that it is accumulating, then lower winter limits will be required in the future.

Comment #A14: The Blackstone River Watershed Council commented that EPA "should re-invest its efforts to forge a watershed-wide planning team and enable this team to engage both RIDEM and MADEP (and their legislators) to sync the actions to be taken to invest and improve upon the whole watershed. Whether it's the planning for a 'river wide' TMDL, fish passage planning and implementation strategies, bike path connections, or standardized NPDES permits to limit nutrients and other impairments, we believe EPA needs to play a larger role." Several other commenters noted the importance of coordinated efforts to improve water quality in the River and watershed.

Response #A14: EPA will continue to support the Blackstone River Watershed Council/Friends of the Blackstone and its partner, the Blackstone River Coalition, in their many efforts to bring about improvements along the Blackstone. EPA, RIDEM, MassDEP and the watershed organizations all play important roles in protecting and improving water quality in the Blackstone River watershed. We agree that coordination of efforts is important. Currently, EPA is working closely with both MassDEP and RIDEM to ensure that we address nutrient discharges from municipal treatment plants in a coordinated fashion. We intend to continue to play an active role in this and other issues related to improvement of the watershed.

PART B.

Some commenters (including Grace Ross, Tatnuck Brook Watershed Association, and City Councilor Frederick Rushton) focused on alternatives to the low nutrient limits.

Comment #B1: Wastewater source reductions (phosphate free detergents and alternative chemicals for copper control in the water supply) and non-point source reductions (organic lawn care and other storm water controls) should be pursued instead of another expensive upgrade.

Response #B1: Regarding the attainment of the new water quality-based effluent limitations for UBWPAD, the Clean Water Act (CWA) and EPA's regulations do not dictate the method by which UBWPAD must meet the new water quality-based effluent limits. While the suggested source controls would have positive benefits and we encourage the permittee to pursue them, they would not be sufficient to achieve the necessary effluent limits. The commenters' suggested source controls for phosphorus would have the benefit of reducing phosphorus in the influent, which should reduce the chemicals and energy used to treat for phosphorus. However, there is a significant amount of phosphorus that is inherent to human waste and will not be affected by source controls. The level of treatment to be provided in the current upgrade is not sufficient to meet the permit limits, even with a significant reduction in the influent concentration of phosphorus from other sources.

While efforts to reduce non-point sources of phosphorus and nitrogen are encouraged and would have beneficial effects, the available science indicates that the significant majority of the total phosphorus loads to the Blackstone River (*see* Reports cited in the Fact Sheet at page 8) and of the total nitrogen loads to Narragansett Bay (*see* Response #F40 below) are from point sources. Even a high level of non-point source nutrient reductions would not preclude the need for significant point source reductions. *See also* Response #C1 below.

Several commenters in addition to UBWPAD (including elected officials, representatives of organizations and members of the public) expressed concern as to the lack of funding to meet the new permit limits. With regard to cost considerations in establishment of water quality-based effluent limits, please see Response #A9. Some suggested that the new permit limits represent an unfunded mandate.

Comment #B2: The need to comply with the limits is an unfunded mandate.

Response #B2: We interpret the reference to "unfunded mandates" as a reference to the requirements of the Unfunded Mandate Reform Act of 1995 (UMRA). The UMRA, however, is inapplicable to this permitting action. The UMRA applies to rulemaking, and not individual NPDES permit decisions. For example, in *In re City of Blackfoot Wastewater Treatment Facility*, NPDES Appeal No. 00-32 (EAB September 17, 2001)

the Environmental Appeals Board denied a petition for review of compliance with UMRA on grounds that UMRA applies only to regulations, not to individual NPDES permits, which are more akin to licenses than a regulation.

In addition, EPA helps to finance the cost of treatment needed to achieve compliance with the Clean Water Act through the Clean Water Act State Revolving Fund (SRF). Through the SRF program, Massachusetts maintains revolving loan funds to provide low-cost financing for a wide range of water quality infrastructure projects. Funds to establish or capitalize the SRF program are provided through federal government grants and state matching funds (equal to 20% of federal government grants). EPA has provided Massachusetts with a total of $956,861,571 in Clean Water Act SRF grant funds for the period from 1989 through July, 2008.

PART C.

Comments were received from Dr. Mauri S. Pelto, Department of Environmental Science, Nichols College on May 24, 2007. Dr. Pelto's letter, in its entirety, is included below:

Comment #C1: The goal of everyone is to achieve a clean Blackstone River by 2015. I have spent seven years working with the BRC (Blackstone River Coalition), BHC (Blackstone Headwaters Coalition), and BRWA (Blackstone River Watershed Association) to setup a system to monitor the water quality and quantity of the Blackstone River Watershed. My role with the BRC has been to establish rating curves at monitoring stations in all significant tributaries to the Blackstone River in Massachusetts. On the second Saturday of each month from April-November, the BRC volunteers and coordinators collect data from throughout the watershed. Through use of the rating curves established by myself, discharge is also determined at many of the locations. Availability of discharge data allows determination of phosphorus load, or more appropriately the mass balance, in the system on a given day based on the measured concentrations. These data fill a key gap in data collected by the DEP and EPA, which have not routinely monitored tributaries to the Blackstone.

One key to achieving a healthy Blackstone River is to minimize the tremendous load of nutrients in the river. The question is how best to do this, given the limited monetary resources that can be allocated. I feel that informed management decisions cannot be made until we attempt to determine the mass balance of phosphorous in this watershed. Data collected by the BRWA provide the ability to do this for select days, although a more continuous mass balance would be ideal. The latter can only be provided by a model, tested against the field data.

I have developed a mass balance for the watershed based on orthophosphate concentrations and discharge measured by the BRWA in 2005 and 2006. These data provide a conservative (low) estimate for total phosphorous loading from the tributaries at the time of measurement as other forms of phosphorus are not accounted for. In addition, not all tributaries are monitored every month, thus additional loading can be

expected from unmonitored tributaries. I was careful to include only non-redundant measurements, that is not utilizing an upstream station and a downstream measurement station that is fed by that upstream station. Values were utilized from either Middle River or Leesville Outflow for the Worcester Headwaters. The main stem tributaries utilized include the Mumford River, West River, Mill River, Mill Brook, Emerson Brook, Cold Spring Brook, Peters River, Quinsigamond River Singletary Brook and Broad Meadow Brook. In each case, the most downstream station for which data were available was used. Data for all of the above noted stations were only available during one month. Thus, as noted above, the measured load in kg/day is conservative because of the use of orthophosphate measurements and the lack of completely comprehensive data.

The attached file has the loading data for 2005 and 2006 measured by BRC and that discharged by waste water treatment plants along the river. Treatment plant load data were provided by Paula Rees, from UMass, based on data acquired from the plants to facilitate their model development at UMass. Data for plants other than the Upper Blackstone plant are not yet available for 2006. Tributary loading has been compared to discharge from the Upper Blackstone plant on two figures, one for 2005 (Figure 1) and one for 2006 (Figure 2). Note that on figures 1 and 2, there are two values presented for the phosphorous load emitted from the Upper Blackstone plant on each date (provided by Dr. Rees), in addition to the load monitored in the tributaries, based on the BRWA data. The first plant load estimate is based on the observed plant effluent discharge and total phosphorus concentration for the given day. The second plant load estimate is based on the observed plant effluent discharge and a total phosphorus concentration of 0.6 mg/L total phosphorus. The concentration of 0.6 mg/L is the target total phosphorus concentration the on-going construction at the plant is designed to meet (or 80% of the allowed limit of 0.75 mg/L). It is conservatively assumed that all of the total phosphorus is actually dissolved orthophosphorus. Additional figures (not numbered) compare tributary loading against loading from other treatment plants along the river in addition to the Upper Blackstone. In these figures, a third estimate of load from the Upper Blackstone has been added. This load is based on the observed plant effluent discharge and a total phosphorus concentration of 0.09 mg/L, or 90% of the proposed future total phosphorus limit for the plant. Load estimates for both the on-going construction and proposed limit were also provided by Dr. Rees.

The data suggest that the main source of phosphorous after the current upgrades are in place will not be from the Upper Blackstone waste water treatment facility. It is also worth noting that the current loading from the treatment plant is typically of the same magnitude as the conservative measure of phosphorous loadings from the tributaries feeding the Blackstone River. This leads me to several conclusions;

1. I have spent more than 300 different days in our streams, and seen countless examples of cappuccino colored brooks indicating the substantial nutrient loading and turbidity issues of our brooks feeding the Blackstone River.
2. That after the current upgrades with respect to phosphorous, Upper Blackstone's output except during low water events, will be much smaller than contributions from the basin's non-point sources. This needs our attention.

3. That support of BRC-BRWA-BHC is providing us with the data to identify these problems specifically and through their advocacy to try to address them.
4. These preliminary investigations indicate the value that can be gleaned from this system of volunteer monitoring and professional coordination. This system needs to be further supported to enhance the data, and to provide a better answer to the TMDL question for the Blackstone River Watershed, sooner rather than in 2013.
5. This field data in combination with the UMASS model can provide us with a preliminary understanding of the phosphorous mass balance of the watershed, that in turn would allow quantitative determination of the best management practices to reduce nutrient loading.

As noted in a letter from the BRC, by Donna Williams, "DEP also calls for a TMDL for Phosphorous to be performed for the Blackstone by 2013. The BRC supports the development of TMDLs for nutrients on the Blackstone, however the TMDL should be completed as soon as possible. It could, in fact, indicate the need for even stricter limits." The BRC, through its tireless efforts, has acquired the resources and the data to provide a preliminary answer to this question and spurs us to do more. This organization is invaluable in addressing this question today and in the future and spreading solutions in the communities through its advocacy.

I look forward to continuing to work with the many people and organizations seeking to clean the Blackstone River and seeing the results with my own eyes, in clearer water.

Response #C1: We commend the efforts of organizations such as the Blackstone River Coalition and volunteers to monitor water quality and to improve the Blackstone River and its watershed.

The analysis provided is difficult to review given the lack of supporting information. Flow and concentration data, sampling locations, and precipitation information are not provided. Key to the loading estimates are the rating curves for estimating flow, but no information is provided as to how the rating curves were developed or how well they calibrate to data from USGS permanent gage sites.

In addition, most of the data provided is not from low flow conditions. The only data set in 2005 from typical low flow periods was the July data set and it rained 2.5 inches the day before the sampling. In 2006 there were only two data sets from typical low flow periods (July and September) and the non-point source loadings during July and September were much lower than at other times of the year.

The permit limits are established to meet water quality criteria under 7Q10 low flow conditions. Under these conditions, non-point sources are minimal and controlling the point source discharges is critical. Under 7Q10 conditions, point sources will continue to be the dominant source of phosphorus loadings even after the current upgrade is completed. However, on an annual basis, loadings from non-point sources are significant and are an issue that warrants further attention, especially to the extent that these loadings may accumulate in downstream impoundments. The storm water permits issued to most

communities in the Blackstone River watershed will help address the non-point sources but more targeted Best Management Practices (BMPs) in future storm water permits will likely be necessary. We agree with the commenter's statement that the usefulness of this type of data is to help allow a quantitative determination of BMPs.

PART D.

Comments were received from the Rhode Island Department of Environmental Management (RIDEM) in a letter dated May 18, 2007. RIDEM noted the significance of the UBWPAD permit relative to water quality in the Blackstone River and Narragansett Bay and expressed support for the nutrient limits in the draft permit. RIDEM also commented that the available science supports the conclusion that attenuation of nitrogen in the Blackstone River is low and urged EPA to ensure the expeditious implementation of WWTF modifications. (See Responses #A2 and #E2 relative to a compliance schedule). Other specific comments are as follows:

Comment #D1: The assumption that the concentration of metals in the upstream water is zero 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 Rhode Island Water Quality Standards. Copper, zinc, and cadmium criteria at the state line, based on a hardness value of 50 ug/l which RIDEM has determined is appropriate for the Rhode Island portion of the Blackstone River, would be exceeded by 18%, 16%, and 5% respectively.

In addition, the Fact Sheet indicates that MassDEP 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 further indicates 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. 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 Rhode Island criteria of 5.2 ug/l. RIDEM strongly objects to establishment of permit limits using the site-specific criteria. The metals limits in the draft permit must ensure that Rhode Island water quality criteria will be met at the state line.

Response #D1: The assumption of pollution concentrations of zero above the UBWPAD discharge has a minor effect on the calculations because the UBWPAD discharge reflects over 90% of the receiving stream flow at the point of the discharge. In addition, the Rhode Island analysis of in-stream metals concentrations indicating exceedances of the Rhode Island criteria at the state line assumes that metals are 100% conservative in the water column. However the river flows for approximately 28 miles from the UBWPAD discharge to the state line. Analyses of metals in the receiving water conducted under near 7Q10 flow conditions indicate that there is a significant reduction in metals concentration and loads from the UBWPAD discharge to the state line. The average results for two low flow surveys – conducted in July and August 2001 – indicate that the

reduction in copper loading between the UBWPAD discharge and the state line is approximately 20%. The surveys showed an average reduction of cadmium of approximately 52%. Zinc was not included in these analyses. (The data from these surveys can be found in the Blackstone River Initiative, May 2001). These reductions were measured notwithstanding other point source discharges downstream from the UBWPAD facility. Taking into account the reduction of metals concentrations as the discharge flows downstream, we believe that the metals limits in the permit are sufficient to ensure that Rhode Island water quality standards are met at the state line.

With regard to the new Massachusetts site-specific criteria for copper, we concur that a significant increase in the draft permit limit based on the recently approved Massachusetts site-specific criteria would result in a reasonable potential to exceed the Rhode Island criteria at the state line. The revised chronic criterion for dissolved copper is 18.1 ug/l and the revised acute criterion for dissolved copper is 25.7 ug/l. Using a dilution factor of 1.1 (*see* Attachment B to the Fact Sheet), the new criteria would result in the following limits:

Monthly Average Limit = (chronic criterion) (dilution factor) = (18.1 ug/l)(1.1) = 19.9 ug/l
Daily Maximum Limit = (acute criterion) (dilution factor) = (25.7 ug/l)(1.1) = 28.3 ug/l

Even accounting for an approximate 20% reduction of copper concentration as the discharge flows downstream, it appears that copper concentrations would be well in excess of the Rhode Island water quality standard for copper of 5.2 ug/l at the state line. Accordingly, the final permit limits for copper are the same as in the draft permit. We note, however, that Rhode Island has also been evaluating development of a site-specific water quality criteria for copper. If such criteria are adopted by the State and approved by EPA, it may be appropriate to evaluate a modification of the copper limit.

Comment #D2: EPA should utilize effluent data collected as part of the bioassay testing to determine whether reasonable potential exists for the UBWPAD facility to cause or contribute to water quality violations for additional pollutants. Since EPA does not enter pollutant data collected as part of the bioassay testing into ICIS, RIDEM 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 from Rhode Island waste water treatment facilities, 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, RIDEM requests that EPA list the pollutants monitored during the bioassay testing in Part I.A.1 of the permit.

Response #D2: We reviewed the bioassay reports from 2005 and 2006. The effluent chromium data are all below detection levels (detection levels ranged from 5 – 10 ug/l) and well below the applicable ambient criteria values in state standards. The effluent nickel data ranged from 5 – 20 ug/l which also is well below ambient criteria values. The effluent lead data are all below detection levels (detection levels ranged from 5 – 10 ug/l). However, the detection levels are higher than the ambient criteria values. Consequently,

we have included a monthly lead monitoring requirement in the final permit, with a quantification level of 0.5 ug/l, in order to be able to assess the need for a permit limit in a future permit action. Effluent aluminum levels are of concern. Effluent values ranged from 70 – 240 ug/l. As indicated in Response #A7, we have included a monthly monitoring requirement for aluminum in the final permit. A permit limit will be established if the data indicate a reasonable potential to exceed criteria.

We concur that requiring reporting of selected effluent data from bioassay testing on Discharge Monitoring Reports (in addition to submitting the information to EPA in a separate report) would make it easier to review these results. Copper, zinc, cadmium, aluminum and lead are all required to be monitored more frequently than quarterly. Accordingly, for these metals, the final permit requires that the effluent results from the WET tests must be included in the required discharge monitoring reports. For nickel, a quarterly monitoring requirement has been included in the final permit in order that effluent results for nickel from the WET tests are also included in the required discharge monitoring reports.

Comment #D3: 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 rolling average is not consistent with the Fact Sheet which refers to the limit as a monthly average. The permit does not provide an explanation of how it was determined that a 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.

Response #D3: The reference to a monthly average limit in the Fact Sheet is an error and should have said "60-day rolling average."

Water quality-based limits that are developed to protect against chronic impacts such as eutrophication are typically established as monthly average limits. For the phosphorus limit in this permit, the 60-day rolling average limit possesses advantages over a monthly average limit: it provides the permittee with flexibility to deal with occasional, perhaps unavoidable, excursions above limits, while at the same time necessitating that such excursions are short-term and that optimum removal efficiencies are maintained overall. Short-term exceedances of the phosphorus limit are unlikely to result in a significant response in the receiving water relative to aquatic plant growth. Longer term exceedances capable of eliciting a response in plant growth would likely result in a violation of the rolling average limit.

The 60-day rolling average ensures the best possible performance on any given day since the results for that day will be averaged with the next 59 days to determine compliance. The uncertainty of future results that will be used for determining compliance dictates the best possible performance on any given day. Short-term excursions will have to be responded to quickly in order to ensure compliance. In contrast, a 30-day (monthly)

average limit can result in relaxed performance towards the end of the 30-day period if performance early on in the period exceeded what was necessary to meet the permit limits.

Comment #D4: 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.

Response #D4: We concur and have made this change.

Comment #D5: 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 language included in the 2006 permit modification issued to the Newburyport Waste Water Treatment Facility which required continuous monitoring of TRC both before and after dechlorination of the effluent, as well as installation of a low TRC level alarm of the pre-dechlorination TRC analyzer.

Response #D5: Analytical methods (not sampling methods) are approved under 40 CFR Part 136. The final permit clarifies EPA's intent that the permittee use an analyzer that employs an EPA approved analytical method. In addition, while serving as a supplement to grab samples, the continuous monitor results are report-only. Continuous monitoring is required based on our concern that grab samples alone may not be adequate for determining compliance with the permit limits for such a fast acting toxicant as chlorine. The data reported from use of the continuous monitor will help to further evaluate the effectiveness of relying on grab samples. *See also* Response #F33.

We do not believe it is necessary to include all of the requirements in the Newburyport permit. The Newburyport requirements were due to concerns we had with both the effectiveness of the chlorine dosing system ***and*** with the adequacy and reliability of the dechlorination system at that particular facility. Our concern with the UBWPAD facility relates to the adequacy and reliability of the dechlorination system in light of flow fluctuations -- not with the effectiveness of the kill of fecal coliform bacteria. Accordingly, we have required continuous monitoring of the final effluent only.

We do believe, however, that some limited additional reporting is warranted to allow for better evaluation of the data submitted from the continuous chlorine monitor. A recent review of results reported by other facilities with a continuous chlorine monitoring requirement indicate that reporting this data via weekly charts alone does not provide enough detail to fully evaluate the continuous monitoring data. (These facilities include: Greenfield, Haverhill, Westfield and Plymouth). Consequently, in addition to submission of weekly charts, we have included in the final permit additional reporting requirements related to the data collected by the continuous monitor. These include the following: monthly maximum daily value, monthly average value, monthly maximum instantaneous value, and duration of time that recorded values were in excess of the permit limits.

PART E.

Comments were received from the Massachusetts Department of Environmental Protection (MassDEP) in a letter dated May 9, 2007. Because the permit is jointly issued by MassDEP and EPA, MassDEP limited its comments to the nitrogen limit which is a federal requirement only.

Comment #E1: The effluent limit for nitrogen in the draft permit is expressed as milligrams per liter. However, EPA permitting requirements at 40 CFR 122.45(f)(1) state that "All pollutants limited in permits shall have limitations, standards or prohibitions expressed in terms of mass."[2] The expressed results needed to reduce impairments to Narragansett Bay are a reduction in mass loading. While no Total Maximum Daily Load (TMDL) has been calculated to ascertain how to allocate load reductions, it is important to note that in the case of Long Island Sound, a TMDL has been completed for nitrogen that calls for a reduction in mass loading of nitrogen. In this case the discharge permits issued by Connecticut correctly contain only mass limits. Finally, mass limits for nitrogen in the UBWPAD discharge permit would give the facility the needed flexibility to manage the treatment plant while attaining strict effluent requirements and would encourage the facility to reduce its discharge volume, a notable goal unto itself. Consequently we believe that EPA should express any nitrogen limit in terms of a mass only limit.

Response #E1: An exception to 40 CFR 122.45(f)(1) applies when applicable standards and limitations are expressed in terms of other units of measurements (*see* 40 CFR 122.45(f)(1)(ii)). In this instance, we believe expression of limits on total nitrogen as concentration limits is necessary to meet Rhode Island's water quality standards. A key report underlying the proposed permit limits is the December 2004 report, *Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers*, completed by RIDEM. The report documents that the Seekonk River is the most nutrient impacted area of Narragansett Bay: current total nitrogen loads to the Seekonk River are 24 times higher than the total nitrogen load to all of Narragansett Bay on a per unit area basis. If the concentration limitations recommended by the report were used to establish mass limits using the design flows of the waste water treatment facilities, the Seekonk River would receive nitrogen loads of approximately 10 times higher than the Bay-wide loads per unit area. With the limitations established as concentration limits, at current flows the Seekonk River would receive nitrogen loads of approximately 6.5 times higher than the Bay wide load. *See, e.g.*, Evaluation of Nitrogen Target and WWTF Load Reductions for the Providence and Seekonk Rivers, RIDEM, December 2004 at 28. Based on the MERL tank experiments, a nitrogen loading of between 2 times and 4 times the Bay wide loading may be necessary to achieve water quality standards. We have established UBWPAD's limit at 5.0 mg/l in light of uncertainties in the physical model. As indicated in the Fact Sheet and in Response #F6, EPA believes that the limit cannot be any less stringent than 5.0 mg/l under all flow conditions and ensure that water quality standards will be met. Concentration based total nitrogen limits have also been

[2] There are exceptions but they do not apply in this instance.

established in permits for other municipal treatment facilities in Massachusetts and Rhode Island that discharge to Narragansett Bay in order to achieve a nitrogen loading of approximately 6.5 times the Bay-wide loading. Further, at least in the short term, all these facilities will be discharging at flows approximating current flows, not design flows.[3] Setting the limits in terms of concentration will enable assessment of the response to a loading of 6.5 times the Bay-wide loading. Finally, we note that MassDEP did not raise this issue in the context of other recently issued permits containing nitrogen limits expressed as concentration limits, including Attleboro and North Attleboro.

Comment #E2: The Draft permit contains limits for nitrogen and phosphorus that the UBWPAD facility cannot currently attain and therefore a schedule for the facility to come into compliance with those limits is necessary. The nitrogen effluent limit is meant to address impairments for Rhode Island waters and we understand that the Rhode Island Water Quality Standards for surface waters do not allow for compliance schedules to be included in a discharge permit. However, the phosphorus effluent limit addresses impairments to waters within Massachusetts and the Massachusetts Water Quality Standards for surface waters do allow for compliance schedules to be included in discharge permits. Therefore we suggest that a schedule for compliance with the phosphorus limit be incorporated into the final permit. From an engineering and economic standpoint it only makes sense that when a compliance schedule for the nitrogen limit is established, the schedule should be consistent with the schedule outlined below that we are proposing for compliance with the phosphorus limit and we encourage EPA to follow this approach.

Below is MassDEP's suggested schedule for UBWPAD to attain the phosphorus effluent limits:

1. August 2009- Complete construction of ongoing upgrade
2. January 2011- initiate engineering evaluation of necessary upgrades to meet phosphorus effluent limit.
3. January 2012- complete engineering evaluation of necessary upgrades to meet phosphorus effluent limit.
4. January 2013- complete design of necessary upgrades to meet phosphorus effluent limit.
5. July 2013- initiate construction of necessary upgrades to meet phosphorus effluent limit.
6. December 2014- complete construction necessary upgrades to meet phosphorus effluent limit.
7. May 2015- obtain operational level to meet phosphorus effluent limit.

[3] Recent annual average flows from the UBWPAD facility have been as follows: 34 mgd in 2002; 41 mgd in 2003; 36 mgd in 2004; 43 mgd in 2005; 35 mgd in 2006; and 30 mgd in 2007. While the flows demonstrate some variation, due at least in part to inflow/infiltration, flows are well below the permitted design flow and there is no upward trend.

Response #E2: Compliance schedules to meet water quality based effluent limits may be included in permits only when the state's water quality standards clearly authorize such schedules and where the limits are established to meet a water quality standard that is either newly adopted, revised or interpreted after July 1, 1977. As noted in the Fact Sheet supporting the draft permit, EPA recognizes that it is unlikely that UBWPAD will be able to comply immediately with the water quality based effluent limits proposed for total nitrogen and phosphorus. With regard to nitrogen, the limits on total nitrogen are necessary to ensure compliance with the Rhode Island Water Quality Standards, not Massachusetts Water Quality Standards. Rhode Island has not included provisions in its Water Quality Regulations for surface waters allowing for schedules in permits. Rhode Island's practice is to incorporate any appropriate schedules in an Administrative Compliance Order or a Consent Agreement. While Massachusetts Water Quality Standards do allow schedules in permits, the decision of whether to include a compliance schedule is discretionary. *See* 314 CMR 4.03(1)(b)(indicating that a "permit may, when appropriate, specify a schedule leading to compliance…").[4] Thus, even if only Massachusetts standards were applicable, the standards do not mandate that a schedule be included in the permit itself. In this matter, there are many overlapping issues related to the planning, design and construction of facilities to meet the limits for phosphorus and nitrogen. Indeed, as MassDEP notes in its comment, the schedules for nitrogen and phosphorus should be consistent from an engineering and economic standpoint. Compliance issues should be handled comprehensively based on the best information when more is known about such issues as modes of compliance and costs. In light of these overlapping issues and the fact that Rhode Island standards do not include provisions allowing for schedules, EPA intends to issue a compliance schedule to meet both the phosphorus and nitrogen limits in a separate administrative order.

There are many factors to be considered in establishing a schedule and these will be fully evaluated prior to establishing a schedule in an administrative order. Several commenters have noted the importance of ensuring compliance expeditiously (*see* Comment #A2 above). As stated in Response #A2, it is our intent to establish a compliance schedule that is reasonable in light of the necessary treatment upgrades but that, consistent with our regulations, also ensures compliance with the permit limits as soon as possible. It is also our intent to ensure that the UBWPAD achieves compliance with its total nitrogen limit in a similar time frame as the Rhode Island facilities achieve compliance with their nitrogen limits in order to facilitate the process of assessing the water quality response in Upper Narragansett Bay.

Comment #E3: Finally, MassDEP is concerned that the effluent limits for phosphorus and nitrogen were established without the benefit of scientific guidance provided by TMDLs and the water quality goals they establish. So as to avoid a large capital expenditure without the benefit of a TMDL, MassDEP is committed to completing a

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[4] The Mass. Standards referenced above are those adopted in 2007. By letter dated September 19, 2007, EPA approved certain modifications to the Mass. Standards, including modifications to the cited provision related to compliance schedules. Like the 1996 version of the Standards, however, the 2007 version provides that incorporation of schedules into permits is discretionary.

TMDL for phosphorus for the Blackstone River prior to the start of construction in the above schedule. We expect that EPA will require Rhode Island to similarly complete a nitrogen TMDL for Narragansett Bay.

Response #E3: The Clean Water Act requires states to complete TMDL analyses for receiving waters listed on the 303(d) list. We do not agree, however, with the suggestion that the establishment of water quality-based nutrient limits in this permit is dependent on completion of TMDLs. While water quality-based effluent limitations in NPDES permits must be "consistent with the assumptions and requirements of any *available* wasteload allocation," (emphasis added) 40 CFR §122.44(d)(1)(vii)(B), an approved TMDL is not a precondition to the issuance of an NPDES permit for discharges to an impaired segment nor is it a precondition for compliance with limits established in the permit. Where a TMDL does not exist, EPA cannot abdicate its responsibility to establish effluent limits necessary to achieve water quality standards and protect existing and designated uses of the receiving water. *See* 40 CFR 122.4(d) and 40 CFR 122.44(d)(1)(i). Until development and approval of TMDLs, EPA will base effluent limits for nutrients on its interpretation of the narrative nutrient criteria in approved water quality standards.

This interpretation is consistent with the preamble to 40 C.F.R. § 122.44(d)(1), which expressly outlines the relationship between subsections 122.44(d)(1)(vi) (*i.e.*, procedures for implementing narrative criteria), and (d)(1)(vii):

> The final point about paragraph (vi) is that in the majority of cases where paragraph (vi) applies waste load allocations and total maximum daily loads will not be available for the pollutant of concern. Nonetheless, any effluent limit derived under paragraph (vi) must satisfy the requirements of paragraph (vii). Paragraph (vii) requires that all water quality-based effluent limitations comply with "appropriate water quality standards," and be consistent with "available" waste load allocations. Thus for the purposes of complying with paragraph (vii), where a wasteload allocation is unavailable, effluent limits derived under paragraph (vi) must comply with narrative water quality criteria and other applicable water quality standards.

See 54 Fed. Reg. 23,868, 23,876 (June 2, 1989). If a TMDL is completed and approved by EPA, the effluent limitation in any subsequently issued NPDES permit must be consistent with the wasteload allocation assigned to the UBWPAD facility. In the meantime, relevant regulations *require* that EPA include an effluent limit for any pollutants which EPA determines "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." 40 C.F.R. § 122.44(d)(1)(i).

It is also important to note that phosphorus TMDLs are very difficult to develop and often take much longer than anticipated. For example, the recently completed draft

Nashua River phosphorus TMDL was more than five years overdue, and there are still many issues to be addressed before it can be approved by EPA. Simulating the fate and transport of phosphorus in river systems is very complex, due to the variety of types of aquatic plants utilizing and then releasing phosphorus after the plants die and decay. Likewise, a nitrogen TMDL for Narragansett Bay has proven to be very difficult to develop, as demonstrated by the extensive resources expended to date and the documented complexities of the Upper Narragansett Bay system. See, e.g., *Evaluation of Nitrogen Target and WWTF Load Reduction for the Providence and Seekonk Rivers,* RIDEM, December 2004 at page 1. *See also Plan for Managing Nutrient Loadings to Rhode Island Waters* (RI-DEM, February 1, 2005) at 3. As described in the RIDEM 2004 Evaluation, "It has recently been determined that due to problems encountered when modeling the interaction between deep channel and shallow flanks of these water bodies, the mass transport component of the system cannot be successfully calibrated and validated. This problem has been encountered in other estuaries and has not been resolved with state of the art numerical solution techniques. Because water doesn't mix in the model as it does in the rivers, we are unable to simulate the chemical and biological behavior of the system in the water quality phase of the modeling effort."

While well-developed TMDLs for the Blackstone River and Narragansett Bay may be very useful in determining what, if any further reductions of phosphorus and nitrogen may be necessary, the Clean Water Act does not allow delay until completion of a TMDL. This is particularly important given the extensive and documented adverse impacts of cultural eutrophication in the Blackstone River and in Upper Narragansett Bay. *See also* Response #A8, and Response #F5, #F6 and #F9 below.[5] In the time that RIDEM has been attempting to develop a dynamic model, for instance, the Seekonk/Providence River system and waters downstream have continued to suffer from the effects of severe cultural eutrophication, including occasional fish kills. *See* www.dem.ri.gov/bart/fishkill.htm. The approach proposed by the commenter – to await the conclusion of complex TMDLs that may take years to complete – would forestall water quality improvements and would be inconsistent with EPA's regulatory obligations. *See also* Response #F47(a)(3)(i)-(iii).

PART F.

Comments were received from the Upper Blackstone River Water Pollution Abatement District in a letter dated May 24, 2007. The letter includes two attachments: Attachment A (Technical Issues/Comments) prepared by CDM and Attachment B (Legal and Policy Issues/Comments) prepared by counsel. The comments are repeated here in their entirety.

Comments raised in UBWPAD's cover letter dated May 24, 2007 are addressed below.

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[5] EPA's response to the comments above are applicable to comments raised by participants at the public hearing urging delay pending TMDLs or further scientific study.

Comment #F1: The Upper Blackstone facility treats waste water from Worcester and eight surrounding communities. The District and its members do not question the intent or the noble goal of restoring the Blackstone River to a place where we can safely swim and fish. We embrace it. We want a clean Blackstone River and a healthy Narragansett Bay. But we want to achieve these conditions using common sense with careful planning, guided by proven science and based on sustainable and cost-effective engineering. To that end, we are sponsoring development of an advanced model of the Blackstone River that will be capable of broad use in evaluating the condition of the River and in assessing management options. Through development of the model we are also supporting work by the U.S. Army Corps of Engineers to preserve and develop habitat along the River, as well as River assessments being completed by U.S. Geological Survey and DEP. We want the benefits of our investments to justify the costs that will burden our rate payers (not the federal or state governments that impose these mandates).

Response #F1: While we recognize the investment made by UBWPAD in water quality modeling, permit issuance cannot await conclusion of these modeling efforts. Where EPA determines that a discharge of a pollutant causes or contributes to an excursion above any State water quality standard, including State narrative criteria for water quality, EPA must include an effluent limitation in the permit for that pollutant. *See also* Response #E3, Response #F6 and Response #F47(a)(3)(i)-(iii) (relative to arguments that this permit await the completion of TMDLs or other studies). If the results of UBWPAD's efforts yields information indicating that any final effluent limit is more or less stringent than necessary to attain water quality standards, a permit modification can be pursued. *See* 40 CFR §122.62. *See also* Response #F43 for additional discussion of the timing of this permit issuance and UBWPAD's modeling efforts.

We recognize that improvements to meet the new limits will increase costs. Cost considerations or technological feasibility, however, are not permissible factors in **setting** water quality based effluent limits. *United States Steel Corp. v. Train*, 556 F. 2d 822, 838 (7th Cir. 1977); *see also In re City of Moscow*, 10 E.A.D. 135, 168 (EAB 2001). Such factors can be taken into account, however, in establishing a compliance schedule. In addition, under certain circumstances, permittees can conduct an analysis of affordability issues for the purposes of determining whether a designated use cannot be obtained or for obtaining a variance. In determining affordability for such an analysis, EPA uses *Interim Economic Guidance for Water Quality Standards*, EPA-823-B-95-002 (March 1995). *See also* Massachusetts Surface Water Quality Standards, 314 CMR 4.03(4); Rhode Island Water Quality Regulations, Rules 19 and 20; 40 CFR §131.10(g). *See also* Response #A9 and Response #F2 and #F4 below for more discussion on the affordability evaluation.

The need for and benefits of the nutrient limits are detailed below. *See, e.g*, Responses #F5, #F6, #F9, #F18, #F51.

Comment #F2: The District believes that the draft discharge permit is not supported by current science, and it is not justified for several reasons. It is an expensive order that fails to consider $180 million in ongoing capital improvements at the District, and as

such imposes an unfair burden on District ratepayers, many of them members of Environmental Justice populations. Without evidence, it will require costly treatment changes that are not environmentally sustainable.

Response #F2: There is an extensive amount of science documenting the need for the permit limits as outlined in the Fact Sheet and detailed throughout this Response to Comments. Further, the upgrades currently being undertaken to meet the limits in the expired permit will be unable to achieve limits that are necessary to ensure attainment of water quality standards. *See* Response #F5. As noted above in Response #F1, EPA can take cost into consideration in establishing a compliance schedule and applicable regulations include a process to evaluate whether, under certain circumstances, relief from requirements to meet water quality standards may be available. While upgrades necessary to meet the new limits will result in increased costs, UBWPAD has not provided the basis for its cost estimates (which vary in its oral and written comments from $100 to $200 million). It is premature to evaluate costs until UBWPAD has had the opportunity to evaluate alternative treatment technologies to meet the limits. In establishing a schedule to meet the new permit limits, EPA will include a reasonable amount of time for UBWPAD to conduct facilities planning including an alternatives evaluation. When UBWPAD has a better understanding of the most cost effective treatment options, we can work with UBWPAD to evaluate the associated economic impacts and the availability of any relief from meeting permit limits. Such an evaluation includes consideration of the timing of design and construction, how the project will be funded, and the resulting impact on ratepayers.

We are aware of Environmental Justice populations within the UBWPAD sewer area. In addition, we note that for these communities and the significant Environmental Justice populations downstream from the UBWPAD discharge,[6] the use and enjoyment of waters has been adversely affected by the associated water quality degradation. While we are mindful of cost impacts to communities in the UBWPAD sewer area, we also are mindful that the Environmental Justice populations in these communities are affected by water quality degradation to the point that designated uses such as swimming and fishing have been impaired.

Comment #F3: The permit imposes legal and administrative burdens on the District for management of member sewers through the co-permittee process that are not allowed in our enabling legislation and that the District has no authority to accept.

Response #F3: The co-permittee language makes the co-permittees directly responsible for controlling flow and maintaining their own sewer systems. *See also* Response #F45.

Comment #F4: The District is financed by each of our member communities based on use, with Worcester paying nearly 90 percent of our costs. For the City of Worcester, the current $180 million upgrade has increased treatment costs more than 300 percent in four

[6] See GIS map dated October 24, 2007 depicting Environmental Justice populations among the communities that discharge to UBWPAD and among communities downstream of the discharge.

years - and more cost increases will come to finance remaining construction. As a result, the city's sewer rates have more than doubled in four years. Median household income in Worcester is $37,000, 35% below the state's median. To impose further costly requirements on Worcester and our other member communities without justification is simply wrong.

Response #F4: *See* Response #A9, #F1 and #F2 as to the role of cost in the process of establishing water quality-based effluent limitations.

We understand that rates have increased and the importance of this issue to residents and public officials in Worcester and the UBWPAD service area. One of the reasons that Worcester residents have experienced recent increases is that they have been paying below average rates for many years. The UBWPAD facility went on line in 1976. The first major upgrades ever undertaken are those currently ongoing, and one of the main objectives was to bring the aging facility up to standards. In 2006, the consulting firm, Tighe & Bond, compiled statewide annual sewer use rates for a typical household. The sewer use rate for the typical household in Worcester was $338 while the statewide average was $485. The water quality of the Blackstone River is clearly not attaining water quality standards, in part due to the UBWPAD discharge. Again, if UBWPAD believes the added costs of treatment necessary to meet the new limits will be unaffordable under EPA's guidelines, the appropriate course is to pursue such a demonstration.

Finally, it is worth noting that other communities are also required to reduce nutrients to address the downstream water quality impairments. *See* Comment #A9. The predominant sources of the nutrient loading in the Providence and Seekonk Rivers are municipal wastewater treatment facilities in Rhode Island and Massachusetts. The State of Rhode Island has recently reissued several Rhode Island Pollutant Discharge Elimination System (RIPDES) permits for POTWs which discharge to the Providence and Seekonk Rivers. These permits include limitations on the discharge of total nitrogen in order to address the cultural eutrophication in these waters and Narragansett Bay. There are several municipal POTWs in Massachusetts, including UBWPAD, which discharge nitrogen into tributaries of the Seekonk and Providence Rivers. To date, EPA has issued final permits with nitrogen and phosphorus limits to North Attleborough and Attleboro, Massachusetts. *See* Response #F47(b)(iv) for additional detail on these other permits.

Comment #F5: In 2001, the District and EPA negotiated a discharge limit for phosphorus (P) of 0.75 milligrams per liter (mg/L) in summer; with no limit on total nitrogen (TN). EPA based these limits on its river model, even though its own Science Advisory Board recommended against doing so. This model remains EPA's only scientific basis for effluent limits on the river today. EPA determined then that these were the limits needed to improve conditions in the Blackstone and to benefit Narragansett Bay (40 miles away). The current proposal lowers the P limit to 0.1 mg/L in summer and to 1.0 mg/L in winter; and TN is set at 5 mg/L in summer. Our new facilities will achieve less than 0.75 mg/L P and less than 8.0 mg/L TN year-round. We

will be approaching the 40-50% summer TN reduction legislated by the Rhode Island Governor's Special Committee by 2009. We note that this goal was set without benefit of having set numerical water quality standards, or completion of a Total Maximum Daily Load (TMDL) assessment as required in EPA regulations.

Response #F5: In the draft 2001 permit, EPA established a phosphorus limit of 0.75 mg/l based on a waste load allocation for achieving minimum dissolved oxygen criteria [*Blackstone River Watershed Dissolved Oxygen Waste Load Allocation for Massachusetts and Rhode Island* (November 1997)]. A final permit was subsequently issued with the 0.75 mg/l phosphorus limit. The District appealed the permit and a settlement of the appeal was negotiated that left the phosphorus limit unchanged.

It is well documented in the 1997 Dissolved Oxygen Waste Load Allocation, the 1999 Response to Comments for the expired permit, and in the Fact Sheet for the current draft permit that the 0.75 mg/l total phosphorus limit was based on meeting dissolved oxygen criteria in the Blackstone River only and did not address eutrophication related impairments in either the Blackstone River or Narragansett Bay. In its response to UBWPAD's comments on the expired permit, EPA cautioned that future permit limits might include more stringent phosphorus limits if warranted by eutrophication impacts. As documented in the Fact Sheet for the current permit, the 0.75 mg/l limit does not ensure that eutrophication related criteria will be met in the Blackstone River and the addition of a total nitrogen limit is necessary to control eutrophication in Narragansett Bay. With regard to nitrogen, the 1998 Fact Sheet for the expired permit noted that the Blackstone River Initiative and the Narragansett Bay studies have shown that dry weather loadings of nitrogen to Narragansett Bay are significant and may be contributing to excessive productivity and DO concerns in the Bay. The Fact Sheet for the expired permit further stated that total nitrogen limits might be recommended in future permits and urged UBWPAD to consider denitrification capability at its treatment plant during future facility planning efforts.

The admonitions regarding more stringent nutrient limits in the administrative record for the expired permit reflect EPA's growing awareness of nutrient-related issues and commitment to resolve those issues. Nutrients (nitrogen and phosphorus) are one of the leading causes of water quality impairment in our Nation's rivers, lakes and estuaries. Virtually every State and Territory is impacted by nutrient-related degradation of our waterways. Massachusetts has listed Clean Water Act Section 303(d) nutrient-related impairments for numerous water bodies. Over the last nine years, EPA has taken a number of steps to provide leadership and to work in partnership with states, territories and authorized tribes to address nutrient impairments. EPA issued a National Strategy for Development of Nutrient Criteria in June 1998, and followed with a November 2001 national action plan for the development and establishment of numeric nutrient criteria. EPA published technical guidance for developing criteria for lakes and reservoirs in May 2000, rivers and streams in June 2000, and estuaries and coastal waters in October 2001. EPA also published recommended nutrient criteria for most streams and lakes in 2001.