EXHIBIT 3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES.

NPDES PERMIT NO.: **MA0102369**

NAME AND ADDRESS OF APPLICANT:

Upper Blackstone Water Pollution Abatement District
50 Route 20
Millbury, MA 01527

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Upper Blackstone Water Pollution Abatement District
50 Route 20
Millbury, MA 01527

CO-PERMITTEES: The municipalities of **Worcester, Millbury, Auburn, Holden, West Boylston, Rutland, and the Cherry Valley Sewer District** are co-permittees for specific activities required by the permit, as set forth in Section IV.H of this Fact Sheet and Sections I.D and I.E of the Draft Permit.

RECEIVING WATER: **Blackstone River**

CLASSIFICATION: **B (Warm Water Fishery)**

I. Proposed Action, Type of Facility, and Discharge Location.

The above named applicant has requested that the U.S. Environmental Protection Agency (EPA) reissue its NPDES permit to discharge into the designated receiving water. The Upper Blackstone Water Pollution Abatement District (UBWPAD) owns and operates a wastewater treatment facility with a design flow of 56 million gallons per day. The facility is engaged in the collection and treatment of domestic, commercial and industrial wastewater. The facility serves Worcester and portions of Auburn, West Boylston, Holden, Rutland, Oxford and Millbury. There are currently more than 200 industrial users contributing wastewater to this facility. There is one Combined Sewer Overflow (CSO) in this system which is in the City of Worcester and under Worcester's jurisdiction. The Permit authorizes the discharge of treated sanitary and

industrial wastewater from the facility to the Blackstone River subject to effluent limitations and other requirements.

The proposed permit would supersede the permit issued on September 30, 1999. UBWPAD filed a Petition for Review of certain conditions of the September 30, 1999 permit. The permit was modified on December 19, 2001, pursuant to a settlement agreement.

II. Description of Discharge.

A quantitative description of the discharge in terms of significant effluent parameters based on recent monitoring data is shown in Attachment A. The facility has a design capacity of 56 million gallons per day and discharges near the headwaters of the Blackstone River. During low flow conditions, UBWPAD's effluent dominates the river flow; the 7Q10 flow of the River is 4.4 million gallons per day. The dilution factor, therefore, is 1.1 (*see* Appendix B for calculations).

III. Limitations and Conditions.

The effluent limitations of the draft permit and the monitoring requirements may be found in the draft NPDES permit.

IV. Permit Basis and Explanation of Effluent Limitation Derivation.

A. General Statutory and Regulatory Background

EPA is issuing this permit pursuant to Section 402(a) of the Clean Water Act. The Commonwealth of Massachusetts is also issuing this permit, except for certain limitations and conditions discussed below, pursuant to Massachusetts General Laws ch. 21, ' 43 (2004).

The Clean Water Act (CWA) prohibits the discharge of pollutants to waters of the United States without a National Pollutant Discharge Elimination System (NPDES) permit unless such a discharge is otherwise authorized by the CWA. The NPDES permit is the mechanism used to implement technology and water quality-based effluent limitations and other requirements including monitoring and reporting. The draft NPDES permit was developed in accordance with various statutory and regulatory requirements established pursuant to the CWA and any applicable State administrative rules. The regulations governing EPA's NPDES permit program are generally found in 40 CFR Parts 122, 124, 125 and 136.

EPA is required to consider technology and water quality-based requirements as well as those requirements and limitations included in the existing permit when developing the renewed permit's effluent limits. Technology-based treatment requirements represent the minimum level of control that must be imposed under Sections 301(b) and 402 of the CWA. Secondary treatment technology guidelines (i.e. effluent limitations) for POTWs can be found at 40 CFR Part 133.

All statutory deadlines for meeting various treatment technology-based effluent limitations

established pursuant to the CWA have expired. When technology-based effluent limits are included in a permit, compliance with those limitations is from the date the issued permit becomes effective. *See* 40 CFR ' 125.3(a)(1). Compliance schedules and deadlines not in accordance with the statutory provisions of the CWA cannot be authorized by an NPDES permit. 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.

Section 301(b)(1)(C) of the CWA requires NPDES permits to contain effluent limits more stringent than technology-based limits where more stringent limits are necessary to comply with, among other things, any applicable state or federal water quality standards. A water quality standard consists of three elements: (1) beneficial designated use or uses for a water body or a segment of a water body; (2) numeric and narrative water quality criteria sufficient to protect the assigned designated use(s); and (3) antidegradation requirements to ensure that existing uses and high quality waters are protected and maintained.

EPA=s regulation at 40 C.F.R. ' 122.4(d) prohibits the issuance of an NPDES permit unless its conditions can Aensure compliance with the applicable water quality requirements of all affected States.@ As discussed below, both Massachusetts and Rhode Island are Aaffected states@ in the context of this permit issuance, and both states= water quality standards are relevant to the permit limitations. Similarly, 40 C.F.R. ' 122.44(d) requires EPA to impose conditions that achieve applicable water quality standards.

The Massachusetts Surface Water Quality Standards (314 CMR 4.00, February, 1996)[1] establish designated uses of the State=s waters, criteria to protect those uses, and an antidegradation provision to ensure that existing uses and high quality waters are protected and maintained. They also include requirements for the regulation and control of toxic constituents and specify that EPA=s recommended water quality criteria, established pursuant to Section 304(a) of the CWA, shall be used unless a site-specific criterion is established.

Rhode Island=s Water Quality Standards (Regulation EVM 112-88.97-1, June 2000) also establish designated uses of the State=s waters, criteria to protect those uses, and an antidegradation provision to ensure that existing uses and high quality waters are protected and maintained.

Section 401(a)(1) of the CWA forbids the issuance of a federal license for a discharge to waters of the United States unless the state where the discharge originates, in this case Massachusetts, either certifies that the discharge will comply with, among other things, state water quality standards, or waives certification. EPA's regulations at 40 CFR § 122.44(d)(3), §124.53 and

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1 The Massachusetts Surface Water Quality Standards ("Massachusetts WQS") referenced in this Fact Sheet are those adopted in 1996. Massachusetts recently adopted revisions to its Standards in January 2007 and has submitted them to EPA for approval. As the revisions are not yet approved, the 1996 version is applicable to this permit.

§124.55 describe the manner in which NPDES permits must conform to conditions contained in state certifications. Section 401(a)(2) of the CWA and 40 CFR § 122.44(d)(4) require EPA to condition NPDES permits in a manner that will ensure compliance with the applicable water quality standards of a "downstream affected state," in this case Rhode Island. The statute directs EPA to consider the views of the downstream state concerning whether a discharge would result in violations of the state's water quality standards. If EPA agrees that a discharge would cause or contribute to such violations, EPA must condition the permit to ensure compliance with the water quality standards. If the downstream affected state believes that the permit fails to include such requirements, then it may appeal the permit (like any other interested person with proper standing).

Section 402(o) of the CWA provides, generally, that the effluent limitations of a renewed, reissued, or modified permit must be at least as stringent as the comparable effluent limitations in the previous permit. Unless certain limited exceptions are met, Abacksliding@ from effluent limitations contained in previously issued permits is prohibited. EPA has also promulgated anti-backsliding regulations, which are found at 40 CFR ' 122.44(l). Unless statutory and regulatory backsliding requirements are met, the limits in the reissued permit must be at least as stringent as those in the previous permit.

B. Development of Water Quality-based Limits

Receiving stream requirements are established according to numerical and narrative standards adopted under state law for each stream classification. Water quality-based limits are established in accordance with 40 CFR ' 122.44(d) and ' 122.45(d). When developing permit limits based on numeric criteria from the state's water quality standards, both the acute and chronic criteria are used. These criteria are expressed in terms of maximum allowable in-stream pollutant concentrations. Maximum daily limits are generally derived from the acute aquatic life criteria, and the average monthly limits are generally derived from the chronic aquatic life criteria.

The permit must limit any pollutant or pollutant parameter (conventional, non-conventional, toxic and whole effluent toxicity) that is or may be discharged at a level that causes or has "reasonable potential" to cause or contribute to an excursion above any water quality criterion. An excursion occurs if the projected or actual in stream concentration exceeds the applicable criterion.

In determining reasonable potential, EPA considers: (1) existing controls on point and non-point sources of pollution; (2) pollutant concentration and variability in the effluent and receiving water as determined from the permit application, monthly discharge monitoring reports (DMRs), and State and Federal water quality reports; (3) sensitivity of the species to toxicity testing; (4) statistical approach outlined in *Technical Support Document for Water Quality-based Toxics Controls,* March 1991, EPA/505/2-90-001 in Section 3; and, where appropriate, (5) dilution of the effluent in the receiving water. In accordance with Massachusetts Surface Water Quality Standards [314 CMR 4.03(3)], available dilution for rivers and streams is based on a known or estimated value of the lowest average flow which occurs for seven (7) consecutive days with a

recurrence interval of once in ten (10) years (7Q10). Rhode Island=s Water Quality Standards provide for a similar dilution calculation for freshwaters. *See* Rule 8.E.(2)(a).

C. Description of Treatment Facility

The UBWPAD wastewater treatment plant includes the following treatment units: mechanical bar racks, grit chambers, primary clarifiers, activated sludge aeration tanks, secondary clarifiers, chlorine disinfection basins, dechlorination facilities, and chemical addition facilities for total phosphorus removal. Sludge is thickened, dewatered and incinerated in a multiple hearth incinerator. The District accepts sludge from many communities, which is dewatered and incinerated in the multiple hearth incinerator. The District also accepts septage from many communities, which is stored in a septage holding facility and then introduced into the headworks of the treatment facility. Effluent from the treatment plant is discharged though outfall 001, to a discharge channel to the Blackstone River.

The UBWPAD is in the process of a major upgrade of the treatment facility. The upgrade is being completed in two phases. Phase I addresses peak flow management, headworks, primary treatment, disinfection, odor control, hazardous waste remediation, and air pollution control improvements. The Phase I upgrade will increase the ability of UBWPAD to accept flow from the CSO treatment facility in Worcester. Phase II upgrades include improvements to the advanced treatment facilities plus additional hazardous waste remediation. Both phases are scheduled to be completed by August 5, 2009.

The preliminary and primary treatment facilities are being upgraded to accept a peak hourly flow of 160 MGD, thereby providing primary treatment to flows that currently are discharged with minimal treatment at the CSO facility. The advanced treatment process is being designed to accept a peak hour flow of 120 MGD and a maximum daily flow of 80 MGD. Discharges in excess of the advanced treatment process capacity will receive primary treatment and disinfection and be discharged through outfall 001A, which will be located adjacent to outfall 001.

The draft permit requires that the combined discharge comply with all permit limits and requirements. Monitoring conditions have been established to ensure that the effluent quality of the high flow outfall is adequately quantified and accounted for in determining compliance with the permit limits.

D. Description of the Receiving Water

The Blackstone River is an interstate water which has its headwaters in Worcester, Massachusetts. It flows south into Rhode Island where it discharges into the Seekonk River in Pawtucket. The Seekonk River, in turn, flows into the Providence River. The Providence River flows into Narragansett Bay, Rhode Island's most important aquatic resource. The Blackstone River is a major source of freshwater to Narragansett Bay.

The Blackstone River in Massachusetts is designated by the Massachusetts Surface Water

Quality Standards as a Class B Warm Water Fishery. Class B waters are designated as a habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation. Where designated they shall be suitable as a source of public water supply with appropriate treatment. They shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. These waters shall have consistently good aesthetic value. In warm water fisheries the temperature shall not exceed 83EF nor shall the rise in temperature due to a discharge exceed 5EF.

The Blackstone River is listed on the *Massachusetts Year 2004 Integrated List of Waters* (which incorporates the CWA § 303(d) list) as a water that is impaired (not meeting water quality standards) and requires one or more Total Maximum Daily Loads (TMDLs) to be prepared to reduce pollutant loadings into the River so that it can attain water quality standards. The Blackstone River is listed as impaired for unknown toxicity, priority organics, metals, ammonia, chlorine, nutrients, organic enrichment/low dissolved oxygen (DO), flow alterations and other habitat alterations, pathogens, suspended solids, turbidity, and objectionable deposits.

The Blackstone River in Rhode Island is designated by the Rhode Island Water Quality Regulations as a Class B1 water from the MA/RI border to the Slaters Mill Dam at the confluence with the Seekonk River. The Seekonk River is a marine water (seawater) designated as a Class SB1{a}water. The Providence River also is a marine water. The northern section of the Providence River is classified as SB1{a}; the southern section is classified as SB{a}.

Class B waters are designated for fish and wildlife habitat and primary and secondary contact recreational activities. They shall be suitable for compatible industrial process and cooling, hydropower, aquacultural uses, navigation, irrigation and other agricultural uses. These waters shall have good aesthetic value. A Class B1 water has the same designated uses as a Class B water, except that primary contact recreational uses may be impacted due to pathogens from approved wastewater discharges. Class SB waters are designated for primary and secondary contact recreational activities; shellfish harvesting for controlled relay and depuration; and fish and wildlife habitat. They shall be suitable for aquacultural uses, navigation, and industrial cooling. These waters shall have good aesthetic value. Class SB1 waters are designated for primary and secondary contact recreational activities and fish and wildlife habitat. They shall be suitable for aquacultural uses, navigation, and industrial cooling. These waters shall have good aesthetic value. Primary contact recreational activities may be impacted due to pathogens from approved wastewater discharges. A partial use restriction – "{a}" – indicates a water which is likely to be impacted by combined sewer overflows in accordance with an approved CSO facilities plan; therefore primary contact recreational activities, shellfishing uses, and fish and wildlife habitat will likely be restricted.

The Blackstone River in RI is listed on the State's *2004 CWA § 303(d) List of Impaired Waters* as a water that is impaired for copper, lead, pathogens, biodiversity impacts, ammonia, nutrients and low dissolved oxygen, and requires one or more TMDLs to be prepared.

The Seekonk River is listed on Rhode Island's *2004 CWA § 303(d) List of Impaired Waters* as a

water that is impaired for nutrients, low DO, and excess algal growth/chlorophyll(a). The Providence River is listed on Rhode Island's *2004 CWA § 303(d) List of Impaired Waters* as a water that is impaired for nutrients, excess algal growth/chlorophyll(a), low DO and pathogens. A TMDL has not been completed but, as is discussed in the Total Nitrogen section of this fact sheet, the State has performed a physical model assessing the impacts of total nitrogen on non-attainment of water quality standards in the Seekonk River and Providence River and has recommended total nitrogen effluent limitations for POTWs discharging to these receiving waters and their tributaries.

E. Limits Derivation

The effluent limits on all of the pollutants discussed below, with the exception of total nitrogen, are established to ensure compliance with technology-based requirements and the Massachusetts Surface Water Quality Standards. Since the applicable water quality criteria for Massachusetts are similar to, and in some cases more stringent than, the applicable water quality criteria for Rhode Island, the effluent limits also ensure compliance with Rhode Island Water Quality Standards. The limits and requirements on total nitrogen are established solely to ensure compliance with the Rhode Island Water Quality Standards.

EPA recognizes it is unlikely that UBWPAD will be able to comply immediately with the limits proposed for nitrogen and phosphorus. In its ongoing facility upgrades, UBWPAD has considered the potential of EPA's issuing a permit with more stringent effluent limits, particularly for nutrients. Until the development and issuance of this proposed permit, however, UBWPAD has not been aware of the specific limits for nitrogen and phosphorus that EPA believes are necessary at this time to meet state water quality standards. EPA will work with UBWPAD to develop a schedule for the planning, design and construction of facilities necessary to meet the specified limits and that takes into account currently ongoing facility upgrades. It is EPA=s intent to begin this process as soon as possible.

Conventional Pollutants:

The May thru October effluent limitations for CBOD and TSS are water-quality based and are the same as those limits found in the existing permit. They were originally established pursuant to a 1997 Waste Load Allocation for achieving minimum dissolved oxygen criteria in the Blackstone River. The November through April effluent limitations for CBOD and TSS are based on secondary treatment requirements and also are the same as those limits found in the existing permit. The basis for the limits is further detailed in the September 7, 2001, *Statement of Basis* established in support of the December 19, 2001 permit modification.

The numerical limitations for fecal coliform, pH, and dissolved oxygen are based on state certification requirements under Section 401(a)(1) of the CWA, as described in 40 CFR ' 124.53 and ' 124.55. These limitations are the same as in the existing permit and so are consistent with antibacksliding requirements. The fecal coliform limits are established as year-round limits (rather than seasonal as in the expired permit) in order to ensure that the water quality criteria are

met at all times.

In addition, year round limits are necessary to meet Rhode Island's Water Quality Standards. The Louis Berger Group conducted water quality sampling for Rhode Island Department of Environmental Management (RIDEM) in the Blackstone River in 2005 and 2006. The sampling station for this data was in Millville, MA, upstream of the Tupperware Dam. This station was chosen as the last accessible point on the main stem of the Blackstone River prior to its crossing the MA-RI border. This sampling included monthly samples collected during dry weather from November 2005 through February 2006, a period during which the upstream Massachusetts POTWs were not disinfecting. Fecal coliform counts of 1700, 1300, 700, and 1700 MPN/100 ml were recorded during this period. The geometric mean of these samples is 1273 MPN/100 ml, and all four of the samples exceed 500 MPN/100 ml, therefore violating RI water quality standards. During dry weather, the only significant sources of fecal coliform bacteria in the river are the upstream POTWs. The sampling also included monthly samples collected during April 2005 and October 2005, a period during which upstream POTWs are disinfecting; samples collected during this time indicate the criteria were generally met. EPA believes that the discharge from UBWPAD, being the dominant point source on the river, has the reasonable potential to cause or contribute to violations of Rhode Island's Water Quality Standards. Therefore, fecal coliform limits are necessary to meet Rhode Island's Water Quality Standards, and they must be applied year round because Rhode Island does not have a provision that allows for seasonal disinfection.

Phosphorus:

The Massachusetts Surface Water Quality Standards do not contain numerical criteria for total phosphorus. They include a narrative criterion for nutrients at 314 CMR 4.05(5)(c), which provides that nutrients "[s]hall not exceed the site specific limits necessary to control accelerated or cultural eutrophication." They also include a requirement that "[a]ny existing point source discharges containing nutrients in concentrations which encourage eutrophication or growth of weeds or algae shall be provided with the highest and best practicable treatment to remove such nutrients." 314 CMR 4.04.

The expired permit has a monthly average phosphorus limit of 750 ug/l from April 1 to October 31. Effluent data from DMRs for April thru October during 2004 thru 2006 ranged from 900 to 2,400 ug/l of total phosphorus.

The impacts associated with the excessive loading of phosphorus are documented in the following reports: *Blackstone River Initiative Report,* May 2001 (EPA New England); *Blackstone River Basin 1998 Water Quality Assessment Report* (MassDEP); *Blackstone River Watershed 2003 DWM Water Quality Monitoring Data,* May 2005 (MassDEP); *Phase I: Water Quality Evaluation and Modeling of the Massachusetts Blackstone River, Draft - March 2004* (US Army Corps of Engineers - http://www.nae.usace.army.mil/projects/ma/blackstone/wqe.htm); and *Blackstone River Watershed 2003 Biological Assessment*, April 4, 2006 (MassDEP), as well as in the Massachusetts and Rhode Island 303(d) Lists of Impaired Waters as discussed above. The impacts include high levels of phosphorus, violations of the minimum dissolved oxygen criteria,

high levels of chlorophyll a, and high levels of macrophyte and periphyton growth. The relationship between high levels of phosphorus and eutrophication, as measured by chlorophyll a, periphyton, macrophyte, and dissolved oxygen levels is well documented in scientific literature, including in guidance developed by EPA to address nutrient overenrichment. *See Nutrient Criteria Technical Guidance Manual – Rivers and Streams,* July 2000 (EPA-822-B-00-002).

The monthly average phosphorus limit in the expired permit of 750 ug/l was established based on a model developed as part of the Blackstone River Initiative. *See Blackstone River Watershed Dissolved Oxygen Waste Load Allocation for Massachusetts and Rhode Island* (November 1997). In that permitting proceeding, the model was used to establish limits that would result in achieving the minimum dissolved oxygen criteria in the Blackstone River. The model was not used to develop effluent limits necessary to control cultural eutrophication. In the Response to Comments issued in September 1999, EPA noted that under the limits established in that permit, the model indicated that chlorophyll-a values and diurnal dissolved oxygen variations would still be at levels of concern relative to eutrophication impacts. EPA further noted that if these problems persisted then more stringent phosphorus limits would need to be implemented. Subsequent studies conducted from 2000 to 2003 by the Massachusetts Department of Environmental Protection (MassDEP) and the Army Corps of Engineers (noted above) provide documentation of the severity of the eutrophication in the Blackstone River. It is clear from these studies, as well as EPA's recently developed nutrient guidance documents, that the existing permit limit is inadequate for ensuring that water quality standards related to the control of eutrophication will be met.

In the absence of a numeric criterion for phosphorus, EPA looks to nationally recommended criteria and other technical guidance documents. *See* 40 CFR 122.44(d)(1)(vi)(B). EPA has produced several guidance documents which contain recommended total phosphorus criteria for receiving waters. The *1986 Quality Criteria for Water* ("Gold Book") recommends in-stream phosphorus concentrations of no greater than 50 ug/l in any stream entering a lake or reservoir, 100 ug/l for any stream not discharging directly to lakes or impoundments, and 25 ug/l within a lake or reservoir. The Blackstone River below the UBWPAD discharge is free flowing for approximately 5 miles before it enters the first of a series of many impoundments before reaching the Seekonk River.

More recently, EPA has released "Ecoregional Nutrient Criteria," established as part of an effort to reduce problems associated with excess nutrients in water bodies in specific areas of the country. *Ambient Water Quality Criteria Recommendations: Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams,* December 2000 (EPA-822-B-00-022). The published criteria represent conditions in waters in that ecoregion that are minimally impacted by human activities, and thus representative of water without cultural eutrophication. The UBWPAD is within Ecoregion XIV, Eastern Coastal Plains. The recommended total phosphorus criterion for this ecoregion is 24 ug/l.

Given the lack of any significant dilution of UBWPAD's discharge under 7Q10 conditions, a total phosphorus discharge of 750 ug/l would result in an in-stream concentration of 682 ug/l

(assuming zero upstream phosphorus and a discharge at design flow). The calculation is as follows: 750 ug/l divided by the dilution factor of 1.1 equals 682 ug/l. This in-stream concentration is far in excess of the national ambient criteria recommendations ranging from 24 ug/l (based on the Ecoregional Nutrient Criteria) to 100 ug/l (based on the Gold Book Criteria). It is clear that the existing limits must be made more stringent to address the documented eutrophication problems in the receiving water.

In the context of other permitting decisions where a TMDL has not yet been completed, MassDEP has interpreted the "highest and best practicable treatment" requirement in its standards as requiring an effluent limit of 0.2 mg/l (200 ug/l) for phosphorus. In this instance, however, the receiving water does not provide sufficient dilution to ensure that a limit of 0.2 mg/l would adequately control eutrophication to meet water quality criteria. With a 0.2 mg/l effluent limit, the resulting instream concentration of total phosphorus would be 182 ug/l (assuming no upstream phosphorus, design effluent flow and 7Q10 receiving water flow). Again, the calculation is as follows: 200 ug/l divided by the dilution factor of 1.1 equals 182 ug/l. Such a concentration also is far above the recommendations of 24 ug/l to 100 ug/l in national guidance detailed above.

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. In light of the lack of any significant dilution, a limit of 0.1 mg/l is necessary to ensure that the resulting instream concentration is maintained at 100 ug/l or less. This limit will be in effect seasonally, from April 1 to October 31.

In addition to the seasonal total phosphorus limit of 0.1 mg/l, the permit contains a winter period total phosphorus limit of 1.0 mg/l for November through March. The winter period limitation on total phosphorus is necessary to ensure that the higher levels of phosphorus discharged in the winter period do not result in the accumulation of phosphorus in the downstream sediments. The limitation 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. A dissolved orthophosphorus monitoring requirement has been included to verify the dissolved fraction. If future evaluations indicate that phosphorus may be accumulating in downstream sediments, the winter period phosphorus limit may be reduced in future permit actions.

Nitrogen:

$ Ammonia:

The permit limits for ammonia-nitrogen are the same as in the previous permit, as modified on December 19, 2001, and are established in order to control both in-stream oxygen demand and the degree of toxicity associated with the discharge.

The May limits and the June thru October limits are based on the 1997 Waste Load Allocation for achieving minimum dissolved oxygen criteria.

The November limits and the December thru April limits are based on a December 1999 ammonia criteria document for preventing toxic impacts associated with in-stream ammonia concentrations. *See 1999 Update of Ambient Water Quality Criteria for Ammonia* (EPA 822-R-99-014, December 1999).

The basis for the limits is further detailed in the September 7, 2001, *Statement of Basis* established in support of the December 19, 2001 permit modification.

- Total Nitrogen:

Narragansett Bay, and the Seekonk and Providence Rivers, have suffered severe cultural eutrophication for many years. This cultural eutrophication results in periodic low dissolved oxygen levels and associated fish kills. In addition, historic estimates of eel grass in Narragansett Bay ranged from 8,000 - 16,000 acres and current estimates of eel grass indicate that less than 100 acres remain. No eel grass remains in the upper two thirds of Narragansett Bay and the Providence River. Severe eutrophication is believed to be a significant contributor to the dramatic decline in eel grass. *See Governor's Narragansett Bay and Watershed Planning Commission, Nutrient and Bacteria Pollution Panel, Initial Report* (March 3, 2004); *Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers,* Rhode Island Department of Environmental Management (December 2004); *Plan for Managing Nutrient Loadings to Rhode Island Waters*, Rhode Island Department of Environmental Management (February 1, 2005).

The Seekonk River has a water quality classification of SB1{a}; the northern portion of the Providence River has a classification of SB1{a} and the southern portion has a classification of SB{a}. The designated uses include primary and secondary contact recreational activities and fish and wildlife habitat. Rhode Island Water Quality Standards Rule 8.B.(2)(c). Applicable criteria include the following:

> "At a minimum, all waters shall be free of pollutants in concentrations or combinations or from anthropogenic activities subject to these regulations that:
>
> i. Adversely affect the composition of fish and wildlife;
> ii. Adversely affect the physical, chemical, or biological integrity of the habitat;
> iii. Interfere with the propagation of fish and wildlife;
> iv. Adversely alter the life cycle functions, uses, processes and activities of fish and wildlife...." Rule 8.D.(1).
>
> The dissolved oxygen shall be "not less than 5 mg/l at any place or time, except as naturally occurs. Normal seasonal and diurnal variations which result in *insitu* concentrations above 5.0 mg/l not associated with cultural eutrophication will be maintained in accordance with the Antidegradation Implementation Policy." Table 2, Rule 8.D.(3)1.

> There shall be no nutrients "in such concentration that would impair any usages specifically assigned to said Class, or cause undesirable or nuisance aquatic species associated with cultural eutrophication." Nutrients "shall not exceed site-specific limits if deemed necessary by the Director to prevent or minimize accelerated or cultural eutrophication. Total phosphorus, nitrates and ammonia may be assigned site-specific permit limits based on reasonable Best Available Technologies." Table 2, Rule 8.D.(3)10; see also Rule 8.D.(1)(d).

Additional relevant regulations include Rule 9.A. and B., which prohibit discharges of pollutants which alone or in combination will likely result in violation of any water quality criterion or interfere with one or more existing or designated uses, and prohibit discharges that will further degrade waters which are already below the applicable water quality standards.

It is clear that eutrophication in the Seekonk and Providence Rivers and Narragansett Bay has reached a level where it is adversely affecting the composition of fish and wildlife; adversely affecting the physical, chemical, or biological integrity of the habitat; interfering with the propagation of fish and wildlife; adversely altering the activities of fish and wildlife; and causing dissolved oxygen to drop well below 5.0 mg/l. The effects of eutrophication, including algae blooms and fish kills, are also interfering with the designated uses of the water. Eutrophication has, therefore, reached a point where it is causing violations of water quality standards.

Excessive loadings of nitrogen have been identified as the cause of the eutrophication. This link has been clearly demonstrated by water quality data and by various studies and reports issued over the years. One key report, titled *Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers*, completed by the Rhode Island Department of Environmental Management (DEM) in December 2004, summarizes and references many of the studies and reports. A more recent study, based on oxygen surveys during August 2001 and August 2002, documents that wide areas of the upper half of Narragansett Bay are subject to intermittent periods of hypoxia during summer months. *See* Deacutis, et al., *Hypoxia in the Upper Half of Narragnsett Bay, RI, During August 2001 and 2002*, Northeastern Naturalist, 13 (Special Issue 4):173-198 (2006).

DEM's 2004 report analyzes both water quality data and information about major discharges to the Providence and Seekonk Rivers. The report, drawing in part on data developed in earlier studies, divides the rivers into segments and analyzes pollutant loadings and specific water quality impairments in each segment. Much of the data used in the analysis is from a 1995 - 1996 study by DEM Water Resources that consisted of measurements of nitrogen loadings from point source discharges and the five major tributaries to the Providence/Seekonk River system. The report also includes an analysis of data produced by a physical model of the Providence/Seekonk River system. That physical model was operated by the Marine Ecosystems Research Laboratory (MERL), and was part of an experiment to evaluate the impact of various levels of nutrient loading on the rivers and Narragansett Bay.

The predominant sources of the nitrogen loading in the Providence and Seekonk Rivers are

municipal wastewater treatment facilities in Rhode Island and in 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. As reflected in the Blackstone River Initiative and DEM's 2004 study, the UBWPAD is the dominant source of nitrogen loadings to the Blackstone River. For instance, the loadings data utilized in DEM's 2004 study indicate that UPWPAD represented approximately 64% of the nitrogen load discharged to the Blackstone River from municipal wastewater treatment facilities for the period of time considered in the study. In addition, the Blackstone River discharges into the headwaters of the Seekonk River, where the greatest impairments in the Narragansett Bay Basin have been measured.

The Commonwealth of Massachusetts submitted detailed comments (February 11, 2005) on the DEM report, questioning the report's evaluation of the nitrogen issue and the basis for nitrogen reductions. Rhode Island responded to those comments on June 27, 2005.

One key issue raised by Massachusetts is whether the impact of nitrogen discharges from Massachusetts POTW sources is significantly reduced by in-stream attenuation before the nitrogen reaches impaired portions of the Seekonk River. The DEM report estimates a 13% attenuation rate for the Blackstone River. Based on the studies and analyses previously referenced, this rate is a reasonable estimate. Moreover, this rate is expected to decrease as phosphorus loads decrease. Much of the attenuation is due to phosphorus-driven eutrophication in the Blackstone River (nitrogen attenuation increases as eutrophication levels increase). Phosphorus discharges to the Blackstone River are expected to be significantly lower during the term of this permit than they were during the 1995-96 period considered in the DEM Report; the resulting decline in phosphorus-driven eutrophication is expected to significantly reduce the attenuation of nitrogen.

Another issue raised by Massachusetts is that there are inherent uncertainties in the conclusions of the DEM report due to its reliance on a physical model. EPA recognizes that 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 Providence and Seekonk Rivers and Upper Narragansett Bay. In the 2004 study, RIDEM notes that differences in dissolved inorganic nitrogen concentrations between tank and field data are likely the result of tidal flushing and microalgae uptake. In this regard, use of a physical model such as the MERL experiments does raise some uncertainty as to the precise level of nitrogen control that may ultimately be needed in the River system to meet Rhode Island's Water Quality Standards. Both the MERL tank experiments and the data from the River system, however, indicate a clear correlation between nitrogen loadings, chlorophyll a levels and dissolved oxygen impairment sufficient to establish effluent limits at this time.

EPA has reviewed all of the available data, including the comments by Massachusetts on the DEM report and Rhode Island's responses. EPA has concluded that there is convincing evidence

that excessive nitrogen loading is impairing the designated uses of the Seekonk and Providence Rivers, and that wastewater treatment facilities in Massachusetts contribute a significant portion of the nitrogen loading. The total permitted municipal wastewater volume to the Blackstone River is 80.4 MGD and the UBWPAD represents approximately 70% of this volume. As noted above, UBWPAD is the dominant source of nitrogen loadings to the Blackstone River. UBWPAD also is the dominant source of nitrogen loadings from the Blackstone River into the Seekonk River. Using an estimated 13% rate of attenuation, 87% of the UBWPAD nitrogen load reaches the Seekonk River.

Based on the available evidence, including nitrogen loadings from the UBWPAD and the discharge of the Blackstone River to the Seekonk River, where the greatest impacts have been measured, EPA has concluded that a seasonal reduction of nitrogen to no more than 5.0 mg/l is required at the UBWPAD facility in order to achieve water quality standards. Together with nitrogen reductions proposed at other Massachusetts and Rhode Island facilities, a limit of 5.0 mg/l at UBWPAD would result in the Seekonk River receiving nitrogen loads of ten times higher than Bay wide loads on a per unit area basis (assuming POTWs were discharging at design flows); assuming the facilities were discharging at current flows, the loading to the Seekonk River would be seven times the Bay wide load. *See Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers,* DEM (December 2004). While the physical model indicates that reduction of nitrogen loadings may need to be greater, differences between the tank experiments and field data raise uncertainties as to the level of nitrogen reduction that ultimately may be warranted. There is no realistic likelihood, however, that water quality standards could be met with a less stringent nitrogen limit than the one proposed. In addition, DEM 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. *See Plan for Managing Nutrient Loadings to Rhode Island Waters*, DEM (February 1, 2005). It is possible that this monitoring will demonstrate that additional pollutant reductions are ultimately needed to meet water quality standards.

Therefore, pursuant to §§ 301(1)(b)(1)(C) and 401(a)(2) of the CWA and 40 C.F.R. §§ 122.4(d) and122.44(d), EPA has included in the draft permit a total nitrogen limit of 5.0 mg/l monthly average from May through October. Nitrogen discharged from May through October is believed to be the dominant source of available nitrogen in the Providence and Seekonk Rivers during the critical growing period (see DEM "Response to Comments Received on Proposed Permit Modifications for the Fields Point, Bucklin Point, Woonsocket and East Providence WWTFs"). EPA's draft permit also includes a treatment optimization requirement for November through April, in order to maximize the nitrogen removal benefits. These nitrogen limits and requirements are contained only in EPA's NPDES permit. The MassDEP is not including these limits in its state-issued permit; the state permit establishes limits that are necessary to protect Massachusetts waters only.

Toxic Pollutants

$ Chlorine

Chlorine and chlorine compounds produced by the chlorination of wastewater can be extremely toxic to aquatic life. The effluent limits for average monthly and maximum daily total residual chlorine (TRC) were developed using the chronic and acute TRC criteria defined the *EPA Quality Criteria for Water, 1986* (the AGold BookA), as incorporated into the Massachusetts WQS.

The criteria were multiplied by the available receiving water dilution (refer to Attachment B) to obtain the TRC limits found in the draft permit. The criteria state that the average TRC in the receiving water should not exceed 11 ug/l for chronic toxicity protection and 19 ug/l for acute toxicity protection. *See* Attachment B for the TRC calculations.

The average monthly and maximum daily TRC limits are below the analytical detection limit for this pollutant. In these situations, EPA, Region I is following guidance set forth in the *Technical Support Document for Water Quality-Based Toxics Control,* EPA/505/2-90-001, March 1991, page 111, which recommends AY that the compliance level be defined in the permit as the minimum level (ML).@ EPA has defined the ML as Athe level at which the entire analytical system shall give recognizable signal and acceptable calibration points.@ The minimum level for TRC is 0.020 mg/l or 20 ug/l, and is defined as such in the draft permit. Therefore, compliance/non-compliance determinations will be based on the Minimum Level (ML). This ML value of 20 ug/l may be reduced by permit modification as more sensitive test methods are approved by the EPA and the MassDEP.

The permit also includes a requirement that chlorine residual from outfall 001 be monitored using a continuous chlorine analyzer and the results reported with the monthly DMRs. This requirement is established in recognition of the limitations of grab sampling for determining compliance with the chlorine limit given the complexities and variability associated with the chlorine demand of wastewater as well as the complexities associated with controlling and coordinating the dosing of chlorine and dechlorination chemicals.

$ Metals

Limitations for cadmium, copper, and zinc were calculated using the EPA recommended water quality criteria found in *National Recommended Water Quality Criteria 2002,* as incorporated into the Massachusetts WQS, in accordance with the calculations below. An in-stream hardness of 65 mg/l, based on the evaluation of in-stream hardness levels conducted as part of the permit modification issued in December 2001, is used in the calculations. These limits have been used in the draft permit for all metals where there is a reasonable potential that the discharge would cause an exceedance of the ambient criteria. For cadmium, copper and zinc, the facility's discharge data indicate that the facility has a reasonable potential to cause or contribute to a violation of water quality standards. (DMR data for these metals are appended to the Fact Sheet as Attachment A).

Copper:

Hardness = 65 mg/l
Chronic Criterion (total recoverable) = 6.5 ug/l
Acute Criterion (total recoverable) = 9.3 ug/l
Dilution Factor = 1.1 (see Attachment B)

Monthly Average Limit = (chronic criterion)(dilution factor) = (6.5 ug/l)(1.1) = 7.2 ug/l
Daily Maximum Limit = (acute criterion)(dilution factor) = (9.3 ug/l)(1.1) = 10.2 ug/l

We note that MassDEP has submitted revised site-specific water quality criteria for copper. The revised chronic criteria for dissolved copper is 18.1 ug/l and the revised acute criteria for dissolved copper is 25.7 ug/l. 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.

Cadmium:

Chronic Criterion (total recoverable) = 0.2 ug/l
Acute Criterion (total recoverable) = 1.4 ug/l
Dilution Factor (DF) = 1.1 (see Attachment B)

Monthly Average Limit = (chronic criterion)(dilution factor) = (0.2 ug/l)(1.1) = 0.2 ug/l
Daily Maximum Limit = (acute criterion)(dilution factor) = (1.4 ug/l)(1.1) = 1.5 ug/l

Zinc:

Chronic Criterion (total recoverable) = 83.0 ug/l
Acute Criterion (total recoverable) = 83.0 ug/l
Dilution Factor (DF) = 1.1 (see Attachment B)

Monthly Average Limit = (chronic criterion)(dilution factor) = (83.0 ug/l)(1.1) = 91.3 ug/l
Daily Maximum Limit = (acute criterion)(dilution factor) = (83.0 ug/l)(1.1) = 91.3 ug/l

While both Massachusetts and Rhode Island water quality criteria for metals are based on dissolved metals, EPA's regulations at 122.45(c) require that permit limits be based on total recoverable metals and not dissolved metals. Consequently, it is necessary to apply a translator in order to develop a total recoverable permit limit from a dissolved criterion. The translator reflects how a discharge partitions between the particulate and dissolved phases after mixing with the receiving water. In the absence of site specific data on how a particular discharge partitions in the receiving water, a default assumption that the translator is equivalent to the inverse of the conversion factor (the conversion factor converts a criterion based on total metals to a criterion based on dissolved metals) is used in accordance with the EPA Metals Translator Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion (EPA-823-B-96-007). Since the translator and the conversion factor offset each other, the limits calculated above represent total metals limits that are necessary to meet the dissolved metals

criteria.

The permit specifies the Furnace Atomic Absorption (AA) method for measuring copper and cadmium. The lower quantification levels (Minimum Levels (MLs)) achieved by this method are necessary in order to obtain results at or near the effluent limits for these parameters.

F. Pretreatment Program

The permittee is required to administer a pretreatment program based on the authority granted under 40 CFR Section 122.44 (j), 40 CFR Section 403 and Section 307 of the Act. UBWPAD's pretreatment program received EPA approval on September 26, 1986 and, as a result, appropriate pretreatment program requirements were incorporated into the expired permit, which were consistent with that approval and federal pretreatment regulations in effect when that permit was issued.

In the reissued permit, activities that the permittee must address if applicable include, but are not limited to, the following: (1) implement and enforce specific effluent limits (technically-based local limits); (2) revise the local sewer-user ordinance or regulation to be consistent with federal regulations; (3) develop an enforcement response plan; (4) implement a slug control evaluation program; (5) track significant noncompliance for industrial users; and (6) establish a definition of and track significant industrial users. These requirements are necessary to ensure continued compliance with the POTW=s NPDES permit and its sludge use or disposal practices.

On October 14, 2005, EPA published in the Federal Register final changes to the General Pretreatment Regulations. The final "Pretreatment Streamlining Rule" is designed to reduce the burden to industrial users and provide regulatory flexibility in technical and administrative requirements of industrial users and POTW's. Within 180 days of the effective date of this permit, the permittee must submit to EPA all required modifications of the Streamlining Rule in order to be consistent with the provisions of the newly promulgated Rule. To the extent that the POTW's legal authority is not consistent with the required changes, they must be revised and submitted to EPA for review. For more information on this new Rule, please visit EPA's pretreatment webpage at: http://cfpub.epa.gov/npdes/home.cfm?program_id=3

The permittee must continue to submit, annually by March 1st, a pretreatment report detailing the activities of the program for the twelve month period ending December 31.

G. Whole Effluent Toxicity

Massachusetts Surface Water Quality Standards contain a narrative toxicity criterion which states that "All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life, or wildlife." 314 CMR 4.05(5)(e).

National studies conducted by the EPA have demonstrated that industrial and domestic sources contribute toxic constituents, such as metals, chlorinated solvents, aromatic hydrocarbons, and others to POTWs. The impacts of such complex mixtures are often difficult to assess. Therefore,

the toxicity of several constituents in a single effluent can only be accurately examined by whole effluent toxicity (WET) testing. Furthermore, 40 CFR 122.44 (d) requires WET limits in NPDES permits when the permittee has a Areasonable potential@ to cause toxicity.

WET tests of the UBWPAD effluent have demonstrated frequent toxicity for Daphnid (*Ceriodaphnia dubia*). Furthermore, the low dilution factor, 1.1, calculated for the receiving water at the UBWPAD treatment plant=s outfall contributes to a "reasonable potential" that the discharge could cause an excursion of the no toxics provision in the State's regulations. Inclusion of the whole effluent toxicity limit in the draft permit will ensure compliance with the State's narrative water quality criterion of "no toxics in toxic amounts." Therefore, based on the potential for toxicity, water quality standards, and available dilution, the draft permit includes chronic and acute whole effluent toxicity limitations and monitoring requirements for Daphnid (*Ceriodaphnia dubia*) only. (*See, e.g.*, *Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants*, 50 Fed. Reg. 30,784- July 24, 1985. *See also* EPA=s *Technical Support Document for Water Quality-Based Toxics Control*, EPA/505/1-90-001.) Attachment B contains the calculation for chronic whole effluent toxicity, which is based on available dilution.

In addition, the permit requires that two toxicity tests per year be conducted with both the daphnid, *Ceriodaphnia dubia* and the fathead minnow, *Pimephales* promelas when outfall 001A is discharging. This requirement is necessary to ensure that the reduced level of treatment received during periods of high flow does not result in a toxic discharge.

The Chronic No Observed Effect Concentration (C-NOEC) limitation in the draft permit prohibits chronic adverse effects (e.g., on survival, growth, and reproduction) when aquatic organisms are exposed to the POTW discharges at the calculated available dilution. The LC50 limitations prohibits acute effects (lethality), to more than 50% of the test organisms when exposed to undiluted POTW effluent for 48 hours.

H. Operation and Maintenance

Regulations regarding proper operation and maintenance are found at 40 CFR ' 122.41(e). These regulations require, "that the permittee shall at all times operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of the permit." The treatment plant and collection system are included in the definition Afacilities and systems of treatment and control@ and are therefore subject to proper operation and maintenance requirements.

Similarly, permittees have a Aduty to mitigate@ pursuant to 40 CFR '122.41(d). This requires the permittees to Atake all reasonable steps to minimize or prevent any discharge in violation of the permit which has a reasonable likelihood of adversely affecting human health or the environment.@

MassDEP has stated that the specific inflow and infiltration (I/I) conditions in the draft permit

are to be included in all POTW permits as a condition for receiving State Certification under Section 401 of the Clean Water Act and 40 CFR ' 124.55(b). Infiltration is groundwater that enters the collection system though physical defects such as cracked pipes, or deteriorated joints. Inflow is extraneous flow entering the collection system through point sources such as roof leaders, yard and area drains, sump pumps, manhole covers, tide gates, and cross connections from storm water systems. Significant I/I in a collection system uses conveyance and treatment capacity that will then not be available for sanitary flow, thereby reducing the capacity and the efficiency of the treatment works and increasing the possibility of sanitary sewer system overflows (SSO) from the collection system.

General requirements for proper operation and maintenance, and mitigation have been included in Part II of the permit. Specific permit conditions have also been included in Part I.D and I.E of the Draft Permit. These requirements include reporting of unauthorized discharges including SSOs, maintaining an adequate maintenance staff, performing preventative maintenance, controlling inflow and infiltration to separate sewer collection systems (combined sewer are not subject to I/I requirements) to the extent necessary to prevent SSOs and I/I related effluent violations at the wastewater treatment plant, and maintaining alternate power where necessary.

Because Worcester, Millbury, Auburn, Holden, West Boylston, Rutland, and the Cherry Valley Sewer District each own and operate collection systems that discharge to UBWPAD's treatment plant, these entities have been included as co-permittees for the specific permit requirements discussed in the paragraph above.

I. Sludge

Section 405(d) of the Act requires that EPA develop technical regulations regarding the use and disposal of sewage sludge. These regulations are found at 40 CFR Part 503 and apply to any facility engaged in the treatment of domestic sewage. The Act further requires that these conditions be implemented through permits. The sludge conditions in the draft permit are intended to implement these regulations.

UBWPAD owns and operates three multiple hearth incinerators. The incinerators have the following air pollution control devices: a venturi scrubber which removes particulate matter and volatile metals; a spray down scrubber which removes acid gases and additional metals; an electrodynamic venturi which removes fine particulates and metals (these will be replaced with electrostatic precipitators which perform more efficiently); and a regenerative thermal oxidizer which coverts volatile organic compounds to carbon dioxide. The City generates approximately 8836 dry metric tons of sewage sludge annually and receives approximately 2260 dry metric tons annually from off-site facilities.

Subpart E of the Part 503 regulations outlines the standards for the incineration of sewage sludge. The permit contains general requirements, management practices, pollutant limitations, an operational standard, monitoring frequency, record keeping and reporting requirements implementing the provisions of the regulations. The basis of each provision is detailed below.

Pollutant Limitations:

The sludge standards regulate seven metals. The pollutant limits in the permit are based on the requirements in §503.43.

Mercury and beryllium are regulated by the National Emission Standard for Hazardous Air Pollutants (NESHAPs) found in 40 CFR Part 61. The permit requires that the firing of sewage sludge in the facility's incinerators does not cause the violation of the NESHAPs for mercury and beryllium. The NESHAP for beryllium applies to each incinerator. The NESHAP for mercury applies to the facility.

The allowable sludge concentrations for arsenic, cadmium, chromium, and nickel are calculated from Equation (5) in §503.43(d):

$$C = \frac{RSC \times 86{,}400}{DF \times (1 - CE) \times SF} \qquad \text{Eq. (5)}$$

Where:

- C = Daily concentration of pollutant in sewage sludge in mg/kg of total solids (dry weight basis)
- CE = control efficiency for the incinerator - based on performance tests
- DF = dispersion factor in micrograms per cubic meter per gram per second
- RSC = risk specific concentration in micrograms per cubic meter
- SF = sewage sludge feed rate in metric tons per day (dry weight basis)

The parameters, with the exception of RSC, are site specific to the UBWPAD's incinerators. The RSC is derived for each pollutant based on a risk assessment.

The RSC is the allowable increase in the average daily ground level ambient air concentration for a pollutant above background levels that result from the firing of sewage sludge in an incinerator. It is equivalent to the amount of a pollutant that a person living near the incinerator can inhale with a probability of 1 in 10,000 that the person will contact cancer as a result of inhaling the pollutant. The RSC was calculated from the equation below, which is found in the *Technical Support Document for Sewage Sludge Incineration* (EPA 822/R-93-003, November 1992):

$$RSC = \frac{RL \times BW}{Q^* \times I_a} \times 10^3$$

Where:

- RL = Risk Level, 10^{-4}
- BW = body weight, 70 kg (154 lbs), this is the average weight of an adult male
- Q^* = allowable dose of a pollutant from EPA's Integrated Risk Information System database
- I_a = inhalation rate, 20 m/day, normal inhalation rate for an adult male.

The RSC calculated from this equation is intended to protect the "Highly Exposed Individual" (HEI). The HEI is a person who remains for an extended period of time, 70 years, at the point of maximum ground level pollutant concentration. The RSC values for the regulated metals are found in Tables 1 and 2 of § 503.43.

The pollutant limit for lead is calculated using equation (4) of §503.43:

$$C = \frac{0.1 \times NAAQS \times 86{,}400}{DF \times (1 - CE) \times SF} \qquad \text{Eq. (4)}$$

Instead of using an RSC, a percentage of the National Ambient Air Quality Standard (NAAQS) for lead was used. The NAAQS for lead is found in 40 CFR part 50.12. It is 1.5 ug/l. Although lead is classified as a probable human carcinogen, the Clean Air Science Advisor Committee of the Science Advisory Board recommended that the NAAQS for lead be based on the noncarcinogenic effects. Developmental neurotoxicty is considered to be the most sensitive end point for lead exposure. The calculated concentration from equation (4) also protects the HEI described above.

The following are parameters used to calculate metals limits contained in the permit:

Sludge Feed Rate: 44.1metric tons/day
Dispersion factor: 1.41 ug/m^3/g/sec

Pollutant	Control Efficiency	RSC
Arsenic	99.75	0.023
Cadmium	99.98	0.057
Chromium	99.98	0.23
Lead	99.86	
Nickel	99.87	2.0

Operational Standard:

The Part 503 regulations have an operational standard for total hydrocarbons (THC). Hydrocarbons are simple organic compounds containing carbon and hydrogen. The standard is designed to regulate organic emissions from sewage sludge incinerators. Total hydrocarbons represent a subset of organic compounds and is used in the regulation since it is impractical to attempt to monitor sludges or stack emissions for all organic compounds which may be present.

The THC value must be corrected to seven percent oxygen and zero percent moisture. The correction to seven percent oxygen is used because seven percent is the standard amount of oxygen used to reference measurements of pollutant limits expressed as concentration; it is also equivalent to 50 percent excess air (excess air is air added to a system above the amount of air

needed for complete combustion to occur); and without the correction, inaccurate readings may occur because the presence of the additional oxygen may dilute the THC reading. Similarly, the correction for moisture is needed since the presence of moisture can also dilute the actual THC reading. THC is conventionally expressed in terms of a dry volumetric basis, hence the need to set the standard based on zero moisture.

On February 25, 1994, §503.40 was amended. The amendment allows facilities to monitor carbon monoxide (CO) instead of THC. A facility can monitor for CO if the facility can meet a monthly average concentration CO limit of 100 parts per million on a volumetric basis. This limit, like the THC limit, is corrected to seven percent oxygen and zero percent moisture. The UBWPAD monitors CO.

Management Practices:

The permit contains management practices based on §503.45. They pertain to the operation of the incinerator. The management practices include maintaining the instruments which monitor CO, oxygen and temperature; proper operation of all air pollution control devices; and notification to EPA when the continuous monitoring equipment is not operational for a period of 72 hours or more.

The permit requires notification to EPA and the state if any monitoring equipment is broken or shut down for longer than 72 hours. It also prohibits adversely affecting a threatened or endangered species or their critical habitat. There are no known threatened or endangered species within the vicinity of the incinerator. Therefore, EPA has determined that the activity will not affect a threatened or endangered species.

The monitoring frequency is based on §503.46. The District is requirement to monitor heavy metals 6 times per year. The monitoring for mercury and beryllium is at the frequency required by 40 CFR Part 61. The record keeping requirements are based on §503.47.

J. Other Monitoring Requirements

The effluent monitoring requirements have been specified in accordance with 40 CFR 122.41(j), 122.44 (i) and 122.48 to yield data representative of the discharge.

V. State Certification Requirements.

The staff of the Massachusetts Department of Environmental Protection has reviewed the draft permit. EPA has requested permit certification by the State pursuant to CWA ' 401(a)(1) and 40 CFR ' 124.53 and expects that the draft permit will be certified. EPA also expects that Rhode Island will be commenting on the permit pursuant to its authorities under CWA ' 401(a)(2).

VI. Public Comment Period, Public Hearing, and Procedures for Final Decision.

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full before the close of the public comment period, to the U.S. EPA, Office of Ecosystem Protection ACMP@, Region 1, 1 Congress Street, Suite 1100, Boston, MA 02114-2023. Any person, prior to such date, may submit a request in writing to EPA and the state agency for a public hearing to consider the draft permit. Such requests shall state the nature of the issues proposed to be raised in the hearing.

A public hearing will be held on May 9, 2007. Please see the Public Notice for additional details. In reaching a final decision on the draft permit, the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston office. Following the close of the comment period, and after a public hearing, if such hearing is held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice. Permits may be appealed to the Environmental Appeals Board in the manner described at 40 CFR § 124.19.

VII. EPA and MassDEP Contacts.

Additional information concerning the draft permit may be obtained between the hours of 9:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays from:

David Pincumbe
Municipal Permits Branch (CMP)
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US Environmental Protection Agency
Congress Street, Suite 1100
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Paul Hogan, Chief
Surface Water Permit Program
Division of Watershed Management
Department of Environmental Protection
627 Main Street, Second Floor
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Tele: (508) 767-2796

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Date

Stephen S. Perkins, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency

Attachment A
NPDES Permit No. MA0102369
Upper Blackstone Water Pollution Abatement District

DESCRIPTION OF DISCHARGE: Effluent from advanced wastewater treatment

DISCHARGE: Outfall 001

Discharge Monitoring Report Date Summary: January 2004 thru December 2006.

AVERAGE EFFLUENT CHARACTERISTICS AT POINT OF DISCHARGE:

Parameter	Range of Monthly Average	Range of Daily Maximums
Flow, MGD	35.0 – 45.0 (annual avg)	----
BOD, mg/l	2.9 – 17.3	5.0 – 66.0
TSS, mg/l	4.0 – 14.0	9.0 – 93.0
pH, s.u.	6.5 - 7.0	7.0 - 7.8
Fecal Coliform, CFU/100/ml	5 - 49	30 - 864
Total Chlorine Residual, ug/l	< 50.0	< 50.0
Ammonia-Nitrogen, mg/l	1.0 – 13.7	1.0 – 16.2 (wkly avg)
Total Phosphorus (April - Oct), mg/l	0.9 – 2.4	----
Total Cadmium, ug/l	< 1.0 – 4.0	< 1.0 – 6.0
Total Copper, ug/l	4.0 - 22.0	5.0 – 47.0
Total Zinc, ug/l	31.0 - 70.0	40.0 - 113.0
BOD, % removal	84 - 99	----
TSS, % removal	88 - 98	----

Attachment B
NPDES Permit No. MA0102369
Upper Blackstone Water Pollution Abatement District

Qe = UBWPAD WWTP Design Flow: 56.0 MGD = 86.7 cfs

Receiving Water - Blackstone River
Qs = 7 day 10 year low flow (7Q10): 4.4 MGD = 6.8 cfs

Dilution

(Qs + Qe)/Qe = (6.8 + 86.7)/86.7 = **1.1**

Chlorine Residual:

EPA Recommended In-stream Chronic Criterion: 11 ug/1
Acute Criterion: 19 ug/1

Average monthly (chronic) limit:

(11 ug/1) x 1.1 = **12.0 ug/1**

Maximum daily (acute) limit:

(19 ug/1) x 1.1 = **21.0 ug/1**

Toxicity

The chronic (C-NOEC) whole effluent toxicity limit was calculated using the in-stream waste concentration (AIWC@) of the WWTP effluent:

IWC = (1/dilution) x 100%

= (1/(1.1)) x 100%

= **90%**