AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Clean Water Act, as amended, (33 U.S.C. §§1251 et seq.; the "CWA"), and the Massachusetts Clean Waters Act, as amended, (M.G.L. Chap. 21, §§ 26-53)

Town of Uxbridge
Sewer Commission

is authorized to discharge from the facility located at

Uxbridge Wastewater Treatment Facility
80 River Road
Uxbridge, MA 01569

to receiving water named

Blackstone River

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on **(See ** below)**

This permit and the authorization to discharge expire at midnight, five (5) years from the last day of the month preceding the effective date.

This permit supersedes the permit issued on September 30, 1999 and effective on October 30, 1999.

This permit consists of 14 pages in Part I including effluent limitations, monitoring requirements, and state permit conditions, **Attachment A** (Freshwater Acute Toxicity Test Procedure and Protocol, February 2011), and 25 pages in Part II, Standard Conditions.

Signed this day of

Stephen S. Perkins, Director	David Ferris, Director
Office of Ecosystem Protection	Massachusetts Wastewater Management Program
Environmental Protection Agency	Department of Environmental Protection
Region 1	Commonwealth of Massachusetts
Boston, MA	Boston, MA

****** This permit will become effective on the date of signature if no comments are received during public notice. If comments are received during public notice, this permit will be made effective no sooner than 30 days after signature.

PART I

A.1.During the period beginning the effective date and lasting through expiration, the permittee is authorized to discharge treated wastewater from outfall **001** to the Blackstone River. Such discharge shall be limited and monitored by the permittee as specified below.

EFFLUENT CHARACTERISTIC	**EFFLUENT LIMITS**						**MONITORING REQUIREMENTS**	
	Mass Limits			Concentration Limits				
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE[1]**
FLOW[2]	***	***	***	2.5 MGD	***	***	Continuous	Recorder
FLOW[2]	***	***	***	Report MGD	***	Report MGD	Continuous	Recorder
BOD_5 [3] (June 1 to October 31)	417 lbs/day	626 lbs/day	Report lbs/day	20 mg/l	30 mg/l	Report mg/l	2/Week	24-Hour Composite[4]
BOD_5 [3] (November 1 to May 31)	626 lbs/day	938 lbs/day	Report lbs/day	30 mg/l	45 mg/l	Report mg/l	2/Week	24-Hour Composite[4]
TSS[3] (June 1 to October 31)	417 lbs/day	626 lbs/day	Report lbs/day	20 mg/l	30 mg/l	Report mg/l	2/Week	24-Hour Composite[4]
TSS[3] (November 1 to May 31)	626 lbs/day	938 lbs/day	Report lbs/day	30 mg/l	45 mg/l	Report mg/l	2/Week	24-Hour Composite[4]
Total Residual Chlorine[5,6,7]	***	***	***	0.24 mg/l	***	0.42 mg/l	2/Day[15]	Grab
Escherichia Coli[5,8] (April 1 to October 31)	***	***	***	126 cfu/100 ml	***	409 cfu/100 ml	2/Week	Grab
Enterococci[8,9]	***	***	***	73 cfu/100 ml	***	236 cfu/100 ml	1/Week	Grab
pH RANGE[5]	6.0 - 8.3 SU See Permit Page 6, Part I.A.1.b.						1/Day	Grab
DISSOLVED OXYGEN[5] (April 1 to October 31)	***	***	***	Not less than 5.0 mg/l			1/Week	Grab
Whole Effluent Toxicity[10,11,12]	Acute LC50 $\geq$ 100%						2/Year	24-Hour Composite[4]
TOTAL AMMONIA, as N (June 1- October 31)	104 lbs/day	208.5 lbs/day	Report lbs/day	5 mg/l	10 mg/l	Report mg/l	1/Week	24-Hour Composite[4]

EFFLUENT CHARACTERISTIC	**EFFLUENT LIMITS**						**MONITORING REQUIREMENTS**	
	Mass Limits			Concentration Limits				
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE[1]**
TOTAL AMMONIA, as N (December 1 to April 30)	313 lbs/day	Report lbs/day	Report lbs/day	15 mg/l	Report mg/l	Report mg/l	1/Week	24-Hour Composite[4]
TOTAL AMMONIA, as N (May 1-31and November 1-30)	208.5 lbs/day	417 lbs/day	Report lbs/day	10 mg/l	20 mg/l	Report mg/l	1/Week	24-Hour Composite[4]
TOTAL PHOSPHORUS[13] (April 1- October 31)	4.2 lbs/day	***	***	0.2 mg/l	***	Report mg/l	2/Week	24-Hour Composite[4]
TOTAL PHOSPHORUS[13] (November 1- March 31)	21 lbs/day	***	***	1.0 mg/l	***	Report mg/l	2/Month	24-Hour Composite[4]
ORTHO PHOSPHORUS, DISSOLVED, as P[13] (November 1- March 31)	Report lbs/day	***	***	Report mg/l	***	Report mg/l	2/Month	24-Hour Composite[4]
TOTAL NITROGEN[14] (May 1- October 31)	167 lbs/day	***	***	8 mg/l	***	Report mg/l	2/Week	24-Hour Composite[4]
TOTAL NITROGEN[14] (November 1 – April 30)	Report lbs/day	***	***	Report mg/l	***	Report mg/l	1/Week	24-Hour Composite[4]
TOTAL ALUMINUM	1.81 lbs/day	***	***	87 ug/l	***	Report ug/l	1/Month	24-Hour Composite[4]

Footnotes:

1. All required effluent samples shall be collected at the outlet of the chlorine contact chamber and prior to discharge to the Blackstone River. A routine sampling program shall be developed in which samples are taken at the same location, the same time and the same days each month. Any deviations from the routine sampling program shall be documented in correspondence attached to the applicable discharge monitoring report that is submitted to EPA. All samples shall be tested using the analytical methods found in 40 CFR §136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR §136.

2. The limit is an annual average limit, which shall be reported as a rolling average. The first value will be calculated using the monthly average flow for the first full month ending after the effective date of the permit and the eleven previous monthly average flows. Each subsequent month's DMR will report the annual average flow that is calculated from that month and the previous 11 months. The monthly average and maximum daily flows for each month shall also be reported.

3. Sampling is required for the influent and effluent.

4. A 24-hour composite sample will consist of at least twenty-four (24) grab samples taken during a consecutive 24 hour period (e.g. 7:00 A.M. Monday to 7:00 A.M. Tuesday), either collected at equal intervals and combined proportional to flow or continuously collected proportionally to flow.

5. Required for Massachusetts State Certification.

6. The minimum level (ML) for total residual chlorine (TRC) is defined as 20 ug/l. This value is the minimum level for chlorine using EPA approved methods found in the most currently approved version of Standard Methods for the Examination of Water and Wastewater, Method 4500 CL-E and G, or USEPA Manual of Methods of Analysis of Water and Wastes, Method 330.5. One of these methods must be used to determine total residual chlorine. For effluent limitations less than 20 ug/l, compliance/non-compliance will be determined based on the ML. Sample results of 20 ug/l or less shall be reported in accordance with the discharge monitoring report instructions. This monitoring shall be conducted concurrently with the fecal coliform and/or E.coli sampling described below.

7. The chlorination system shall include an alarm system within six (6) months of the effective date of the permit. Any interruption or malfunction of the chlorine dosing system that may have resulted in levels of chlorine which were inadequate for achieving effective disinfection or that may have resulted in excessive levels of chlorine in the final effluent shall be reported with the monthly DMRs. The report shall include the date and time of the interruption or malfunction, the nature of the problem(s), and the estimated amount of time that the low or high dosage levels of chlorine chemicals occurred.

8. Bacteria samples shall be collected concurrently with the TRC samples.

9. The E. coli limits are State certification requirements. The enterococci limits are a requirement of the U. S. EPA permit and are not a requirement of the Massachusetts Department of Environmental Protection (MassDEP) permit.

The enterococci sample shall be collected currently with one of the E.coli samples during the April to October period. After a minimum of one year, the permitee may request reduction of enterococci monitoring to winter only, if the monitoring data establishes that E.coli control is adequate to ensure control of enterococcus. The request shall be made in writing to EPA and shall include all concurrent monitoring data collected by the permittee. The permittee shall continue sampling for both E.coli and enterococci between April and October until receiving written approval of its request from EPA.

10. The permittee shall conduct acute toxicity tests two times per year. The permittee shall test the daphnid, Ceriodaphnia dubia, only. Toxicity test samples shall be collected during the months of April and October. The test results shall be submitted by the last day of the month following the completion of the test. The results are due May 31st and November 30th, respectively. The tests must be performed in accordance with test procedures and protocols specified in **Attachment A** of this permit.

Test Periods	**Submit Results By:**	**Test Species**	**Acute Limit LC50**
April and October	May 31st November 30th	Ceriodaphnia dubia (Daphnid)	$\geq$ 100%

11. If toxicity test(s) using receiving water as diluent show the receiving water to be toxic or unreliable, the permittee shall either follow procedures outlined in **Attachment A (Toxicity Test Procedure and Protocol) Section IV., DILUTION WATER** in order to obtain an individual approval for use of an alternate dilution water, or the permittee shall follow the Self-Implementing Alternative Dilution Water Guidance, which may be used to obtain automatic approval of an alternate dilution water, including the appropriate species for use with that water. This guidance is found in Attachment G of *NPDES Program Instructions for the Discharge Monitoring Report Forms (DMRs)*, which may be found on the EPA Region I web site at http://www.epa.gov/Region1/enforcementandassistance/dmr.html. If this guidance is revoked, the permittee shall revert to obtaining individual approval as outlined in **Attachment A**. Any modification or revocation to this guidance will be transmitted to the permittees. However, at any time, the permittee may choose to contact EPA-New England directly using the approach outlined in **Attachment A**.

Any tests using alternate dilution water must be run with a minimum of two controls: a receiving water (Blackstone River) control and a toxicity-free alternate dilution water control. Chemical data of the receiving water, including data for all metals listed in the protocol, must be included in the whole effluent toxicity (WET) report.

12. The LC50 is the concentration of effluent which causes mortality to 50% of the test organisms. Therefore, a 100% limit means that a sample of 100% effluent (no dilution) shall cause no more than a 50% mortality rate.

13. The maximum daily concentration and loading values for dissolved ortho phosphorus shall be derived from sampling done concurrently with the sampling for total phosphorus.

14. The nitrogen requirements are conditions of the U.S. Environmental Protection Agency (EPA) permit and are not requirements of the MassDEP permit. Sampling must be conducted and reported as specified, beginning on the effective date of the permit. The permittee shall operate the treatment facility to reduce the discharge of total nitrogen during the months of November to

April to the maximum extent possible, using all available treatment equipment in place at the facility. The total nitrogen values will be calculated by adding the results of the nitrite and nitrate nitrogen and the total Kjeldahl nitrogen sampling. The addition of a carbon source that may be necessary in order to meet the total nitrogen limit during the months of May through October is not required during the months of November through April.

15. Two samples per day Monday to Friday; one sample per day Saturday and Sunday.

Part I.A.2

a. The discharge shall not cause a violation of the water quality standards of the receiving waters.

b. The pH of the effluent shall not be less than 6.0 nor greater than 8.3 at any time.

c. The discharge shall not cause objectionable discoloration of the receiving waters.

d. The effluent shall contain neither a visible oil sheen, foam, nor floating solids at any time.

e. The permittee's treatment facility shall maintain a minimum of 85 percent removal of total suspended solids, biochemical oxygen demand and carbonaceous biochemical oxygen demand. The percent removal shall be based on monthly average values.

f. The permittee shall minimize the use of chlorine while maintaining adequate bacterial control.

g. If the average annual flow in any calendar year exceeds 80 percent of the facility’s design flow, the permittee shall submit a report to MassDEP by March 31 of the following calendar year describing its plans for further flow increases and describing how it will maintain compliance with the flow limit and all other effluent limitations and conditions.

h. The results of sampling for any parameter above its required frequency must also be reported.

3. All POTWs must provide adequate notice to the Director of the following:

a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of the Clean Water Act if it were directly discharging those pollutants; and

b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.

c. For purposes of this paragraph, adequate notice shall include information on:

(1) the quantity and quality of effluent introduced into the POTW; and

(2) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

4. Prohibitions Concerning Interference and Pass Through:

Pollutants introduced into POTW's by a non-domestic source (user) shall not pass through the POTW or interfere with the operation or performance of the works.

5. Toxics Control

a. The permittee shall not discharge any pollutant or combination of pollutants in toxic amounts.

b. Any toxic components of the effluent shall not result in any demonstrable harm to aquatic life or violate any state or federal water quality standard which has been or may be promulgated. Upon promulgation of any such standard, this permit may be revised or amended in accordance with such standards.

6. Numerical Effluent Limitations for Toxicants

EPA or MassDEP may use the results of the toxicity tests and chemical analyses conducted pursuant to this permit, as well as national water quality criteria developed pursuant to Section 304(a)(1) of the Clean Water Act (CWA), state water quality criteria, and any other appropriate information or data, to develop numerical effluent limitations for any pollutants, including but not limited to those pollutants listed in Appendix D of 40 CFR Part 122.

B. UNAUTHORIZED DISCHARGES

The permittee is authorized to discharge only in accordance with the terms and conditions of this permit and only from the outfall listed in Part I A.1 of this permit. Discharges of wastewater from any other point sources, including sanitary sewer overflows (SSOs) are not authorized by this permit and shall be reported to EPA and MassDEP in accordance with Section D.1.e.(1) of the General Requirements (Part II) of this permit (Twenty-four hour reporting).

Notification of Sanitary Sewer Overflows (SSOs) to MassDEP shall be made on its SSO Reporting Form (which includes MassDEP Regional Office Telephone numbers). The reporting form and instructions for its completion may be found on-line at http://www.mass.gov/dep/water/approvals/surffms.htm#sso.

C. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

Operation and maintenance (O & M) of the sewer system shall be in compliance with the General Requirements of Part II and the following terms and conditions. The permittee is required to complete the following activities for the collection system which it owns:

1. Maintenance Staff

   The permittee shall provide an adequate staff to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this permit. Provisions to meet this requirement shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

2. Preventive Maintenance Program

   The permittee shall maintain an ongoing preventive maintenance program to prevent overflows and bypasses caused by malfunctions or failures of the sewer system infrastructure. The program shall include an inspection program designed to identify all potential and actual unauthorized discharges. Plans and programs to meet this requirement shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

3. Infiltration/Inflow

   The permittee shall control infiltration and inflow (I/I) into the sewer system as necessary to prevent high flow related unauthorized discharges from their collection systems and high flow related violations of the wastewater treatment plant's effluent limitations. Plans and programs to control I/I shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

4. Collection System Mapping

   Within 30 months of the effective date of this permit, the permittee shall prepare a map of the sewer collection system it owns (see page 1 of this permit for the effective date). The map shall be on a street map of the community, with sufficient detail and at a scale to allow easy interpretation. The collection system information shown on the map shall be based on current conditions and shall be kept up to date and available for review by federal, state, or local agencies. Such map(s) shall include, but not be limited to the following:

   a. All sanitary sewer lines and related manholes;
   b. All combined sewer lines, related manholes, and catch basins;
   c. All combined sewer regulators and any known or suspected connections between the sanitary sewer and storm drain systems (e.g. combination manholes);

d. All outfalls, including the treatment plant outfall(s), CSOs, and any known or suspected SSOs, including stormwater outfalls that are connected to combination manholes;
e. All pump stations and force mains;
f. The wastewater treatment facility(ies);
g. All surface waters (labeled);
h. Other major appurtenances such as inverted siphons and air release valves;
i. A numbering system which uniquely identifies manholes, catch basins, overflow points, regulators and outfalls;
j. The scale and a north arrow; and
k. The pipe diameter, date of installation, type of material, distance between manholes, and the direction of flow.

5. Collection System Operation and Maintenance Plan

The permittee shall develop and implement a Collection System Operation and Maintenance Plan.

a. Within six (6) months of the effective date of the permit, the permittee shall submit to EPA and MassDEP

(1) A description of the collection system management goals, staffing, information management, and legal authorities;
(2) A description of the collection system and the overall condition of the collection system including a list of all pump stations and a description of recent studies and construction activities; and
(3) A schedule for the development and implementation of the full Collection System O & M Plan including the elements in paragraphs b.1. through b.8. below.

b. The full Collection System O & M Plan shall be submitted and implemented to EPA and MassDEP within twenty-four (24) months from the effective date of this permit. The Plan shall include:

(1) The required submittal from paragraph 5.a. above, updated to reflect current information;
(2) A preventive maintenance and monitoring program for the collection system;
(3) Description of sufficient staffing necessary to properly operate and maintain the sanitary sewer collection system and how the operation and maintenance program is staffed;
(4) Description of funding, the source(s) of funding and provisions for funding sufficient for implementing the plan;
(5) Identification of known and suspected overflows and back-ups, including manholes. A description of the cause of the identified overflows and

back-ups, corrective actions taken, and a plan for addressing the overflows and back-ups consistent with the requirements of this permit;

(6) A description of the permittee's programs for preventing I/I related effluent violations and all unauthorized discharges of wastewater, including overflows and by-passes and the ongoing program to identify and remove sources of I/I. The program shall include an inflow identification and control program that focuses on the disconnection and redirection of illegal sump pumps and roof down spouts; and

(7) An educational public outreach program for all aspects of I/I control, particularly private inflow.

(8) An Overflow Emergency Response Plan to protect public health from overflows and unanticipated bypasses or upsets that exceed any effluent limitation in the permit.

6. Annual Reporting Requirement

The permittee shall submit a summary report of activities related to the implementation of its Collection System O & M Plan during the previous calendar year. The report shall be submitted to EPA and MassDEP annually by March 31. The summary report shall, at a minimum, include:

a. A description of the staffing levels maintained during the year;
b. A map and a description of inspection and maintenance activities conducted and corrective actions taken during the previous year;
c. Expenditures for any collection system maintenance activities and corrective actions taken during the previous year;
d. A map with areas identified for investigation/action in the coming year;
e. If treatment plant flow has reached 80% of the design flow [1.9 MGD] or there have been capacity-related overflows, submit a calculation of the maximum daily, weekly, and monthly infiltration and the maximum daily, weekly, and monthly inflow for the reporting year; and
f. A summary of unauthorized discharges during the past year and their causes and a report of any corrective actions taken as a result of the unauthorized discharges reported pursuant to the Unauthorized Discharges section of this permit.

7. Alternate Power Source

In order to maintain compliance with the terms and conditions of this permit, the permittee shall provide an alternative power source(s) sufficient to operate the portion of the publicly owned treatment works[1] it owns and operates.

1 As defined at 40 CFR §122.2, which references the definition at 40 CFR §403.3

D. SLUDGE CONDITIONS

1. The permittee shall comply with all existing federal and state laws and regulations that apply to sewage sludge use and disposal practices, including EPA regulations promulgated at 40 CFR Part 503, which prescribe "Standards for the Use or Disposal of Sewage Sludge" pursuant to Section 405(d) of the CWA, 33 U.S.C. § 1345(d).

2. If both state and federal requirements apply to the permittee's sludge use and/or disposal practices, the permittee shall comply with the more stringent of the applicable requirements.

3. The requirements and technical standards of 40 CFR Part 503 apply to the following sludge use or disposal practices.

   a. Land application - the use of sewage sludge to condition or fertilize the soil
   b. Surface disposal - the placement of sewage sludge in a sludge only landfill
   c. Sewage sludge incineration in a sludge only incinerator

4. The requirements of 40 CFR Part 503 do not apply to facilities which dispose of sludge in a municipal solid waste landfill. 40 CFR § 503.4. These requirements also do not apply to facilities which do not use or dispose of sewage sludge during the life of the permit but rather treat the sludge (e.g. lagoons, reed beds), or are otherwise excluded under 40 CFR § 503.6.

5. The 40 CFR. Part 503 requirements including the following elements:

   - General requirements
   - Pollutant limitations
   - Operational Standards (pathogen reduction requirements and vector attraction reduction requirements)
   - Management practices
   - Record keeping
   - Monitoring
   - Reporting

   Which of the 40 C.F.R. Part 503 requirements apply to the permittee will depend upon the use or disposal practice followed and upon the quality of material produced by a facility. The EPA Region 1 Guidance document, "EPA Region 1 - NPDES Permit Sludge Compliance Guidance" (November 4, 1999), may be used by the permittee to assist it in determining the applicable requirements.[2]

2 This guidance document is available upon request from EPA Region 1 and may also be found at: http://www.epa.gov/region1/npdes/permits/generic/sludgeguidance.pdf

6. The sludge shall be monitored for pollutant concentrations (all Part 503 methods) and pathogen reduction and vector attraction reduction (land application and surface disposal) at the following frequency. This frequency is based upon the volume of sewage sludge generated at the facility in dry metric tons per year

less than 290	1/ year
290 to less than1,500	1 /quarter
1,500 to less than 15,000	6 /year
15,000 +	1 /month

Sampling of the sewage sludge shall use the procedures detailed in 40 CFR 503.8.

7. Under 40 CFR § 503.9(r), the permittee is a "person who prepares sewage sludge" because it "is … the person who generates sewage sludge during the treatment of domestic sewage in a treatment works …." If the permittee contracts with *another* "person who prepares sewage sludge" under 40 CFR § 503.9(r) – i.e., with "a person who derives a material from sewage sludge" – for use or disposal of the sludge, then compliance with Part 503 requirements is the responsibility of the contractor engaged for that purpose. If the permittee does not engage a "person who prepares sewage sludge," as defined in 40 CFR § 503.9(r), for use or disposal, then the permittee remains responsible to ensure that the applicable requirements in Part 503 are met. 40 CFR §503.7. If the ultimate use or disposal method is land application, the permittee is responsible for providing the person receiving the sludge with notice and necessary information to comply with the requirements of 40 CFR Part 503 Subpart B.

8. The permittee shall submit an annual report containing the information specified in the 40 CFR Part 503 requirements (§ 503.18 (land application), § 503.28 (surface disposal), or § 503.48 (incineration)) by **February 19** (*see also* "EPA Region 1 - NPDES Permit Sludge Compliance Guidance"). Reports shall be submitted to the address contained in the reporting section of the permit. If the permittee engages a contractor or contractors for sludge preparation and ultimate use or disposal, the annual report need contain only the following information:

- Name and address of contractor(s) responsible for sludge preparation, use or disposal
- Quantity of sludge (in dry metric tons) from the POTW that is transferred to the sludge contractor(s), and the method(s) by which the contractor will prepare and use or dispose of the sewage sludge.

E. MONITORING AND REPORTING

The permittee shall submit monitoring data and all other NPDES permit required reports to EPA electronically using NetDMR, a web-based tool that allows permittees to electronically submit discharge monitoring reports (DMRs) and other required reports via a secure internet connection. Specific requirements regarding submittal of data and reports in hard copy form and for submittal using NetDMR are described below:

1. Submittal of Reports Using NetDMR

   NetDMR is accessed from: http://www.epa.gov/netdmr. DMRs shall be submitted electronically to EPA no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA, including the MassDEP Monthly Operations and Maintenance Report, as an electronic attachment to the DMR. A permittee submitting reports using NetDMR is no longer required to submit hard copies of DMRs or other reports to EPA and no longer required to submit hard copies of DMRs to MassDEP. However, permittees shall continue to send hard copies of reports other than DMRs (including Monthly Operation and Maintenance Reports, Toxicity Test Results and Nutrient Optimization Reports) to MassDEP until further notice from MassDEP.

2. Submittal of Reports in Hard Copy Form

   While we do not anticipate the need for the permittee to submit hard copies of reports to EPA, any hard copies that are submitted to EPA shall be submitted to the Director at the following address:

U.S. Environmental Protection Agency
Water Technical Unit (OES04-SMR)
5 Post Office Square - Suite 100
Boston, MA 02109-3912

Duplicate signed copies of all reports or notifications required above shall be submitted to the State at the following address:

Massachusetts Department of Environmental Protection
Central Regional Office
Bureau of Resource Protection
627 Main Street
Worcester, Massachusetts 01608

Toxicity test reports only shall also be submitted to the State at the following address:

Massachusetts Department of Environmental Protection
Surface Water Discharge Permit Program
627 Main Street, 2nd Floor
Worcester, Massachusetts 01608

Any verbal reports, if required in **Parts I** and/or **II** of this permit, shall be made to both EPA-New England and to MassDEP.

F. STATE PERMIT CONDITIONS

1. This authorization to discharge includes two separate and independent permit authorizations. The two permit authorizations are (i) a federal National Pollutant Discharge Elimination System permit issued by the U.S. Environmental Protection Agency (EPA) pursuant to the Federal Clean Water Act, 33 U.S.C. §§1251 et seq.; and (ii) an identical state surface water discharge permit issued by the Commissioner of the Massachusetts Department of Environmental Protection (MassDEP) pursuant to the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53, and 314 C.M.R. 3.00. With the exception of the nitrogen and winter fecal coliform limits, all of the requirements contained in this authorization, as well as the standard conditions contained in 314 CMR 3.19, are hereby incorporated by reference into this state surface water discharge permit.

2. This authorization also incorporates the state water quality certification issued by MassDEP under § 401(a) of the Federal Clean Water Act, 40 C.F.R. 124.53, M.G.L. c. 21, § 27 and 314 CMR 3.07. All of the requirements (if any) contained in MassDEP's water quality certification for the permit are hereby incorporated by reference into this state surface water discharge permit as special conditions pursuant to 314 CMR 3.11.

3. Each agency shall have the independent right to enforce the terms and conditions of this permit. Any modification, suspension or revocation of this permit shall be effective only with respect to the agency taking such action, and shall not affect the validity or status of this permit as issued by the other agency, unless and until each agency has concurred in writing with such modification, suspension or revocation. In the event any portion of this permit is declared invalid, illegal or otherwise issued in violation of state law such permit shall remain in full force and effect under federal law as a NPDES Permit issued by the U.S. Environmental Protection Agency. In the event this permit is declared invalid, illegal or otherwise issued in violation of federal law, this permit shall remain in full force and effect under state law as a permit issued by the Commonwealth of Massachusetts.

NPDES PART II STANDARD CONDITIONS
(January, 2007)

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PART II. A. GENERAL REQUIREMENTS

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

a. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirements.

b. The CWA provides that any person who violates Section 301, 302, 306, 307, 308, 318, or 405 of the CWA or any permit condition or limitation implementing any of such sections in a permit issued under Section 402, or any requirement imposed in a pretreatment program approved under Section 402 (a)(3) or 402 (b)(8) of the CWA is subject to a civil penalty not to exceed $25,000 per day for each violation. Any person who negligently violates such requirements is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both. Any person who knowingly violates such requirements is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or both.

c. Any person may be assessed an administrative penalty by the Administrator for violating Section 301, 302, 306, 307, 308, 318, or 405 of the CWA, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the CWA. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.

Note: See 40 CFR §122.41(a)(2) for complete "Duty to Comply" regulations.

2. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or notifications of planned changes or anticipated noncompliance does not stay any permit condition.

3. Duty to Provide Information

The permittee shall furnish to the Regional Administrator, within a reasonable time, any information which the Regional Administrator may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Regional Administrator, upon request, copies of records required to be kept by this permit.

4. Reopener Clause

The Regional Administrator reserves the right to make appropriate revisions to this permit in order to establish any appropriate effluent limitations, schedules of compliance, or other provisions which may be authorized under the CWA in order to bring all discharges into compliance with the CWA.

For any permit issued to a treatment works treating domestic sewage (including "sludge-only facilities"), the Regional Administrator or Director shall include a reopener clause to incorporate any applicable standard for sewage sludge use or disposal promulgated under Section 405 (d) of the CWA. The Regional Administrator or Director may promptly modify or revoke and reissue any permit containing the reopener clause required by this paragraph if the standard for sewage sludge use or disposal is more stringent than any requirements for sludge use or disposal in the permit, or contains a pollutant or practice not limited in the permit.

Federal regulations pertaining to permit modification, revocation and reissuance, and termination are found at 40 CFR §122.62, 122.63, 122.64, and 124.5.

5. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from responsibilities, liabilities or penalties to which the permittee is or may be subject under Section 311 of the CWA, or Section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

6. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges.

7. Confidentiality of Information

a. In accordance with 40 CFR Part 2, any information submitted to EPA pursuant to these regulations may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission in the manner prescribed on the application form or instructions or, in the case of other submissions, by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with the procedures in 40 CFR Part 2 (Public Information).

b. Claims of confidentiality for the following information will be denied:

(1) The name and address of any permit applicant or permittee;
(2) Permit applications, permits, and effluent data as defined in 40 CFR §2.302(a)(2).

c. Information required by NPDES application forms provided by the Regional Administrator under 40 CFR §122.21 may not be claimed confidential. This includes information submitted on the forms themselves and any attachments used to supply information required by the forms.

8. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee must apply for and obtain a new permit. The permittee shall submit a new application at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Regional Administrator. (The Regional Administrator shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)

9. State Authorities

Nothing in Part 122, 123, or 124 precludes more stringent State regulation of any activity covered by these regulations, whether or not under an approved State program.

10. Other Laws

The issuance of a permit does not authorize any injury to persons or property or invasion of other private rights, nor does it relieve the permittee of its obligation to comply with any other applicable Federal, State, or local laws and regulations.

PART II. B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly 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 this permit and with the requirements of storm water pollution prevention plans. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of the permit.

2. Need to Halt or Reduce Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

4. Bypass

a. Definitions

(1) *Bypass* means the intentional diversion of waste streams from any portion of a treatment facility.

(2) *Severe property damage* means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can be reasonably expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Bypass not exceeding limitations

The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provision of Paragraphs B.4.c. and 4.d. of this section.

c. Notice

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.
(2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in paragraph D.1.e. of this part (Twenty-four hour reporting).

d. Prohibition of bypass

Bypass is prohibited, and the Regional Administrator may take enforcement action against a permittee for bypass, unless:

(1) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
(2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and
(3) i) The permittee submitted notices as required under Paragraph 4.c. of this section.
ii) The Regional Administrator may approve an anticipated bypass, after considering its adverse effects, if the Regional Administrator determines that it will meet the three conditions listed above in paragraph 4.d. of this section.

5. <u>Upset</u>

a. Definition. *Upset* means an exceptional incident in which there is an unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph B.5.c. of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the cause(s) of the upset;
(2) The permitted facility was at the time being properly operated;
(3) The permittee submitted notice of the upset as required in paragraphs D.1.a. and 1.e. (Twenty-four hour notice); and
(4) The permittee complied with any remedial measures required under B.3. above.

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

PART II. C. MONITORING REQUIREMENTS

1. Monitoring and Records

a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

b. Except for records for monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application except for the information concerning storm water discharges which must be retained for a total of 6 years. This retention period may be extended by request of the Regional Administrator at any time.

c. Records of monitoring information shall include:

(1) The date, exact place, and time of sampling or measurements;
(2) The individual(s) who performed the sampling or measurements;
(3) The date(s) analyses were performed;
(4) The individual(s) who performed the analyses;
(5) The analytical techniques or methods used; and
(6) The results of such analyses.

d. Monitoring results must be conducted according to test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, unless other test procedures have been specified in the permit.

e. The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

2. Inspection and Entry

The permittee shall allow the Regional Administrator or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

PART II. D. REPORTING REQUIREMENTS

1. Reporting Requirements

a. Planned Changes. The permittee shall give notice to the Regional Administrator as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is only required when:

(1) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR§122.29(b); or
(2) The alteration or addition could significantly change the nature or increase the quantities of the pollutants discharged. This notification applies to pollutants which are subject neither to the effluent limitations in the permit, nor to the notification requirements at 40 CFR§122.42(a)(1).
(3) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition or change may justify the application of permit conditions different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

b. Anticipated noncompliance. The permittee shall give advance notice to the Regional Administrator of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

c. Transfers. This permit is not transferable to any person except after notice to the Regional Administrator. The Regional Administrator may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the CWA. (See 40 CFR Part 122.61; in some cases, modification or revocation and reissuance is mandatory.)

d. Monitoring reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(1) Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by the Director for reporting results of monitoring of sludge use or disposal practices.

(2) If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in the permit, the results of the monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Director.

(3) Calculations for all limitations which require averaging or measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

e. Twenty-four hour reporting.

(1) The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances.

A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(2) The following shall be included as information which must be reported within 24 hours under this paragraph.

(a) Any unanticipated bypass which exceeds any effluent limitation in the permit. (See 40 CFR §122.41(g).)
(b) Any upset which exceeds any effluent limitation in the permit.
(c) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Regional Administrator in the permit to be reported within 24 hours. (See 40 CFR §122.44(g).)

(3) The Regional Administrator may waive the written report on a case-by-case basis for reports under Paragraph D.1.e. if the oral report has been received within 24 hours.

f. Compliance Schedules. Reports of compliance or noncompliance with, any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

g. Other noncompliance. The permittee shall report all instances of noncompliance not reported under Paragraphs D.1.d., D.1.e., and D.1.f. of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in Paragraph D.1.e. of this section.

h. Other information. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Administrator, it shall promptly submit such facts or information.

2. Signatory Requirement

a. All applications, reports, or information submitted to the Regional Administrator shall be signed and certified. (See 40 CFR §122.22)

b. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 2 years per violation, or by both.

3. Availability of Reports.

Except for data determined to be confidential under Paragraph A.8. above, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water pollution control agency and the Regional Administrator. As required by the CWA, effluent data shall not be considered confidential. Knowingly making any false statements on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the CWA.

PART II. E. DEFINITIONS AND ABBREVIATIONS

1. Definitions for Individual NPDES Permits including Storm Water Requirements

Administrator means the Administrator of the United States Environmental Protection Agency, or an authorized representative.

Applicable standards and limitations means all, State, interstate, and Federal standards and limitations to which a "discharge", a "sewage sludge use or disposal practice", or a related activity is subject to, including "effluent limitations", water quality standards, standards of performance, toxic effluent standards or prohibitions, "best management practices", pretreatment standards, and "standards for sewage sludge use and disposal" under Sections 301, 302, 303, 304, 306, 307, 308, 403, and 405 of the CWA.

Application means the EPA standard national forms for applying for a permit, including any additions, revisions, or modifications to the forms; or forms approved by EPA for use in "approved States", including any approved modifications or revisions.

Average means the arithmetic mean of values taken at the frequency required for each parameter over the specified period. For total and/or fecal coliforms and Escherichia coli, the average shall be the geometric mean.

Average monthly discharge limitation means the highest allowable average of "daily discharges" over a calendar month calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

Average weekly discharge limitation means the highest allowable average of "daily discharges" measured during the calendar week divided by the number of "daily discharges" measured during the week.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "waters of the United States." BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Best Professional Judgment (BPJ) means a case-by-case determination of Best Practicable Treatment (BPT), Best Available Treatment (BAT), or other appropriate technology-based standard based on an evaluation of the available technology to achieve a particular pollutant reduction and other factors set forth in 40 CFR §125.3 (d).

Coal Pile Runoff means the rainfall runoff from or through any coal storage pile.

Composite Sample means a sample consisting of a minimum of eight grab samples of equal volume collected at equal intervals during a 24-hour period (or lesser period as specified in the section on Monitoring and Reporting) and combined proportional to flow, or a sample consisting of the same number of grab samples, or greater, collected proportionally to flow over that same time period.

Construction Activities - The following definitions apply to construction activities:

(a) Commencement of Construction is the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities.

(b) Dedicated portable asphalt plant is a portable asphalt plant located on or contiguous to a construction site and that provides asphalt only to the construction site that the plant is located on or adjacent to. The term dedicated portable asphalt plant does not include facilities that are subject to the asphalt emulsion effluent limitation guideline at 40 CFR Part 443.

(c) Dedicated portable concrete plant is a portable concrete plant located on or contiguous to a construction site and that provides concrete only to the construction site that the plant is located on or adjacent to.

(d) Final Stabilization means that all soil disturbing activities at the site have been complete, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

(e) Runoff coefficient means the fraction of total rainfall that will appear at the conveyance as runoff.

Contiguous zone means the entire zone established by the United States under Article 24 of the Convention on the Territorial Sea and the Contiguous Zone.

Continuous discharge means a "discharge" which occurs without interruption throughout the operating hours of the facility except for infrequent shutdowns for maintenance, process changes, or similar activities.

CWA means the Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub. L. 92-500, as amended by Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, and Pub. L. 97-117; 33 USC §§1251 et seq.

Daily Discharge means the discharge of a pollutant measured during the calendar day or any other 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

Director normally means the person authorized to sign NPDES permits by EPA or the State or an authorized representative. Conversely, it also could mean the Regional Administrator or the State Director as the context requires.

Discharge Monitoring Report Form (DMR) means the EPA standard national form, including any subsequent additions, revisions, or modifications for the reporting of self-monitoring results by permittees. DMRs must be used by "approved States" as well as by EPA. EPA will supply DMRs to any approved State upon request. The EPA national forms may be modified to substitute the State Agency name, address, logo, and other similar information, as appropriate, in place of EPA's.

Discharge of a pollutant means:

(a) Any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source", or

(b) Any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation (See "Point Source" definition).

This definition includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances leading into privately owned treatment works.

This term does not include an addition of pollutants by any "indirect discharger."

Effluent limitation means any restriction imposed by the Regional Administrator on quantities, discharge rates, and concentrations of "pollutants" which are "discharged" from "point sources" into "waters of the United States", the waters of the "contiguous zone", or the ocean.

Effluent limitation guidelines means a regulation published by the Administrator under Section 304(b) of CWA to adopt or revise "effluent limitations".

EPA means the United States "Environmental Protection Agency".

Flow-weighted composite sample means a composite sample consisting of a mixture of aliquots where the volume of each aliquot is proportional to the flow rate of the discharge.

Grab Sample – An individual sample collected in a period of less than 15 minutes.

Hazardous Substance means any substance designated under 40 CFR Part 116 pursuant to Section 311 of the CWA.

Indirect Discharger means a non-domestic discharger introducing pollutants to a publicly owned treatment works.

Interference means a discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

(a) Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

(b) Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act (CWA), the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resources Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the SDWA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection Research and Sanctuaries Act.

Landfill means an area of land or an excavation in which wastes are placed for permanent disposal, and which is not a land application unit, surface impoundment, injection well, or waste pile.

Land application unit means an area where wastes are applied onto or incorporated into the soil surface (excluding manure spreading operations) for treatment or disposal.

Large and Medium municipal separate storm sewer system means all municipal separate storm sewers that are either: (i) located in an incorporated place (city) with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census (these cities are listed in Appendices F and 40 CFR Part 122); or (ii) located in the counties with unincorporated urbanized populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships, or towns within such counties (these counties are listed in Appendices H and I of 40 CFR 122); or (iii) owned or operated by a municipality other than those described in Paragraph (i) or (ii) and that are designated by the Regional Administrator as part of the large or medium municipal separate storm sewer system.

Maximum daily discharge limitation means the highest allowable "daily discharge" concentration that occurs only during a normal day (24-hour duration).

Maximum daily discharge limitation (as defined for the Steam Electric Power Plants only) when applied to Total Residual Chlorine (TRC) or Total Residual Oxidant (TRO) is defined as "maximum concentration" or "Instantaneous Maximum Concentration" during the two hours of a chlorination cycle (or fraction thereof) prescribed in the Steam Electric Guidelines, 40 CFR Part 423. These three synonymous terms all mean "a value that shall not be exceeded" during the two-hour chlorination cycle. This interpretation differs from the specified NPDES Permit requirement, 40 CFR § 122.2, where the two terms of "Maximum Daily Discharge" and "Average Daily Discharge" concentrations are specifically limited to the daily (24-hour duration) values.

Municipality means a city, town, borough, county, parish, district, association, or other public body created by or under State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes, or an Indian tribe or an authorized Indian tribe organization, or a designated and approved management agency under Section 208 of the CWA.

National Pollutant Discharge Elimination System means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318, and 405 of the CWA. The term includes an "approved program".

New Discharger means any building, structure, facility, or installation:

(a) From which there is or may be a "discharge of pollutants";

(b) That did not commence the "discharge of pollutants" at a particular "site" prior to August 13, 1979;

(c) Which is not a "new source"; and

(d) Which has never received a finally effective NPDES permit for discharges at that "site".

This definition includes an "indirect discharger" which commences discharging into "waters of the United States" after August 13, 1979. It also includes any existing mobile point source (other than an offshore or coastal oil and gas exploratory drilling rig or a coastal oil and gas exploratory drilling rig or a coastal oil and gas developmental drilling rig) such as a seafood processing rig, seafood processing vessel, or aggregate plant, that begins discharging at a "site" for which it does not have a permit; and any offshore rig or coastal mobile oil and gas exploratory drilling rig or coastal mobile oil and gas developmental drilling rig that commences the discharge of pollutants after August 13, 1979, at a "site" under EPA's permitting jurisdiction for which it is not covered by an individual or general permit and which is located in an area determined by the Regional Administrator in the issuance of a final permit to be in an area of biological concern. In determining whether an area is an area of biological concern, the Regional Administrator shall consider the factors specified in 40 CFR §§125.122 (a) (1) through (10).

An offshore or coastal mobile exploratory drilling rig or coastal mobile developmental drilling rig will be considered a "new discharger" only for the duration of its discharge in an area of biological concern.

New source means any building, structure, facility, or installation from which there is or may be a "discharge of pollutants", the construction of which commenced:

(a) After promulgation of standards of performance under Section 306 of CWA which are applicable to such source, or

(b) After proposal of standards of performance in accordance with Section 306 of CWA which are applicable to such source, but only if the standards are promulgated in accordance with Section 306 within 120 days of their proposal.

NPDES means "National Pollutant Discharge Elimination System".

Owner or operator means the owner or operator of any "facility or activity" subject to regulation under the NPDES programs.

Pass through means a Discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation).

Permit means an authorization, license, or equivalent control document issued by EPA or an "approved" State.

Person means an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof.

Point Source means any discernible, confined, and discrete conveyance, including but not limited to any pipe ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff (see 40 CFR §122.2).

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. §§2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. It does not mean:

(a) Sewage from vessels; or

(b) Water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well is used either to facilitate production or for disposal purposes is approved by the authority of the State in which the well is located, and if the State determines that the injection or disposal will not result in the degradation of ground or surface water resources.

Primary industry category means any industry category listed in the NRDC settlement agreement (Natural Resources Defense Council et al. v. Train, 8 E.R.C. 2120 (D.D.C. 1976), modified 12 E.R.C. 1833 (D. D.C. 1979)); also listed in Appendix A of 40 CFR Part 122.

Privately owned treatment works means any device or system which is (a) used to treat wastes from any facility whose operation is not the operator of the treatment works or (b) not a "POTW".

Process wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

Publicly Owned Treatment Works (POTW) means any facility or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature which is owned by a "State" or "municipality".

This definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment.

Regional Administrator means the Regional Administrator, EPA, Region I, Boston, Massachusetts.

Secondary Industry Category means any industry which is not a "primary industry category".

Section 313 water priority chemical means a chemical or chemical category which:

(1) is listed at 40 CFR §372.65 pursuant to Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986);

(2) is present at or above threshold levels at a facility subject to EPCRA Section 313 reporting requirements; and

(3) satisfies at least one of the following criteria:

   (i) are listed in Appendix D of 40 CFR Part 122 on either Table II (organic priority pollutants), Table III (certain metals, cyanides, and phenols), or Table V (certain toxic pollutants and hazardous substances);
   (ii) are listed as a hazardous substance pursuant to Section 311(b)(2)(A) of the CWA at 40 CFR §116.4; or
   (iii) are pollutants for which EPA has published acute or chronic water quality criteria.

Septage means the liquid and solid material pumped from a septic tank, cesspool, or similar domestic sewage treatment system, or a holding tank when the system is cleaned or maintained.

Sewage Sludge means any solid, semisolid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. Sewage sludge includes, but is not limited to, solids removed during primary, secondary, or advanced wastewater treatment, scum, septage, portable toilet pumpings, Type III Marine Sanitation Device pumpings (33 CFR Part 159), and sewage sludge products. Sewage sludge does not include grit or screenings, or ash generated during the incineration of sewage sludge.

Sewage sludge use or disposal practice means the collection, storage, treatment, transportation, processing, monitoring, use, or disposal of sewage sludge.

Significant materials includes, but is not limited to: raw materials, fuels, materials such as solvents, detergents, and plastic pellets, raw materials used in food processing or production, hazardous substance designated under section 101(14) of CERCLA, any chemical the facility is required to report pursuant to EPCRA Section 313, fertilizers, pesticides, and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

Significant spills includes, but is not limited to, releases of oil or hazardous substances in excess of reportable quantities under Section 311 of the CWA (see 40 CFR §110.10 and §117.21) or Section 102 of CERCLA (see 40 CFR § 302.4).

Sludge-only facility means any "treatment works treating domestic sewage" whose methods of sewage sludge use or disposal are subject to regulations promulgated pursuant to Section 405(d) of the CWA, and is required to obtain a permit under 40 CFR §122.1(b)(3).

State means any of the 50 States, the District of Columbia, Guam, the Commonwealth of Puerto Rico, the Virgin Islands, American Samoa, the Trust Territory of the Pacific Islands.

Storm Water means storm water runoff, snow melt runoff, and surface runoff and drainage.

Storm water discharge associated with industrial activity means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing, or raw materials storage areas at an industrial plant. (See 40 CFR §122.26 (b)(14) for specifics of this definition.

Time-weighted composite means a composite sample consisting of a mixture of equal volume aliquots collected at a constant time interval.

Toxic pollutants means any pollutant listed as toxic under Section 307 (a)(1) or, in the case of "sludge use or disposal practices" any pollutant identified in regulations implementing Section 405(d) of the CWA.

Treatment works treating domestic sewage means a POTW or any other sewage sludge or wastewater treatment devices or systems, regardless of ownership (including federal facilities), used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated for the disposal of sewage sludge. This definition does not include septic tanks or similar devices.

For purposes of this definition, "domestic sewage" includes waste and wastewater from humans or household operations that are discharged to or otherwise enter a treatment works. In States where there is no approved State sludge management program under Section 405(f) of the CWA, the Regional Administrator may designate any person subject to the standards for sewage sludge use and disposal in 40 CFR Part 503 as a "treatment works treating domestic sewage", where he or she finds that there is a potential for adverse effects on public health and the environment from poor sludge quality or poor sludge handling, use or disposal practices, or where he or she finds that such designation is necessary to ensure that such person is in compliance with 40 CFR Part 503.

Waste Pile means any non-containerized accumulation of solid, non-flowing waste that is used for treatment or storage.

Waters of the United States means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of tide;

(b) All interstate waters, including interstate "wetlands";

(c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands", sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

(1) Which are or could be used by interstate or foreign travelers for recreational or other purpose;

(2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(3) Which are used or could be used for industrial purposes by industries in interstate commerce;

(d) All impoundments of waters otherwise defined as waters of the United States under this definition;

(e) Tributaries of waters identified in Paragraphs (a) through (d) of this definition;

(f) The territorial sea; and

(g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in Paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA (other than cooling ponds as defined in 40 CFR §423.11(m) which also meet the criteria of this definition) are not waters of the United States.

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Whole Effluent Toxicity (WET) means the aggregate toxic effect of an effluent measured directly by a toxicity test. (See Abbreviations Section, following, for additional information.)

2. Definitions for NPDES Permit Sludge Use and Disposal Requirements.

Active sewage sludge unit is a sewage sludge unit that has not closed.

Aerobic Digestion is the biochemical decomposition of organic matter in sewage sludge into carbon dioxide and water by microorganisms in the presence of air.

Agricultural Land is land on which a food crop, a feed crop, or a fiber crop is grown. This includes range land and land used as pasture.

Agronomic rate is the whole sludge application rate (dry weight basis) designed:

(1) To provide the amount of nitrogen needed by the food crop, feed crop, fiber crop, cover crop, or vegetation grown on the land; and

(2) To minimize the amount of nitrogen in the sewage sludge that passes below the root zone of the crop or vegetation grown on the land to the ground water.

Air pollution control device is one or more processes used to treat the exit gas from a sewage sludge incinerator stack.

Anaerobic digestion is the biochemical decomposition of organic matter in sewage sludge into methane gas and carbon dioxide by microorganisms in the absence of air.

Annual pollutant loading rate is the maximum amount of a pollutant that can be applied to a unit area of land during a 365 day period.

Annual whole sludge application rate is the maximum amount of sewage sludge (dry weight basis) that can be applied to a unit area of land during a 365 day period.

Apply sewage sludge or sewage sludge applied to the land means land application of sewage sludge.

Aquifer is a geologic formation, group of geologic formations, or a portion of a geologic formation capable of yielding ground water to wells or springs.

Auxiliary fuel is fuel used to augment the fuel value of sewage sludge. This includes, but is not limited to, natural gas, fuel oil, coal, gas generated during anaerobic digestion of sewage sludge, and municipal solid waste (not to exceed 30 percent of the dry weight of the sewage sludge and auxiliary fuel together). Hazardous wastes are not auxiliary fuel.

Base flood is a flood that has a one percent chance of occurring in any given year (i.e. a flood with a magnitude equaled once in 100 years).

Bulk sewage sludge is sewage sludge that is not sold or given away in a bag or other container for application to the land.

Contaminate an aquifer means to introduce a substance that causes the maximum contaminant level for nitrate in 40 CFR §141.11 to be exceeded in ground water or that causes the existing concentration of nitrate in the ground water to increase when the existing concentration of nitrate in the ground water exceeds the maximum contaminant level for nitrate in 40 CFR §141.11.

Class I sludge management facility is any publicly owned treatment works (POTW), as defined in 40 CFR §501.2, required to have an approved pretreatment program under 40 CFR §403.8 (a) (including any POTW located in a state that has elected to assume local program responsibilities pursuant to 40 CFR §403.10 (e) and any treatment works treating domestic sewage, as defined in 40 CFR § 122.2, classified as a Class I sludge management facility by the EPA Regional Administrator, or, in the case of approved state programs, the Regional Administrator in conjunction with the State Director, because of the potential for sewage sludge use or disposal practice to affect public health and the environment adversely.

Control efficiency is the mass of a pollutant in the sewage sludge fed to an incinerator minus the mass of that pollutant in the exit gas from the incinerator stack divided by the mass of the pollutant in the sewage sludge fed to the incinerator.

Cover is soil or other material used to cover sewage sludge placed on an active sewage sludge unit.

Cover crop is a small grain crop, such as oats, wheat, or barley, not grown for harvest.

Cumulative pollutant loading rate is the maximum amount of inorganic pollutant that can be applied to an area of land.

Density of microorganisms is the number of microorganisms per unit mass of total solids (dry weight) in the sewage sludge.

Dispersion factor is the ratio of the increase in the ground level ambient air concentration for a pollutant at or beyond the property line of the site where the sewage sludge incinerator is located to the mass emission rate for the pollutant from the incinerator stack.

Displacement is the relative movement of any two sides of a fault measured in any direction.

Domestic septage is either liquid or solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device, or similar treatment works that receives only domestic sewage. Domestic septage does not include liquid or solid material removed from a septic tank, cesspool, or similar treatment works that receives either commercial wastewater or industrial wastewater and does not include grease removed from a grease trap at a restaurant.

Domestic sewage is waste and wastewater from humans or household operations that is discharged to or otherwise enters a treatment works.

Dry weight basis means calculated on the basis of having been dried at 105 degrees Celsius (°C) until reaching a constant mass (i.e. essentially 100 percent solids content).

Fault is a fracture or zone of fractures in any materials along which strata on one side are displaced with respect to the strata on the other side.

Feed crops are crops produced primarily for consumption by animals.

Fiber crops are crops such as flax and cotton.

Final cover is the last layer of soil or other material placed on a sewage sludge unit at closure.

Fluidized bed incinerator is an enclosed device in which organic matter and inorganic matter in sewage sludge are combusted in a bed of particles suspended in the combustion chamber gas.

Food crops are crops consumed by humans. These include, but are not limited to, fruits, vegetables, and tobacco.

Forest is a tract of land thick with trees and underbrush.

Ground water is water below the land surface in the saturated zone.

Holocene time is the most recent epoch of the Quaternary period, extending from the end of the Pleistocene epoch to the present.

Hourly average is the arithmetic mean of all the measurements taken during an hour. At least two measurements must be taken during the hour.

Incineration is the combustion of organic matter and inorganic matter in sewage sludge by high temperatures in an enclosed device.

Industrial wastewater is wastewater generated in a commercial or industrial process.

Land application is the spraying or spreading of sewage sludge onto the land surface; the injection of sewage sludge below the land surface; or the incorporation of sewage sludge into the soil so that the sewage sludge can either condition the soil or fertilize crops or vegetation grown in the soil.

Land with a high potential for public exposure is land that the public uses frequently. This includes, but is not limited to, a public contact site and reclamation site located in a populated area (e.g., a construction site located in a city).

Land with low potential for public exposure is land that the public uses infrequently. This includes, but is not limited to, agricultural land, forest and a reclamation site located in an unpopulated area (e.g., a strip mine located in a rural area).

Leachate collection system is a system or device installed immediately above a liner that is designed, constructed, maintained, and operated to collect and remove leachate from a sewage sludge unit.

Liner is soil or synthetic material that has a hydraulic conductivity of 1×10^{-7} centimeters per second or less.

Lower explosive limit for methane gas is the lowest percentage of methane gas in air, by volume, that propagates a flame at 25 degrees Celsius and atmospheric pressure.

Monthly average (Incineration) is the arithmetic mean of the hourly averages for the hours a sewage sludge incinerator operates during the month.

Monthly average (Land Application) is the arithmetic mean of all measurements taken during the month.

Municipality means a city, town, borough, county, parish, district, association, or other public body (including an intermunicipal agency of two or more of the foregoing entities) created by or under State law; an Indian tribe or an authorized Indian tribal organization having jurisdiction over sewage sludge management; or a designated and approved management agency under section 208 of the CWA, as amended. The definition includes a special district created under state law, such as a water district, sewer district, sanitary district, utility district, drainage district, or similar entity, or an integrated waste management facility as defined in section 201 (e) of the CWA, as amended, that has as one of its principal responsibilities the treatment, transport, use or disposal of sewage sludge.

Other container is either an open or closed receptacle. This includes, but is not limited to, a bucket, a box, a carton, and a vehicle or trailer with a load capacity of one metric ton or less.

Pasture is land on which animals feed directly on feed crops such as legumes, grasses, grain stubble, or stover.

Pathogenic organisms are disease-causing organisms. These include, but are not limited to, certain bacteria, protozoa, viruses, and viable helminth ova.

Permitting authority is either EPA or a State with an EPA-approved sludge management program.

Person is an individual, association, partnership, corporation, municipality, State or Federal Agency, or an agent or employee thereof.

Person who prepares sewage sludge is either the person who generates sewage sludge during the treatment of domestic sewage in a treatment works or the person who derives a material from sewage sludge.

pH means the logarithm of the reciprocal of the hydrogen ion concentration; a measure of the acidity or alkalinity of a liquid or solid material.

Place sewage sludge or sewage sludge placed means disposal of sewage sludge on a surface disposal site.

Pollutant (as defined in sludge disposal requirements) is an organic substance, an inorganic substance, a combination or organic and inorganic substances, or pathogenic organism that, after discharge and upon exposure, ingestion, inhalation, or assimilation into an organism either directly from the environment or indirectly by ingestion through the food chain, could on the basis on information available to the Administrator of EPA, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunction in reproduction) or physical deformations in either organisms or offspring of the organisms.

Pollutant limit (for sludge disposal requirements) is a numerical value that describes the amount of a pollutant allowed per unit amount of sewage sludge (e.g., milligrams per kilogram of total solids); the amount of pollutant that can be applied to a unit of land (e.g., kilograms per hectare); or the volume of the material that can be applied to the land (e.g., gallons per acre).

Public contact site is a land with a high potential for contact by the public. This includes, but is not limited to, public parks, ball fields, cemeteries, plant nurseries, turf farms, and golf courses.

Qualified ground water scientist is an individual with a baccalaureate or post-graduate degree in the natural sciences or engineering who has sufficient training and experience in ground water hydrology and related fields, as may be demonstrated by State registration, professional certification, or completion of accredited university programs, to make sound professional judgments regarding ground water monitoring, pollutant fate and transport, and corrective action.

Range land is open land with indigenous vegetation.

Reclamation site is drastically disturbed land that is reclaimed using sewage sludge. This includes, but is not limited to, strip mines and construction sites.

Risk specific concentration is the allowable increase in the average daily ground level ambient air concentration for a pollutant from the incineration of sewage sludge at or beyond the property line of a site where the sewage sludge incinerator is located.

Runoff is rainwater, leachate, or other liquid that drains overland on any part of a land surface and runs off the land surface.

Seismic impact zone is an area that has 10 percent or greater probability that the horizontal ground level acceleration to the rock in the area exceeds 0.10 gravity once in 250 years.

Sewage sludge is a solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to:, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in treatment works.

Sewage sludge feed rate is either the average daily amount of sewage sludge fired in all sewage sludge incinerators within the property line of the site where the sewage sludge incinerators are located for the number of days in a 365 day period that each sewage sludge incinerator operates, or the average daily design capacity for all sewage sludge incinerators within the property line of the site where the sewage sludge incinerators are located.

Sewage sludge incinerator is an enclosed device in which only sewage sludge and auxiliary fuel are fired.

Sewage sludge unit is land on which only sewage sludge is placed for final disposal. This does not include land on which sewage sludge is either stored or treated. Land does not include waters of the United States, as defined in 40 CFR §122.2.

Sewage sludge unit boundary is the outermost perimeter of an active sewage sludge unit.

Specific oxygen uptake rate (SOUR) is the mass of oxygen consumed per unit time per unit mass of total solids (dry weight basis) in sewage sludge.

Stack height is the difference between the elevation of the top of a sewage sludge incinerator stack and the elevation of the ground at the base of the stack when the difference is equal to or less than 65 meters. When the difference is greater than 65 meters, stack height is the creditable stack height determined in accordance with 40 CFR §51.100 (ii).

State is one of the United States of America, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Trust Territory of the Pacific Islands, the Commonwealth of the Northern Mariana Islands, and an Indian tribe eligible for treatment as a State pursuant to regulations promulgated under the authority of section 518(e) of the CWA.

Store or storage of sewage sludge is the placement of sewage sludge on land on which the sewage sludge remains for two years or less. This does not include the placement of sewage sludge on land for treatment.

Surface disposal site is an area of land that contains one or more active sewage sludge units.

Total hydrocarbons means the organic compounds in the exit gas from a sewage sludge incinerator stack measured using a flame ionization detection instrument referenced to propane.

Total solids are the materials in sewage sludge that remain as residue when the sewage sludge is dried at 103 to 105 degrees Celsius.

Treat or treatment of sewage sludge is the preparation of sewage sludge for final use or disposal. This includes, but is not limited to, thickening, stabilization, and dewatering of sewage sludge. This does not include storage of sewage sludge.

Treatment works is either a federally owned, publicly owned, or privately owned device or system used to treat (including recycle and reclaim) either domestic sewage or a combination of domestic sewage and industrial waste of a liquid nature.

Unstable area is land subject to natural or human-induced forces that may damage the structural components of an active sewage sludge unit. This includes, but is not limited to, land on which the soils are subject to mass movement.

Unstabilized solids are organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Vector attraction is the characteristic of sewage sludge that attracts rodents, flies, mosquitoes, or other organisms capable of transporting infectious agents.

Volatile solids is the amount of the total solids in sewage sludge lost when the sewage sludge is combusted at 550 degrees Celsius in the presence of excess air.

Wet electrostatic precipitator is an air pollution control device that uses both electrical forces and water to remove pollutants in the exit gas from a sewage sludge incinerator stack.

Wet scrubber is an air pollution control device that uses water to remove pollutants in the exit gas from a sewage sludge incinerator stack.

3. Commonly Used Abbreviations

BOD	Five-day biochemical oxygen demand unless otherwise specified
CBOD	Carbonaceous BOD
CFS	Cubic feet per second
COD	Chemical oxygen demand
Chlorine	
Cl_2	Total residual chlorine
TRC	Total residual chlorine which is a combination of free available chlorine (FAC, see below) and combined chlorine (chloramines, etc.)

TRO	Total residual chlorine in marine waters where halogen compounds are present
FAC	Free available chlorine (aqueous molecular chlorine, hypochlorous acid, and hypochlorite ion)
Coliform	
Coliform, Fecal	Total fecal coliform bacteria
Coliform, Total	Total coliform bacteria
Cont. (Continuous)	Continuous recording of the parameter being monitored, i.e. flow, temperature, pH, etc.
Cu. M/day or M^3/day	Cubic meters per day
DO	Dissolved oxygen
kg/day	Kilograms per day
lbs/day	Pounds per day
mg/l	Milligram(s) per liter
ml/l	Milliliters per liter
MGD	Million gallons per day
Nitrogen	
Total N	Total nitrogen
NH_3-N	Ammonia nitrogen as nitrogen
NO_3-N	Nitrate as nitrogen
NO_2-N	Nitrite as nitrogen
NO_3-NO_2	Combined nitrate and nitrite nitrogen as nitrogen
TKN	Total Kjeldahl nitrogen as nitrogen
Oil & Grease	Freon extractable material
PCB	Polychlorinated biphenyl
pH	A measure of the hydrogen ion concentration. A measure of the acidity or alkalinity of a liquid or material
Surfactant	Surface-active agent

Temp. °C — Temperature in degrees Centigrade

Temp. °F — Temperature in degrees Fahrenheit

TOC — Total organic carbon

Total P — Total phosphorus

TSS or NFR — Total suspended solids or total nonfilterable residue

Turb. or Turbidity — Turbidity measured by the Nephelometric Method (NTU)

ug/l — Microgram(s) per liter

WET — "Whole effluent toxicity" is the total effect of an effluent measured directly with a toxicity test.

C-NOEC — "Chronic (Long-term Exposure Test) – No Observed Effect Concentration". The highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specified time of observation.

A-NOEC — "Acute (Short-term Exposure Test) – No Observed Effect Concentration" (see C-NOEC definition).

LC_{50} — LC_{50} is the concentration of a sample that causes mortality of 50% of the test population at a specific time of observation. The LC_{50} = 100% is defined as a sample of undiluted effluent.

ZID — Zone of Initial Dilution means the region of initial mixing surrounding or adjacent to the end of the outfall pipe or diffuser ports.

USEPA REGION 1 FRESHWATER ACUTE
TOXICITY TEST PROCEDURE AND PROTOCOL

I. GENERAL REQUIREMENTS

The permittee shall conduct acceptable acute toxicity tests in accordance with the appropriate test protocols described below:

- **Daphnid (Ceriodaphnia dubia) definitive 48 hour test.**
- **Fathead Minnow (Pimephales promelas) definitive 48 hour test.**

Acute toxicity test data shall be reported as outlined in Section VIII.

II. METHODS

The permittee shall use 40 CFR Part 136 methods. Methods and guidance may be found at:

http://water.epa.gov/scitech/swguidance/methods/wet/index.cfm#methods

The permittee shall also meet the sampling, analysis and reporting requirements included in this protocol. This protocol defines more specific requirements while still being consistent with the Part 136 methods. If, due to modifications of Part 136, there are conflicting requirements between the Part 136 method and this protocol, the permittee shall comply with the requirements of the Part 136 method.

III. SAMPLE COLLECTION

A discharge sample shall be collected. Aliquots shall be split from the sample, containerized and preserved (as per 40 CFR Part 136) for chemical and physical analyses required. The remaining sample shall be measured for total residual chlorine and dechlorinated (if detected) in the laboratory using sodium thiosulfate for subsequent toxicity testing. (Note that EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection.) Grab samples must be used for pH, temperature, and total residual chlorine (as per 40 CFR Part 122.21).

Standard Methods for the Examination of Water and Wastewater describes dechlorination of samples (APHA, 1992). Dechlorination can be achieved using a ratio of 6.7 mg/L anhydrous sodium thiosulfate to reduce 1.0 mg/L chlorine. If dechlorination is necessary, a thiosulfate control (maximum amount of thiosulfate in lab control or receiving water) must also be run in the WET test.

All samples held overnight shall be refrigerated at 1- 6^{o}C.

IV. DILUTION WATER

A grab sample of dilution water used for acute toxicity testing shall be collected from the receiving water at a point immediately upstream of the permitted discharge's zone of influence at a reasonably accessible location. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist. In the case where an alternate dilution water has been agreed upon an additional receiving water control (0% effluent) must also be tested.

If the receiving water diluent is found to be, or suspected to be toxic or unreliable, an alternate standard dilution water of known quality with a hardness, pH, conductivity, alkalinity, organic carbon, and total suspended solids similar to that of the receiving water may be substituted **AFTER RECEIVING WRITTEN APPROVAL FROM THE PERMIT ISSUING AGENCY(S)**. Written requests for use of an alternate dilution water should be mailed with supporting documentation to the following address:

Director
Office of Ecosystem Protection (CAA)
U.S. Environmental Protection Agency-New England
5 Post Office Sq., Suite 100 (OEP06-5)
Boston, MA 02109-3912

and

Manager
Water Technical Unit (SEW)
U.S. Environmental Protection Agency
5 Post Office Sq., Suite 100 (OES04-4)
Boston, MA 02109-3912

Note: USEPA Region 1 retains the right to modify any part of the alternate dilution water policy stated in this protocol at any time. Any changes to this policy will be documented in the annual DMR posting.

See the most current annual DMR instructions which can be found on the EPA Region 1 website at http://www.epa.gov/region1/enforcementandassistance/dmr.html for further important details on alternate dilution water substitution requests.

It may prove beneficial to have the proposed dilution water source screened for suitability prior to toxicity testing. EPA strongly urges that screening be done prior to set up of a full definitive toxicity test any time there is question about the dilution water's ability to support acceptable performance as outlined in the 'test acceptability' section of the protocol.

V. TEST CONDITIONS

The following tables summarize the accepted daphnid and fathead minnow toxicity test conditions and test acceptability criteria:

EPA NEW ENGLAND EFFLUENT TOXICITY TEST CONDITIONS FOR THE DAPHNID, CERIODAPHNIA DUBIA 48 HOUR ACUTE TESTS[1]

1.	Test type	Static, non-renewal
2.	Temperature (°C)	20 ± 1° C or 25 ± 1°C
3.	Light quality	Ambient laboratory illumination
4.	Photoperiod	16 hour light, 8 hour dark
5.	Test chamber size	Minimum 30 ml
6.	Test solution volume	Minimum 15 ml
7.	Age of test organisms	1-24 hours (neonates)
8.	No. of daphnids per test chamber	5
9.	No. of replicate test chambers per treatment	4
10.	Total no. daphnids per test concentration	20
11.	Feeding regime	As per manual, lightly feed YCT and Selenastrum to newly released organisms while holding prior to initiating test
12.	Aeration	None
13.	Dilution water[2]	Receiving water, other surface water, synthetic water adjusted to the hardness and alkalinity of the receiving water (prepared using either Millipore Milli-Q[R] or equivalent deionized water and reagent grade chemicals according to EPA acute toxicity test manual) or deionized water combined with mineral water to appropriate hardness.
14.	Dilution series	≥ 0.5, must bracket the permitted RWC

15.	Number of dilutions[3]	5 plus receiving water and laboratory water control and thiosulfate control, as necessary. An additional dilution at the permitted effluent concentration (% effluent) is required if it is not included in the dilution series.
16.	Effect measured	Mortality-no movement of body or appendages on gentle prodding
17.	Test acceptability	90% or greater survival of test organisms in dilution water control solution
18.	Sampling requirements	For on-site tests, samples must be used within 24 hours of the time that they are removed from the sampling device. For off-site tests, samples must first be used within 36 hours of collection.
19.	Sample volume required	Minimum 1 liter

Footnotes:

1. Adapted from EPA-821-R-02-012.
2. Standard prepared dilution water must have hardness requirements to generally reflect the characteristics of the receiving water.

EPA NEW ENGLAND TEST CONDITIONS FOR THE FATHEAD MINNOW (PIMEPHALES PROMELAS) 48 HOUR ACUTE TEST[1]

1.	Test Type	Static, non-renewal
2.	Temperature (°C):	20 ± 1 ° C or 25 ± 1°C
3.	Light quality:	Ambient laboratory illumination
4.	Photoperiod:	16 hr light, 8 hr dark
5.	Size of test vessels:	250 mL minimum
6.	Volume of test solution:	Minimum 200 mL/replicate
7.	Age of fish:	1-14 days old and age within 24 hrs of each ~~the~~ other~~s~~
8.	No. of fish per chamber	10
9.	No. of replicate test vessels per treatment	4
10.	Total no. organisms per concentration:	40
11.	Feeding regime:	As per manual, lightly feed test age larvae using concentrated brine shrimp nauplii while holding prior to initiating test
12.	Aeration:	None, unless dissolved oxygen (D.O.) concentration falls below 4.0 mg/L, at which time gentle single bubble aeration should be started at a rate of less than 100 bubbles/min. (Routine D.O. check is recommended.)
13.	dilution water:[2]	Receiving water, other surface water, synthetic water adjusted to the hardness and alkalinity of the receiving water (prepared using either Millipore Milli-Q^R or equivalent deionized and reagent grade chemicals according to EPA acute toxicity test manual) or deionized water combined with mineral water to appropriate hardness.
14.	Dilution series	≥ 0.5, must bracket the permitted RWC

15.	Number of dilutions[3]	5 plus receiving water and laboratory water control and thiosulfate control, as necessary. An additional dilution at the permitted effluent concentration (% effluent) is required if it is not included in the dilution series.
16.	Effect measured	Mortality-no movement on gentle prodding
17.	Test acceptability	90% or greater survival of test organisms in dilution water control solution
18.	Sampling requirements	For on-site tests, samples must be used within 24 hours of the time that they are removed from the sampling device. For off-site tests, samples are used within 36 hours of collection.
19.	Sample volume required	Minimum 2 liters

Footnotes:

1. Adapted from EPA-821-R-02-012
2. Standard dilution water must have hardness requirements to generally reflect characteristics of the receiving water.

VI. CHEMICAL ANALYSIS

At the beginning of a static acute toxicity test, pH, conductivity, total residual chlorine, oxygen, hardness, alkalinity and temperature must be measured in the highest effluent concentration and the dilution water. Dissolved oxygen, pH and temperature are also measured at 24 and 48 hour intervals in all dilutions. The following chemical analyses shall be performed on the 100 percent effluent sample and the upstream water sample for each sampling event.

Parameter	Effluent	Receiving Water	ML (mg/l)
Hardness[1,]	x	x	0.5
Total Residual Chlorine (TRC)[2, 3,]	x		0.02
Alkalinity	x	x	2.0
pH[4]	x	x	--
Specific Conductance	x	x	--
Total Solids	x		--
Total Dissolved Solids	x		--
Ammonia	x	x	0.1
Total Organic Carbon	x	x	0.5
Total Metals			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005
Al	x	x	0.02
Other as permit requires			

Notes:

1. Hardness may be determined by:
   - APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
     -Method 2340B (hardness by calculation)
     -Method 2340C (titration)
2. Total Residual Chlorine may be performed using any of the following methods provided the required minimum limit (ML) is met.
   - APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
     -Method 4500-CL E Low Level Amperometric Titration
     -Method 4500-CL G DPD Colorimetric Method
3. Required to be performed on the sample used for WET testing prior to its use for toxicity testing

VII. TOXICITY TEST DATA ANALYSIS

LC50 Median Lethal Concentration (Determined at 48 Hours)

Methods of Estimation:

- Probit Method
- Spearman-Karber
- Trimmed Spearman-Karber
- Graphical

See the flow chart in Figure 6 on p. 73 of EPA-821-R-02-012 for appropriate method to use on a given data set.

No Observed Acute Effect Level (NOAEL)

See the flow chart in Figure 13 on p. 87 of EPA-821-R-02-012 .

VIII. TOXICITY TEST REPORTING

A report of the results will include the following:

- Description of sample collection procedures, site description
- Names of individuals collecting and transporting samples, times and dates of sample collection and analysis on chain-of-custody
- General description of tests: age of test organisms, origin, dates and results of standard toxicant tests; light and temperature regime; other information on test conditions if different than procedures recommended. Reference toxicant test data should be included.
- All chemical/physical data generated. (Include minimum detection levels and minimum quantification levels.)
- Raw data and bench sheets.
- Provide a description of dechlorination procedures (as applicable).
- Any other observations or test conditions affecting test outcome.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND - REGION I
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MASSACHUSETTS 02109-3912

FACT SHEET

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

NPDES PERMIT NUMBER: **MA0102440**

PUBLIC NOTICE START AND END DATES: September 21, 2012 thru November 19, 2012

NAME AND MAILING ADDRESS OF APPLICANT:

Town of Uxbridge
Sewer Commission
River Road
Uxbridge, MA 01569

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Uxbridge Wastewater Treatment Facility
80 River Road
Uxbridge, MA 01569

RECEIVING WATER: **Blackstone River (MA51-05)**
USGS Hydrologic Code #01090003 – Blackstone River Watershed (51)

RECEIVING WATER CLASSIFICATION(S): **Class B – warm water fishery**

Table of Contents

List of Tables and Figures

Attachments:

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

The above named applicant has applied to the U.S. Environmental Protection Agency ("EPA") for the reissuance of its NPDES permit to discharge into the designated receiving water. The facility is engaged in the collection and treatment of domestic wastewater and septage. The discharge from this secondary wastewater treatment facility is via Outfall 001 to the Blackstone River.

II. Description of Treatment System and Discharges

A quantitative description of the wastewater treatment plant discharge in terms of significant effluent parameters based on recent monitoring data is shown on **Table 1**. **Figure 1** shows the geographical location, and **Figure 2** shows the flow process diagram of the Uxbridge Wastewater Treatment Facility (WWTF).

The Uxbridge WWTF is a 2.5 million gallon per day (MGD) secondary wastewater treatment facility which serves a population of about 6618, according to the Town's permit application dated April 26, 2004. There is currently one industrial user contributing a small amount of non-contact cooling water to the WWTF. The collection system consists of separate sanitary sewers and there are no known combined sewers or combined sewer overflows. The facility accepts several thousand gallons per day of septage from within Uxbridge and may accept septage from other communities.

The WWTF's treatment process is shown in Figure 2. Influent wastewater flow is pumped to a headworks building where a mechanical bar rack and a shredder remove coarse sewage solids and other materials from the wastewater; heavier suspended solids are then removed in primary sedimentation tanks. Following primary sedimentation, sodium aluminate is added to the wastewater in a rapid mix tank to enhance phosphorus removal. The wastewater then enters aeration tanks, where it is mixed with sludge returned from the secondary sedimentation tanks, and undergoes biological treatment. Following aeration, the flow is discharged to secondary settling tanks where biological flocculant and fine solids are removed. The flow is then discharged to an effluent channel, where flow is measured with an ultrasonic Parshall flume, and then to a chlorine contact chamber, where the effluent is seasonally disinfected with liquid sodium hypochlorite, added in proportion to flow. The effluent is then discharged to the Blackstone River through a diffuser on the river bottom. The sludge handling facilities are described in Section VIII.

III. Receiving Water Description

The Uxbridge WWTF discharges to the Blackstone River in southeastern Uxbridge, MA. The Blackstone River is an interstate water which has its headwaters in Worcester. It flows south through Millbury, Sutton, Grafton, Northbridge, Uxbridge, Millville and Blackstone to the state line with Rhode Island, approximately five miles downstream of the Uxbridge discharge. The river then flows through Rhode Island to Pawtucket, where the Slater Mill Dam marks the boundary with the marine waters of the Seekonk River, the uppermost segment of Narragansett Bay. The Seekonk River joins the Providence River, which then flows into the main body of

Narragansett Bay. The Seekonk and Providence Rivers are estuaries and are classified as marine waters. The Blackstone River has a number of dams and related impoundments along its length. The closest downstream is the Tupperware Dam and associated "Millville Pond" impoundment at Blackstone, MA, approximately 3 miles downstream of the Uxbridge discharge.

Massachusetts Surface Water Quality Standards ("MA SWQS") list the Blackstone River, from its source to the Rhode Island border, as a Class B Warm Water Fishery. Its uses include habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary (e.g., swimming) and secondary (e.g., fishing and boating) contact recreation. *See* 314 CMR 4. 05(3)(b) and 4.06 (Table 11). Such waters must have consistently good aesthetic value.

Rhode Island has classified the Blackstone River as a Class B1 water from the Massachusetts border to the Central Falls CSO outfall, and as a Class B1{a} water from the CSO outfall to the Seekonk River. The Seekonk River is designated as a Class SB1 water from the Blackstone to the confluence with the Providence River. The Providence River has been designated as a Class SB1{a} water from its confluences with the Seekonk and two other tributaries until a boundary extending between Warwick and East Providence, and a Class SB{a}water from that point until it reaches the Upper Narragansett Bay segment. Rhode Island Water Quality Regulations, July 2006, amended December 2009 ("RI WQR"), Appendix A.

Rhode Island Class B1 waters' designated uses include primary and secondary recreational uses and fish and wildlife habitat, except that primary contact recreational uses may be impacted by pathogens from approved wastewater discharges. RI WQR at Rule 8.B(1)(d). Rhode Island Class SB waters' designated uses include primary and secondary contact recreation; fish and wildlife habitat; shellfish harvesting; and must have good aesthetic value. Id. at Rule 8(B)(2)(b). Class SB1 waters share the same designated uses as Class SB, with the exception of shellfish harvesting. Id. at Rule 8(B)(2)(c). The {a} designation indicates partial use due to impacts from CSOs. RI WQR, Appendix A.

The Blackstone River is listed on the *Massachusetts Year 2010 Integrated List of Waters* (the "MA 303(d) list") as a water that is impaired (not meeting water quality standards) and requiring one or more Total Maximum Daily Loads (TMDLs). The segment of the Blackstone River that the Uxbridge WWTF discharges to, Segment MA51-05, is listed for impairments caused by unknown toxicity, priority organics, metals, nutrients, pH, flow alteration, pathogens, taste/odor/color, suspended solids and turbidity. The Blackstone River in Rhode Island is listed on Rhode Island's *2010 303(d) List of Impaired Waters* for impairments caused by cadmium, lead, total phosphorus, dissolved oxygen, fecal coliform, enterococcus, mercury and PCB in fish tissue, and benthic macroinvertebrate bioassessments (as well as non-native plant impairments not caused by pollutants). The Seekonk and Providence Rivers are listed for impairments caused by total nitrogen, low dissolved oxygen, and fecal coliform.

No TMDLs have been completed for these pollutants in either Massachusetts or Rhode Island. However extensive work has been completed to document and analyze these impairments, as set forth in the discussion of effluent limits derivation below.

IV. Limitations and Conditions

The effluent limitations and all other requirements described in Part VI of this Fact Sheet may be found in the draft permit.

V. Permit Basis: Statutory and Regulatory Authority

Congress enacted the Clean Water Act (CWA) "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." CWA § 101(a). To achieve this objective, the CWA makes it unlawful for any person to discharge any pollutant into the waters of the United States from any point source, except as authorized by specified permitting sections of the CWA, one of which is Section 402. *See* CWA §§ 301(a), 402(a).

Section 402(a) established one of the CWA's principal permitting programs, the National Pollutant Discharge Elimination System (NPDES). Under this section of the CWA, EPA may "issue a permit for the discharge of any pollutant, or combination of pollutants" in accordance with certain conditions. *See* CWA § 402(a). NPDES permits generally contain discharge limitations and establish related monitoring and reporting requirements. *See* CWA § 402(a)(1)-(2).

Section 301 of the CWA provides for two types of effluent limitations to be included in NPDES permits: "technology-based" limitations and "water quality-based" limitations. *See* §§ 301, 304(b); 40 CFR §§ 122, 125, 131. Technology-based treatment requirements represent the minimum level of control that must be imposed under Sections 402 and 301(b) of the Clean Water Act. For publicly owned treatment works (POTWs), technology based requirements are effluent limits based on secondary treatment as defined in 40 CFR 133.102.

EPA regulations require NPDES permits to contain effluent limits more stringent than technology-based limits where necessary to maintain or achieve federal or state water quality standards. Under Section 301(b)(1)(C) of the CWA, discharges are subject to effluent limitations based on water quality standards. The Massachusetts Surface Water Quality Standards (MA SWQS), 314 CMR 4.00, establish requirements for the regulation and control of toxic constituents and also require that EPA criteria, established pursuant to Section 304 (a) of the CWA, shall be used unless a site specific criteria is established. Massachusetts regulations similarly require that its permits contain limitations which are adequate to assure the attainment and maintenance of the water quality standards of the receiving waters as assigned in the MA SWQS, 314 CMR 4.00. *See* 314 CMR 3.11(3). EPA is required to obtain certification from the state in which the discharge is located that all water quality standards or other applicable requirements of state law, in accordance with Section 301(b)(1)(C) of the CWA, are satisfied, unless the state waives certification.

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 RI WQR 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.

In addition, a permit may not be renewed, reissued or modified with less stringent limitations or conditions than those contained in the previous permit unless in compliance with the anti-backsliding requirements of CWA § 303(d)(4) and 40 CFR §122.44(l). States are also required to develop antidegradation policies pursuant to 40 CFR § 131.12. No lowering of water quality is allowed, except in accordance with the antidegradation policy.

VI. Explanation of Permit's Effluent Limitations

A. Basis of current permit limits

The current permit was issued on September 30, 1999, and incorporated limits based on a waste load allocation (WLA) set forth in *Blackstone River Watershed Dissolved Oxygen Waste Load Allocation for Massachusetts and Rhode Island* (November 1997). This WLA was based on a dissolved oxygen (DO) mathematical model developed by the University of Rhode Island and funded by the EPA, the MassDEP and the Rhode Island Department of Environmental Management (RIDEM) which was calibrated and verified using water quality survey data collected in 1991. The water quality data and modeling report can be found in the *Blackstone River Initiative Report* (February 1998). Modeling results formed the basis for water quality based seasonal limits on biochemical oxygen demand (BOD_5), carbonaceous oxygen demand (CBOD), total suspended solids (TSS), phosphorus and ammonia nitrogen that were found necessary to achieve the minimum dissolved oxygen criterion of 5.0 mg/l for the Blackstone River.

The draft permit maintains the existing concentration-based limits on BOD_5, TSS and ammonia nitrogen while also expressing those limits as mass load limits. The CBOD limits in the current permit have been expressed as BOD limits in the draft permit at the permittee's request, in order to conserve laboratory resources due to the greater complexity of the CBOD laboratory methods. BOD is a more conservative measure than CBOD (CBOD should always be less than BOD), and BOD is equally consistent with the approved WLA. The draft permit also sets more stringent limits on total phosphorus and additional limits for total nitrogen, metals and bacteria. These are discussed in greater detail in the pollutant-specific sections that follow.

B. Effluent Limits Derivation

The effluent limits in the draft permit are established to ensure compliance with technology-based requirements, the MA SWQS, the approved WLA for dissolved oxygen, and RI WQR. In most cases 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, so that the effluent limits designed to meet the MA SWQS also ensure compliance with the RI WQR. This is not the case for the limits on total nitrogen and on bacteria in the winter months, and those limits are established solely to ensure compliance with the RI WQR.

1. Flow

The draft permit contains an annual average flow limit of 2.5 MGD, which is the long term average design flow of the facility. The flow limit in the current permit is expressed as a monthly average flow of 2.5 MGD. This change from a monthly average to an annual average is the result of MassDEP adopting a policy establishing flow limits in POTW permits as an annual average in order to account for seasonal flow variations, particularly those associated with high flow and high groundwater which commonly occur in the spring time. *See* MassDEP-DWM, *NPDES Permit Program Policies Related to Flow and Nutrients in NPDES Permits* (2000). Uxbridge's actual flow is routinely well below its design flow, averaging 0.91 MGD in 2009-2010. See Table 1.

2. Conventional Pollutants

a. BOD and TSS

The concentration-based effluent limits for these pollutants remain the same as in the current permit with the exception of the change from CBOD to BOD. For the period of November through May, effluent limitations for monthly and weekly average BOD_5 and TSS are based on secondary treatment requirements. CWA § 301(b)(1)(B); 40 CFR § 133.102. The BOD and TSS draft permit limits for the period from June to October (20 mg/l average monthly and 30 mg/l average weekly) are water-quality based limits based on the WLA. These water quality based effluent limits are more stringent than the technology-based limits for BOD and TSS of 30 mg/l average monthly and 45 mg/l average weekly. There were no CBOD, BOD or TSS violations between 2005 and December 2010.

Mass loading effluent limits for average monthly and average weekly BOD_5, BOD and TSS are found by multiplying the allowable effluent concentration in mg/l by the design flow in MGD and converting to units of pounds per day. The calculations are shown in Attachment A. The monitoring frequency is reduced from three to two times per week based on the facility's history of compliance; long term average concentrations of these pollutants are on the order of 2 mg/l, well below the permit average monthly limits of 20 and 30 mg/l.

b. Ammonia and DO

The draft permit limits for ammonia nitrogen and dissolved oxygen are the same as in the current permit. The permit limits for ammonia nitrogen (expressed in mg/l of nitrogen) were established in order to control both in-stream oxygen demand and the degree of toxicity associated with the discharge. The May limits (10 mg/l and 20 mg/l) and the June through October limits (5 mg/l and 10 mg/l) were based on the 1997 WLA for achieving minimum DO criteria. The November limits (10 mg/l and 20 mg/l) and the December thru April limits (15 mg/l) were based on a December 1999 ammonia criteria document for preventing toxic impacts associated with in-stream ammonia concentrations. *See* EPA, *1999 Update of Ambient Water Quality Criteria for Ammonia,* 822-R-99-014 (1999). There were no violations of the ammonia nitrogen limits from 2005 to 2010.

The minimum DO requirement of 5.0 mg/l has been continued in the draft permit with weekly monitoring, consistent with the State WQS for Class B waters. There were 12 violations of the minimum DO requirement from 2005 to 2010.

c. Bacteria

Limitations for bacteria are based upon state water quality standards and differ from those in the current permit in two respects. First, during the seasonal period of April to October, this permit transitions from fecal coliform to Escherichia coli (*E. coli*) as the bacterial indicator. Second, while the expired permit has seasonal bacteria limits, this permit includes year round limits to satisfy the RI WQR, which are in terms of enterococci.

There were no violations of the existing fecal coliform limits from 2005 to 2010.

<u>E. coli limits</u>

The draft permit includes seasonal (April 1st – October 31st) *E. coli* limitations which are based upon the *E. coli* criteria in the revisions to the MA SWQS, 314 CMR § 4.05(3)(b), approved by EPA in 2007. The monthly average limitation in the draft permit is 126 colony forming units (cfu) per 100 ml, and shall be expressed as a monthly geometric mean. The daily maximum limitation in the draft permit is 409 cfu/100 ml. These limitations are a State certification requirement and are consistent with EPA guidance recommending that no dilution be considered in establishing permit limits for discharges to rivers designated for primary contact recreation. EPA, *Memorandum re: Initial Zones of Dilution for Bacteria in Rivers and Streams Designated for Primary Contact Recreation*,(2008).

The monitoring frequency is maintained at two times per week. In addition, all bacterial samples shall be collected concurrently with one of the daily total residual chlorine (TRC) samples.

<u>Enterococci bacteria limits</u>

Rhode Island's water quality standard for bacteria in Class B waters is a year round criterion for enterococci bacteria. Enterococci concentrations are not to exceed a geometric mean value of 54 colonies/100 ml, with a single sample maximum of 61 colonies/100 ml. For permitting purposes RIDEM uses the geometric mean criterion to establish monthly average permit limit, and the 90% upper confidence level value for "lightly used full body contact recreation" of 175 colonies/100ml to set daily maximum permit limits. RIDEM, *Burrillville Wastewater Treatment Facility Permit Development Document* (January 2012).

To confirm whether water quality standards are in fact violated at the state line, EPA reviewed water quality data collected by USGS at a monitoring station in Millville, MA, upstream of the Tupperware Dam (close to the Rhode Island border) between 2007 and 2009. Monitoring data from the winter months show a median enterococci count of 104 cfu/100 ml, with seven of eleven counts above the single sample maximum (high of 1,160) cfu/100 ml, violating Rhode Islands WQR. Monitoring data from between April and October show a median of 42 cfu/100 ml, with six of fifteen data points above the single sample maximum (high of 1,167 cfu/100 ml), violating the single sample maximum standard. RIDEM, data transmittal (July 9, 2012). While

Uxbridge has not been monitoring bacteria levels in the winter months, the only significant source of bacteria in the river during dry weather is the upstream POTWs. Therefore, EPA has determined that the discharge from the Massachusetts POTWs, including Uxbridge, have a reasonable potential to cause or contribute to violations of Rhode Island's WQR, and that bacteria limitations designed to meet the RI WQR are necessary for these NPDES permits.

To establish the appropriate bacteria limit to meet the RI standard at the state line, EPA has estimated the amount of bacteria die-off that is expected to occur between Uxbridge and the state line. Die-off was estimated using a first order die-off equation as shown below and derived from Crane, S.R., and Moore, J.A., "Modeling enteric bacterial die-off: a review", *Water, Air and Soil Pollution*, 27, 411-39 (1986); and Illinois state water quality standards, Title 35, Subtitle C: Water Pollution; Part 378 (Effluent Disinfection Exemptions.).

$$N(t) = \{N(o)\}e^{-kt}$$

Where:

N(t) = Predicted concentration of bacteria at travel time t, downstream, in #/100 ml
N(o) = Bacteria concentration in the effluent of the source, in #/100 ml
k = The first order die-off rate constant, in 1/day
t = travel time to the point of interest below the source, in days

Although the value of N(o) would typically be the source, or effluent concentration of bacteria, by setting this value to 1 the value that is solved for, N(t), will be a fraction of the bacteria discharged at the source. This allows estimation of the percentage of the effluent concentration that is present at the downstream point (the State line). EPA assumed a river velocity of 1.0 feet per second, which was also used in the Northbridge permit. This value was within the range that was estimated for river flows consistent with this time of year by a USGS modeling effort. A travel distance of 5 miles, or 26400 feet was used, as estimated from the *Blackstone River Initiative Report* at 5-3 and 5-4. This distance is the difference between the river mile readings at Reach 14 of the Blackstone River in Uxbridge (23.2 miles) and that of Reach 16 which crosses over into Rhode Island (18.2). Using these values results in an estimated travel time of 0.31 days. EPA selected a decay rate (k) of 1.0/day from the literature. Mancini, J.L., "Numerical estimates of coliform mortality rates under various conditions", *Journal of Water Pollution Control Federation,* 50, (1978), pp 2477 – 2484. This results in a percentage of the bacteria count at the state line, or N(t), of 74% (0.74). In other words, 74% of the bacteria that is discharged at the Uxbridge WWTF would be present at the state line.

Using the die-off estimate of 26%, EPA has set the enterococci limits for the period of November 1 to March 31 at a monthly geometric mean of 73 colonies/100 ml and a daily maximum of 175 colonies/100 ml, as calculated below. The proposed limits are consistent with Rhode Island's WQR.

$$\frac{\text{Bacteria target at State line}}{\text{percent of discharge bacteria present at state line}} = \text{maximum discharged at WWTF}$$

Monthly average: (Geometric mean)	Daily maximum:
$\frac{54}{0.74}$ = **73 colonies/100 ml**	$\frac{175}{0.74}$ = **236 colonies/100 ml**

The draft permit limit does not take into account dilution consistent with EPA policy (*see EPA Memorandum, supra*), and because of the multitude of other sources of bacteria in the river that effectively eliminate the dilution benefit of the instream flow. Blackstone River data indicate that bacteria concentrations in the river exceed the Rhode Island criteria at various times of the year and under a variety of different flow conditions. *See, e.g.,* Louis Berger Group, Inc., *Water Quality – Blackstone River, Final Report 2: Field Investigations* (2008). Consequently, allowing for dilution would not ensure that the discharge does not cause or contribute to a violation of the RI WQR at the state line.

The monitoring frequency is established at one time per week. Enterococci samples shall be collected concurrently with the E. coli sample. This is a year-round limit, consistent with Rhode Island's year-round water quality standard. However, should monitoring data from the April to October period indicate that control of *E.coli* is sufficient to ensure adequate control of enterococci, the permittee may request that enterococci monitoring be reduced to winter only. Any such request must be based on a minimum of one year of concurrent monitoring and include a side by side comparison of all concurrent bacteria monitoring data.

d. pH

Limitations for pH are based upon State Certification requirements for POTWs under Section 401(d) of the CWA, 40 CFR 124.53 and 124.55, and water quality standards. Although the lower end of the pH range in the MA SQWS is 6.5 s.u., the permit limit was established at 6.0 s.u. in the 1999 permit. The permittee's historic pH data show levels in the 6.0 to 6.5 range, although there has been only one reported pH value below 6.5 since 2005. The low pH values were likely caused by the plant's nitrification efforts. Although it was not stated in the fact sheet accompanying the 1999 permit, it is assumed that the 6.0 s.u. at the effluent was determined not to have a reasonable potential to violate the instream standard of a minimum of 6.5 s.u., since there is considerable mixing available to the effluent. In addition, adding chemical to raise the pH to 6.5 in the absence of a reasonable potential to cause an exceedance of instream water quality standards would not be environmentally justified. The permit limit is also consistent with the technology based requirements of 40 CFR § 133.102. Therefore, the pH range will remain at 6.0 to 8.3 s.u.

3. Nutrients

Nutrients, such as phosphorus and nitrogen, are necessary for the growth of aquatic plants and animals to support a healthy ecosystem. In excess, however, nutrients can contribute to fish disease, brown tide, algae blooms and low DO. Excessive nutrients, generally phosphorus in freshwater and nitrogen in salt water, stimulate the growth of algae, which can start a chain of events detrimental to the health of an aquatic ecosystem. Algae inhibit sunlight from penetrating through the water column. Once deprived of sunlight, underwater plants cannot survive and are lost. Animals that depend on these plants for food and shelter leave the area or die. Large biomass of algae causes extreme diurnal swings in DO levels. In addition, as the algae decay, they further depress the DO levels in the water. Fish and shellfish are in turn deprived of oxygen, and fish kills can occur. Excessive algae may also cause foul smells and decreased aesthetic value, which could affect swimming and recreational uses.

a. Phosphorus

The draft permit contains a monthly average phosphorus limit of 0.2 mg/l from April to October to control this discharge's contribution to eutrophication in the Blackstone River. The current permit limit of 1.0 mg/l established through the WLA to meet minimum dissolved oxygen criteria in the Blackstone River is not sufficient to control cultural eutrophication.

i. Evidence of eutrophication and reasonable potential

The MA SWQS at 314 CMR 4.00 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 "all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses." They also include a requirement that "[a]ny existing point source discharge containing nutrients in concentrations that would cause or contribute to cultural eutrophication, including the excessive growth of aquatic plants or algae, in any surface water shall be provided with the most appropriate treatment as determined by the Department, including, where necessary, highest and best practical treatment (HBPT) for POTWs" Id. 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.

Numerous reports and studies have documented the existence of cultural eutrophication in the Blackstone River reaches downstream of the Uxbridge discharge and have identified wastewater treatment plant discharges of phosphorus as the major cause. The *Blackstone River 1998 Water Quality Assessment Report* found the river segment where the Uxbridge WWTF discharge is located (MA51-05) to be non-supportive of aquatic life uses based on elevated nutrient levels and an impaired benthic macroinvertebrate community. Similar impairment to the benthic community was documented in MassDEP's 2003 assessment surveys. *Blackstone River Watershed 2003 Biological Assessment* (MassDEP 2006). The *Blackstone River Initiative Report* (2001), the product of a "multi-phased, interagency, interstate project to conduct the sampling, assessment, and modeling work necessary for the restoration of the river system," stated that "[p]hosphorus and its contribution to algal blooms in the river is a serious water quality concern" and linked the problem to "the cumulative effect from the combined input of all municipal discharges." *BRI Report* at 1-3 to 4. The Army Corps of Engineers' *Phase I: Water Quality Evaluation and Modeling of the Massachusetts Blackstone River, Draft* (March 2004), a followup study intended to expand and build upon the results from the Blackstone River Initiative, concluded that the reaches of the river below Sutton to the RI state line were characterized by "high productivity" and "a consistent rise in algae" as indicated by nutrient loss ratios and profiles of chlorophyll_a (an indicator parameter for algae).

Water quality monitoring data confirms the extensive phosphorus enrichment in the area of Blackstone River affected by this discharge. In 1998 MassDEP found total phosphorus concentrations of 0.34 mg/l upstream and 0.23 mg/l downstream of the discharge. MassDEP's monthly monitoring from May to October 2003 documented total phosphorus levels ranging from 0.16 to 0.69 mg/l in Northbridge, upstream of the discharge, and ranging from 0.11 to 0.37 mg/l downstream of the discharge in Millville. *Blackstone River Watershed 2003 DWM Water Quality Monitoring Data* (MassDEP 2005). While MassDEP has not yet released the results of its 2008 water quality monitoring, data from the Blackstone River Coalition Volunteer Water Quality Monitoring Program confirms continued high concentrations of phosphorus in the vicinity of the Uxbridge discharge, with dissolved phosphorus concentrations averaging 0.41 mg/l (and as high as 0.9 mg/l) between 2005 and 2008 at their monitoring site on the Blackstone River in Uxbridge, upstream of the Uxbridge WWTF. These values far exceed the recommended values contained in EPA's national technical guidance and the peer-reviewed scientific literature pertaining to nutrients. These sources recommend protective in-stream phosphorus values ranging from 0.024 mg/l (24 ug/l) to 0.1 mg/l (100 ug/l). *1986 Quality Criteria for Water* (EPA 1986); *Ambient Water Quality Criteria Recommendations: Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Nutrient Ecoregion XIV,* December 2000 (EPA- 822-B-00-022).

Given the condition of the receiving water described above, EPA has determined that the discharge of phosphorus from the Uxbridge WWTF under the current permit limit "will cause, have reasonable potential to cause, or contribute to" an excursion above the narrative criterion for nutrients. The Uxbridge plant currently discharges under a seasonal monthly average effluent limit of 1.0 mg/l, with concentrations averaging 0.55 mg/l during the 2009-10 phosphorus control seasons. Concentrations outside of the treatment season (indicative of the full potential of the facility to contribute to water quality exceedances) have been as high as 2.8 mg/l. These concentrations are well above the receiving water concentrations that have already been shown to be related to eutrophication in the Blackstone River. The receiving water does not provide substantial dilution under low flow (7Q10) conditions, as receiving water concentrations are already high due to the inputs from the numerous upstream POTWs and nonpoint sources. Therefore the setting of a more stringent effluent limit is required. 40 CFR § 122.44(d)(1)(ii) and (iii).

ii. Determination of effluent limitation

As noted above, the MA SWQS require the implementation of "highest and best practical treatment," interpreted by MassDEP as an effluent limit of 0.2 mg/l for POTWs, where necessary to control cultural eutrophication. EPA is also, however, required under the Clean Water Act to determine whether such an effluent limit is sufficient to ensure that the receiving water quality complies with all applicable water quality standards. 40 CFR § 122.44(d)(vii)(A). EPA must therefore determine whether an effluent limit of 0.2 mg/l is sufficiently stringent to ensure compliance with the standard that "all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses." 314 CMR 4.05(5)(c).

To determine whether the water quality standard is met, EPA interprets the Massachusetss narrative criterion in numeric terms by looking to nationally recommended criteria and other technical guidance documents. *See* 40 CFR 122.44(d)(1)(vi)(B). EPA has previously established a numeric target of 0.1 mg/l to meet the narrative criterion in the Blackstone River, based on the *1986 Quality Criteria for Water* ("Gold Book") recommendation of 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. This target is consistent with criteria and guidelines adopted by other states for total phosphorus, as well as other EPA Guidance, *see, e.g., Nutrient Criteria Technical Guidance Manual: Rivers and Streams* (EPA 2000), and EPA's choice of this standard has been upheld by the Environmental Appeals Board in *In re Upper Blackstone Water Pollution Abatement District*, 14 E.A.D. __ (2010).

To determine whether a 0.2 mg/l is sufficient to ensure that the instream level of 0.1 mg/l is met under 7Q10 low flow conditions, EPA calculated the projected instream concentration assuming all the contributing point sources are discharging at their effluent limits under design flow conditions. Design flows and effluent limits for these facilities are set forth in Table 2 below. It should be noted that this does not represent the current discharge concentrations to the Blackstone River, which are significantly higher, but rather the expected discharge concentrations after the facilities are brought into compliance with their newest permit limits.[1] Phosphorus levels in the base flow in the Blackstone River is also included, with a background concentration of 0.04 mg/l based on monitoring data upstream of UBWPAD collected by MassDEP in 2002 (near 7Q10 conditions). MassDEP, *Blackstone River 2003-2007 Water Quality Assessment Report*, at F-8 (2008).[2]

Table 2. Blackstone River POTW Phosphorus Limits

Source	Flow (MGD)	P limit
UBWPAD	56.0	0.1 mg/l
Grafton	2.4	0.2 mg/l*
Northbridge	2.0	0.2 mg/l
Douglas WWTF	0.6	1.2 lbs/day
Upton WWTF	0.4	0.2 mg/l
Uxbridge	2.5	0.2 mg/l*

* proposed

Instream concentration is determined using a mass balance equation as follows:

$$Q_r C_r = \Sigma\ Q_d C_d + Pload_{\text{Douglas}} + Q_s C_s$$

[1] In the case of Grafton, a new permit limit of 0.2 mg/l has been proposed in a draft permit issued concurrently with this draft permit.

[2] While these data are several years old they are consistent with more recent monitoring data from the Blackstone Watershed Coalition's volunteer monitoring program taken upstream of POTW influence. The BWC data indicates a median orthophosphate (as P) concentration of 0.033 mg/l in the Mumford River upstream of the Douglas WWTF in the period 2005 to 2008. Blackstone Watershed Coalition, *WQM Database* (April 2008).

Where

Q_r = receiving water flow downstream of the discharge (Σ Qd + $Q_{Douglas}$ + Qs)
C_r = total phosphorus concentration in the receiving water downstream of the discharge
Q_d = design flow from each facility (excluding Douglas)
C_d = total phosphorus concentration in each discharge (assumed to be permit limit)
$Q_{Douglas}$ = design flow from Douglas
$Pload_{Douglas}$ = mass load from Douglas (assumed to be permit load limit)
Q_s = Blackstone River base flow at 7Q10 = 22.75 cfs = 14.7 MGD[3]
C_s = phosphorus concentration in baseflow, from sampling upstream of all POTWs = 0.04 mg/l

Solving for C_r yields:

$$C_r = \frac{\Sigma\ Q_d C_d + Pload_{Douglas} + Q_s C_s}{Qr}$$

$$C_r = \frac{56 * 0.1 + 2.4*0.2 + 2.0*0.2 + 0.4*0.2 + 2.5 * 0.2 + 1.2/8.34 + 14.7*0.04}{78.4}$$

$$C_r = 0.10 \text{ mg/l}$$

This calculation indicates that an effluent limit of 0.2 mg/l, consistent with the "highest and best practical treatment" mandated under the MA SWQS, is sufficient to ensure that the narrative water quality standard for nutrients is met.

In addition to the seasonal phosphorus limit of 0.2 mg/l, the permit contains a winter period total phosphorus limit of 1.0 mg/l which will be in effect from November 1 through March 31. A higher phosphorus effluent discharge limitation in the winter period is appropriate because the expected predominant form of phosphorus, the dissolved fraction, lacking plant growth to absorb it, will likely remain dissolved and flow out of the system. Imposing a limit on phosphorus during the cold weather months is, however, necessary to ensure that phosphorus discharged during the cold weather months does not result in the accumulation of phosphorus in the sediments, and subsequent release during the warm weather growing season. To confirm that EPA's assumption of the anticipated behavior of dissolved and particulate phosphorus is correct, a monitoring requirement for orthophosphorus has been included for this winter period (November 1 - March 31) in order to determine the dissolved particulate fraction of phosphorus in this discharge. If future evaluations indicate that phosphorus may be accumulating in downstream sediments, the winter period phosphorus limit may be reduced in future permitting actions.

iii. UBWPAD modeling effort

EPA also notes that the UBWPAD has funded the development of an HSPF model of the Blackstone River, conducted by CDM Smith and the University of Massachusetts. EPA has

[3] Baseflow is calculated by subtracting upstream POTW flows from the total 7Q10 at Uxbridge (82.7 cfs) that was derived from the Wasteload Allocation Model. See Attachment B.

reviewed the model (including underlying model input files provided by CDM to EPA) and results to determine whether they form a basis for a different permit limit for phosphorus for this facility. For the reasons below, EPA has concluded that they do not.

First, EPA notes that this modeling effort is funded by the UBWPAD and is specifically designed to address the impacts of UBWPAD permit limits and potential alternatives in dam management and nonpoint source reduction. It clearly does not attempt to assess impacts of changes in permit limits and discharges from any of the other Massachusetts facilities downstream on the Blackstone River, which are assumed to be at their 1997-2005[4] discharges for all the future scenarios analyzed. *Review of Scenario Results Utilizing the Blackstone River HSPF Model 2010 Calibration* at 9 (April 2011). This is unfortunate, as substantial reductions in phosphorus concentrations were achieved by these facilities between 2000 and 2007, and since that time, in connection with permit limits implemented during this period.

As CDM Smith noted in a letter to EPA dated August 9, 2012, the modeled annual average discharge from the smaller MA plants was 25,986 lbs/yr[5], 33% more than the reported discharges in 2007 (19,538 lbs/yr) and 75% more than the 2010-11 discharges (14,944 lbs/yr). The difference would be even larger for the critical summer months when more stringent permit limits are in effect, and new limits on Uxbridge and Grafton are expected to reduce current loads by more than half. In scale the load reduction being implemented from the smaller MA facilities, which discharge directly upstream of the most impacted reaches in the modeling results, is comparable to the 20% NPS reduction scenario in the model (87,400 to 69,900 lbs/yr). *Blackstone River HSPF Model 2009 Scenario Report*, Tables 15 and 16 (2010).[6] The HSPF modeling effort appears to contain an implicit assumption that reductions in discharges from the other WWTPs on the Blackstone River are irrelevant, a position with which EPA disagrees. This makes the modeling results unsuitable for setting permit limits on these facilities.

The decision to focus on 2002 for presentation of results of all scenarios, based on the hydrological conditions during that year that approached 7Q10, exacerbates this issue. Not only are the 2002 phosphorus concentrations for Northbridge, Grafton and Uxbridge far above the current levels, but the Millbury WWTP was still operating in 2002. The scenario plots show a clear spike in phosphorus concentrations at the location of the (now discontinued) Millbury outfall, as well as noticeable spikes at the locations of Grafton and Northbridge (less so Uxbridge) that represent far greater phosphorus discharges than current loads, let alone the reductions that would be seen under new permit limits for Grafton and Uxbridge. These plots therefore do not plausibly reflect what actual conditions would be under the future scenarios.

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[4] While the model extends through 2007, the modeling team used year 2003 and 2000 data in lieu of actual discharges in 2006 and 2007. *Blackstone River HSPF Water Quality Model Calibration Report* at 4-4 (August 2008). This does not appear to have been updated in later refinements of the model, based on EPA's review of the model input files provided in connection with the UBWPAD permit modification request.

[5] This is a correction of the mass balance figures contained in the *Blackstone River HSPF Model 2009 Scenario Report*, Table 15 (2010) which stated that loads from the "other PS" in Massachusetts totaled 98,000 lbs/yr.

[6] As CDM Smith did not correct these figures in its letter of August 9, 2012, EPA assumes that the reported values are correct. We note that while CDM suggests that any review of the model be based on information provided with their modification request, and not the "older, more dated 2009 Scenario report", the updated modeling reports do not contain updated mass balance tables or any other data tables showing input loads.

Moreover, there are additional questions concerning the model itself, particularly the fact that the model does not incorporate periphyton; the consistent overprediction of chlorophyll-a concentrations by the model; and the large errors and paucity of validation data in the Rhode Island reaches. As the Technical Advisory Committee assembled to review the modeling effort stated, "the current HSPF model may be used with caution (because it gives a conservative prediction [too-high] of chlorophyll-a and ammonia concentrations) for evaluating relative in-stream benefits likely to be realized from alternative nutrient reduction scenarios for the UBWPAD discharge and other point and non-point source inputs to the river. However, we believe that improvements will need to be made in the model's ability to predict algal growth dynamics and nitrogen nutrient levels during the growing season, before it is appropriate for use in more detailed applications, such as for development of a nutrient Total Maximum Daily Load (TMDL)." *Technical Advisory Committee (TAC) Review Report on The Blackstone River HSPF Water Quality Model* at 2 (April 29, 2011).

In light of the above, EPA does not believe it is appropriate to use this model in the setting of permits limits for this facility. However, EPA notes that the modeling results on a general level support EPA's position that a high level control on all sources, not just the UBWPAD, is necessary to control eutrophication in the Blackstone River. That is the basis for EPA's implementation of phosphorus limits in this permit and those of the other downstream WWTPs. In addition, EPA is addressing nonpoint source and stormwater reduction efforts through grant funding, stormwater permitting for construction, industrial and municipal separate storm sewer system (MS4) sources, and other programs. EPA believes this multi-pronged approach is consistent with all available data regarding the necessary steps to achieve water quality standards in the Blackstone River.

In summary, the draft permit total phosphorus limit for the period of April 1 to October 31 is 0.2 mg/l and for the period of November 1 to March 31 is 1.0 mg/l. The monitoring frequency for the summer is 2/week, and the winter monitoring frequency is 2/month.

b. Nitrogen

The draft permit contains an effluent limitation of 8 mg/l total nitrogen in the summer months, in order to ensure that this discharge does not contribute to eutrophication in the Seekonk and Providence River estuaries. This requirement is imposed in order to meet the water quality standards of Rhode Island, an affected downstream state under 40 CFR § 122.44(d)(vii)(b)(4).

Rhode Island like Massachusetts, does not provide numeric criteria for nutrients. The relevant narrative criterion for nutrients provides:

> Nutrients: None in such concentration that would impair any usages specifically assigned to said Class, or cause undesirable or nuisance aquatic species associated with cultural eutrophication. 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.

RI WQR, Rule 8.D(3)(10)(Table 2); *see also* Rule 8.D(1)(d). The regulations also include requirements for minimum instantaneous DO levels and cumulative DO exposure, Rule 8.D(3) Table 3, and other applicable criteria including:

> 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).

i. Evidence of eutrophication and link to nitrogen discharges

Narragansett Bay, and particularly the Seekonk and Providence River estuaries which form its upper reaches, has suffered severe cultural eutrophication for many years. This cultural eutrophication results in periodic phytoplankton blooms, low DO levels and associated fish kills. Numerous studies have documented hypoxic conditions in the upper bay and Seekonk and Providence Rivers, with the worst conditions found at the upper boundary of the Seekonk River where the Blackstone River discharges. RIDEM, *Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers* (2004); Deacutis, et al., "Hypoxia in the Upper Half of Narragansett Bay, RI, During August 2001 and 2002," *Northeastern Naturalist*, 13 (Special Issue 4):173-198 (2006); Bergondo, et al., "Time-series observations during the low sub-surface oxygen events in Narragansett Bay during summer 2001," *Marine Chemistry*, 97, 90-103 (2005). In addition, important habitat has been destroyed: 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* (2004); RIDEM, *Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers* (2004); RIDEM, *Plan for Managing Nutrient Loadings to Rhode Island Waters* (2005).

It is clear that eutrophication in the Seekonk and Providence Rivers and Narragansett Bay has reached levels where it is adversely affecting the composition of fish and wildlife; adversely affecting the physical, chemical, and biological integrity of the habitat; interfering with the propagation of fish and wildlife; adversely altering the activities of fish and wildlife; and causing DO to drop well below allowable levels. 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 demonstrated by water quality data and by various studies and reports. The RIDEM report, titled *Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers* (December 2004), summarizes and references many of the studies and reports. RIDEM'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 RIDEM's Water Resources unit 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. EPA's guidance document *Nutrient Criteria Technical Guidance Manual, Estuarine and Coastal Marine Waters* (2001) cites the MERL experiments as compelling evidence that nitrogen criteria are necessary to control enrichment of estuaries.

The predominant sources of nitrogen loading in the Providence and Seekonk Rivers are municipal wastewater treatment facilities in Rhode Island and in Massachusetts. In 2006, the State of Rhode Island reissued several Rhode Island Pollutant Discharge Elimination System (RIPDES) permits for POTWs which discharge to the Providence and Seekonk Rivers and Narragansett Bay. These permits include limitations on the discharge of total nitrogen for a number of facilities, in order to address the cultural eutrophication in these waters and Narragansett Bay, consistent with the targets identified in the 2004 RIDEM Report. RIDEM, *Response to Public Comments Received on Proposed Permit Modification for the Fields Point, Bucklin Point, Woonsocket and East Providence WWTFs* (2006) In addition smaller Rhode Island facilities, not identified in the 2004 RIDEM Report, have had nitrogen optimization and other requirements placed in their permits as they have been (re)issued. *See* RIPDES Permit No. RI0100455, Burrillville WTP (2006).

The 2004 RIDEM Report also concluded that substantial reductions in loadings from the three largest Massachusetts POTWs on the Blackstone and Ten Mile Rivers would be necessary to achieve water quality standards in the Seekonk River and Upper Narragansett Bay. After reviewing the RIDEM studies and other relevant material and performing its own analysis, EPA agreed that nitrogen discharges from the Upper Blackstone Water Pollution Abatement District (UBWPAD) facility (on the Blackstone River) and the Attleboro and North Attleboro WWTFs (on the Ten Mile River) are contributing to impairments in Rhode Island. EPA therefore imposed effluent limits on those facilities that are designed to ensure attainment of water quality standards and are consistent with the 2004 RIDEM Report and Rhode Island's regulation of its in-state facilities. RIDEM updated this analysis to include other Massachusetts POTWs on these rivers, including the Uxbridge WWTF, in 2005 (see section 3(b)(ii)(a)(1) below); limits for these facilities are being analyzed as their permits are reissued. Requirements on these facilities will be implemented in order to achieve equitable regulation of WWTF discharges across the region, to reduce nutrient impacts and achieve acceptable levels of dissolved oxygen.

Monitoring reports submitted by the Uxbridge WWTF confirm that the facility discharges nitrogen to the Blackstone River, which flows into the Seekonk River where the greatest impairments in the Narragansett Bay Basin have been measured. Therefore EPA must determine whether the Uxbridge discharge "will cause, have reasonable potential to cause, or contribute to" a violation of water quality standards. 40 CFR §122.44(d)(1)(i). In doing so, EPA considers "existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, . . . and where appropriate, the dilution of the effluent in the receiving water." 40 CFR §122.44(d)(1)(ii).

Under the current permit the Uxbridge WWTF reports its discharges of ammonia and of "NO2 + NO3". Together these represent the dissolved inorganic nitrogen ("DIN") component of the facilities nitrogen discharges. While effluent limits are generally set in terms of total nitrogen, DIN was in fact the parameter used for analysis of the impact of nitrogen loadings in the RIDEM studies, and can be used to assess the facility's contribution to effects in the Seekonk River. The average DIN concentration in the Uxbridge discharge from 2005 through 2010, based on the DMRs, was 11.1 mg/l, giving a total load at design flow of 105 kg/day (231 lbs/day).

The Uxbridge discharge is located approximately 21 miles upstream of the impaired reaches in the Seekonk River, so EPA considered whether its nitrogen loading is significantly reduced by in-stream attenuation. There is conflicting evidence concerning the extent of attenuation, if any, within the Blackstone River, with estimates ranging from zero to 23%. *See* Nixon, et al., "Investigation of the Possible Attenuation of Dissolved Inorganic Nitrogen and Phosphorus in the Lower Blackstone River," *Anthropogenic Nutrient Inputs to Narragansett Bay – A Twenty-Five Year Perspective*, Appendix B (2005)); RIDEM, *Nutrient Permit Modifications – Response to Comments* (2005). For this analysis, EPA is applying the 13% attenuation rate used for UBWPAD discharges in the RIDEM 2004 Report based on 1995-96 monitoring data, adjusted proportional to the relative distance along the Blackstone River. This results in an attenuation rate of 6% for the Uxbridge discharge. Based on the studies and analyses previously referenced, EPA believes that this rate is a reasonable estimate. At this attenuation rate, the effective loading from the Uxbridge discharge to the Seekonk River is 99 kg/day (218 lbs/day).

To determine the impact of this loading on the Seekonk River, EPA considers the areally distributed load (load divided by area) in order to allow comparison to the results of the MERL experiment applied in the RIDEM 2004 Report. The MERL enrichment gradient experiment included a study of the impact of different loadings of nutrients on dissolved oxygen and chlorophyll a. *See* Oviatt, et al., "Patterns of Productivity During Eutrophication: A Mesocosm Experiment", *Marine Ecology* (1986); 2004 RIDEM Load Reduction Evaluation. The MERL enrichment gradient experiments consisted of 9 tanks (mesocosms). Three tanks were used as controls, and were designed to have regimes of temperature, mixing, turnover, and light similar to a relatively clean Northeast estuary with no major sewage inputs. The remaining six mesocosms had the same regimes, but were fed reagent grade inorganic nutrients (nitrogen, phosphorus and silica) in ratios found in POTW effluent discharged to the Providence River. The six mesocosms were fed nutrients in multiples of the estimated average sewage inorganic effluent nutrient loading to Narragansett Bay. For example the 1X mesocosm nitrogen loading was 40.3 mg/m^2/day, representing the average nutrient loading in the Narragansett Bay as a whole. The 2X was twice that (80.6 mg/m^2/day) and so on (4X, 8X, 16X) up to a maximum load of 32X. During the study, dissolved oxygen, chlorophyll, and dissolved inorganic nutrients were measured in the water column and benthic respiration was also measured. Id. From the collected data the investigators produced times series for oxygen, pH, temperature, nutrients, chlorophyll and system metabolism. Id. The study documented precipitous drops in dissolved oxygen levels with loadings above the 4X gradient, along with increasing and highly variable chlorophyll levels indicative of eutrophic conditions.

The areally distributed loading to the Seekonk River from the Uxbridge discharge alone is 35.2 $mg/m^2/day$. This compares to a "1X" loading in the MERL experiments of 40.3 $mg/m^2/day$, and indicates that even as one of the smaller wastewater plants discharging to this reach, the Uxbridge WWTF alone has the potential to contribute nitrogen levels to the Seekonk nearly matching the background areally distributed load to the bay as a whole. The Seekonk River is already the most enriched portion of the Narragansett Bay under natural conditions, with estimated natural background nitrogen inputs at the 4X level. RIDEM 2004. This makes this area especially vulnerable to overenrichment from wastewater treatment plant sources, and indeed the addition of the Uxbridge to background sources alone would be expected to reduce minimum DO levels from 3.0 mg/l to 2.75 mg/l under MERL experiment conditions. *See* RIDEM 2005 (Figure 4). Of course, the Seekonk River is far from background levels, with loadings as of 2005 estimated at the 24X level, indicating extreme over-enrichment. Effluent limits that have been placed on other wastewater treatments plants in Rhode Island and Massachusetts are expected to achieve an areal load equivalent to the 6.5X condition at current flows, and 10X at 90% design flows. However, this goal will not be reached if the Uxbridge discharge is not controlled.

Based on the available evidence, the Uxbridge discharge "will cause, have reasonable potential to cause, or contribute to" a violation of water quality standards in the Seekonk River and an effluent limit must be set.

ii. Nitrogen Effluent Limit

Having found that the discharge has a reasonable potential to cause an excursion over Rhode Island's narrative standard for the nutrient nitrogen, EPA is required to set an effluent limit for this pollutant. 40 CFR § 122.44(d)(vi). In setting a limit, EPA must ensure that:

> (A) The level of water quality to be achieved by limits on point sources established under this paragraph is derived from, and complies with all applicable water quality standards; and
>
> (B) Effluent limits developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, are consistent with the assumptions and requirements of any available wasteload allocation for the discharge prepared by the State and approved by EPA pursuant to 40 CFR 130.7.

40 CFR § 122.44d(vii).

While Rhode Island DEM has not developed a TMDL or other wasteload allocation that has been approved pursuant to 40 CFR 130.7, RIDEM has performed a load allocation analysis that incorporates the Grafton and Uxbridge discharges and has proposed an effluent limit (8 mg/l) based on that analysis. While EPA is not bound by this analysis, EPA has reviewed the technical basis and allocation method applied in the RIDEM analysis and has determined that it generally represents a sound and technically valid approach. EPA has therefore agreed to process Massachusetts permits in a manner consistent with the RIDEM analysis. *See* EPA and RIDEM, *Performance Partnership Agreement Between the Rhode Island Department of Environmental Management and US Environmental Protection Agency Region 1* (2006), Appendix B. In doing so, however, EPA has an independent obligation both to ensure that the load allocation analysis remains valid, particularly in light of changes in circumstances since the initial analysis was developed five years ago, and to ensure that the level of water quality that will be achieved complies with the applicable water quality standards. We consider these questions in turn below.

a. RIDEM load allocation analysis and EPA Update

(1) RIDEM analysis

RIDEM's approach to allocating nitrogen loads has been to require higher removal rates from larger facilities than from smaller facilities (e.g. 5 mg/l for NBC Bucklin Point and UBWPAD; 8 mg/l for Attleboro and North Attleboro). RIDEM, *Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers* (2004) ("2004 RIDEM Report"). This is an accepted approach under EPA guidance for wasteload allocations. *See* EPA, *Technical Support Document for Water Quality-based Toxics Control*, EPA/505/2-90-001, at 69. In RIDEM's initial analysis of nitrogen loads, facilities as small as Grafton and Uxbridge were not considered in the analysis, with North Attleboro (at 4.6 MGD) the smallest facility included. *See* 2004 RIDEM Report. Subsequently, in 2005, RIDEM updated its analysis to incorporate three additional facilities on the Blackstone River – the Uxbridge, Grafton and Millbury WWTFs – based on a calibrated/validated Qual2e model. This analysis is summarized in the 2005 *Response to Comments Received on Proposed Permit Modifications for the Fields Point, Bucklin Point, Woonsocket and East Providence WWTFs*, Appendix A ("2005 RIDEM RTC"). *See* Michaelis, B., *Dissolved Oxygen Dynamics in a Shallow Stream System,* Dissertation in Civil and Environmental Engineering at the University of Rhode Island (URI 2005). That analysis indicated that under design flows and 2005 permit limits for ammonia and phosphorus, the load at the MA/RI state line from the MA POTWs discharging to the Blackstone was expected to be 4,319 lbs/day. Figure 3. Uxbridge contributes 295 lbs/day (7% of the total) of this load.

The 2005 RIDEM RTC does not specifically set forth the loading target in the Seekonk River to be achieved at the proposed permit limits, but this can be calculated from the proposed effluent limits and design flows as shown in Table 3 below, giving a target load allocation to Massachusetts facilities of 1488 lbs/day DIN at the MA/RI state line. This represents a 65% reduction in loads at design flow from the Massachusetts facilities on the Blackstone River (e.g. 4319 to 1488 lbs/day), consistent with the RIDEM assertion in the 2005 RIDEM RTC that the proposed limits will reduce the total loading to the Seekonk River by 62%.

Figure 3: Table from Rhode Island load analysis

Table 3. Percent delivery and percent contribution of MA WWTF to the MA/RI state line under DWS3 at design flows and currently required permit limits for ammonia and phosphorus.

			At MA/RI state line	
Point Source	Initial Load at end of pipe (lb/day)	Final Load at MA/RI state line (lb/day)	Delivery (%)	Contribution (%)
UBWPAD	3780	3493	92	79
Millbury WWTF	336	312	93	7
Grafton WWTF	239	219	92	5
Uxbridge WWTF	300	295	98	7
Total WWTF	4655	4319	93	98

* Note "DWS3" indicates the model run under flow conditions from August 2005 ("dry weather survey 3").

Table 3. Load Allocation at State Line per RIDEM Analysis

						At MA/RI State Line	
Point Source	Design flow (MGD)	90% of Design Flow (MGD)[1]	Proposed total N permit limit (mg/l)	DIN component of permit limit (mg/l)[2]	DIN load discharged at limit (lb/day)	DIN load at MA/RI state line	Delivery Factor (%)[3]
UBWPAD	56	50.4	5	3	1261	1165	92%
Millbury WWTF	2.7	2.43	8	6	122	113	93%
Grafton WWTF	2.4	2.16	8	6	108	99	92%
Uxbridge WWTF	2.5	2.25	8	6	113	111	98%
Total WWTF					1603	1488	93%

[1] Loads are calculated using 90% of design flow consistent with RIDEM's methodology in the 2004 RIDEM Report

[2] Non-DIN component of total N assumed to be 2 mg/l per the 2004 RIDEM Report.

[3] Delivery factors from the 2005 RIDEM RTC; for discussion of delivery factors see Attachment C.

(2) EPA Update of RI analysis

In applying this load allocation analysis to the reissuance of permits to the Grafton and Uxbridge WWTFs, EPA notes that (1) several other facilities on the Blackstone River and its tributaries were not explicitly considered by RIDEM in its analysis; and (2) the Millbury WWTF is no longer discharging, having tied into UBWPAD. Table 4 shows the current MA dischargers to the Blackstone River system and their seasonal loads based on monitoring data from 2007-09.

Table 4. Current DIN Loadings to Blackstone River from WWTFs

POTW	May-Oct, 2007 to 2009 DMR data Flow (MGD)	DIN (mg/l)	DIN load discharged (lb/day)
UBWPAD	33.5	7.35	1995
Douglas	0.3	5.5	15
Grafton	1.8	10.5	186
Hopedale[1]	0.4	10.7	32
Northbridge	0.9	11.3	75
Upton	0.19	14.9	24
Uxbridge	0.8	10.9	67
		TOTAL:	2,394

[1] The Hopedale facility monitors total N only; DIN calculated by subtracting 2 mg/l from total N per 2004 RIDEM Report.

The omission of Douglas, Hopedale, Northbridge and Upton from RIDEM's analysis was presumably based RIDEM's conclusion that these contributions are *de minimis*, based on the size of the discharger and/or location of the discharger on a tributary to the Blackstone River. While EPA agrees with this determination with respect to Douglas, Hopedale and Upton, we note that it does not appear that the Northbridge WWTF contribution is negligible. Northbridge's current flow, effluent DIN concentration and DIN loads are higher than those of Uxbridge, and while Northbridge discharges to a tributary it is less than 200 yards from the mainstem Blackstone River, unlikely to substantially reduce the delivery of nitrogen to the Blackstone River. For these reasons EPA is including Northbridge in its updated load allocation analysis. The revised load analysis, excluding Millbury WWTF but including Northbridge, is set forth in Table 5.

Table 5. Updated Load Analysis at State Line Using RIDEM Methodology

						At MA/RI State Line	
Point Source	Design flow (MGD)	90% of Design Flow (MGD)[1]	Proposed total N permit limit (mg/l)	DIN component of permit limit (mg/l)[2]	Initial DIN load (lb/day)	Final DIN load at MA/RI state line	Delivery (%)[3]
UBWPAD	56	50.4	5	3	1261	1165	92%
Grafton WWTF	2.4	2.16	8	6	108	99	92%
Uxbridge WWTF	2.5	2.25	8	6	113	111	98%
Alternatives for Northbridge discharge:							
1. Northbridge at current concentration				Current DIN from DMR			
Northbridge	2	1.8	--	11.3	170	155	92%
Total WWTF						1530	
2. Northbridge with permit limit of 8 mg/l			N limit	DIN component			
Northbridge	2	1.8	8	6	90	83	92%
Total WWTF						1458	

[1] Loads are calculated using 90% of design flow consistent with RIDEM's methodology in the *2004 RIDEM Report*

[2] Non-DIN component of total N assumed to be 2 mg/l per the *2004 RIDEM Report*.

[3]Delivery factors from the 2005 RIDEM RTC; for further discussion of delivery factors see Attach. C

As shown in Table 5, the load allocation target is not met if Northbridge discharges at design flow at its current DIN levels, but would be met if Northbridge had an effluent limit similar to that proposed for Grafton and Uxbridge. EPA will consider whether to impose a limit on Northbridge, including conducting further analysis of the appropriate delivery factor, upon reissuance of the Northbridge WWTF permit.

For the purposes of the Grafton and Uxbridge permits, the analysis shows that the RIDEM load allocation can be met and that effluent limits on these discharges consistent with the RIDEM proposal are necessary in order to meet that load allocation. While the Millbury discharge has been tied into UBWPAD and therefore is accounted for in the UBWPAD load allocation, the need to account for the Northbridge discharge eliminates any load reduction that might be achieved eliminating an allocation for Millbury. Therefore it is EPA's intent that the permit limits in the Grafton and Uxbridge reissued permits will be consistent with the load allocation analysis above.

b. Water Quality Analysis

EPA is also obligated to ensure that the proposed effluent limits will achieve a level of water quality that complies with the applicable water quality standards. Since the load allocation analysis discussed above is not from an approved TMDL or waste load allocation, EPA as the permitting authority must independently demonstrate that this standard is met. In doing so, EPA draws from the analysis set forth in connection with the issuance of the UBWPAD permit. *See* EPA, *Fact Sheet, Upper Blackstone Water Pollution Abatement District*, NPDES No. MA0102369 (2006); EPA, *Response to Comments, Upper Blackstone Water Pollution Abatement District*, NPDES No. MA010 (2008); *In re Upper Blackstone Water Pollution Abatement District*, 14 E.A.D. __ (2010).

(1) Loading rate to meet water quality standards

In the UBWPAD permit issuance, EPA concluded that an overall loading rate from all facilities (MA and RI) equivalent to the "6.5X" MERL experiment gradient under current flows, or 1,624 lbs/day[7] was appropriate to ensure that water quality standards in the Seekonk River were met. This conclusion was based on guidance documents, studies of the Seekonk and Providence Rivers and Narragansett Bay, and on an analysis of the application of the MERL experiment results to the Seekonk River. *See* EPA, *Response to Comments, UBWPAD*, at 28-29 and documents cited. It should be noted that the effluent limit established to meet that water quality target was challenged by both the UBWPAD (as too stringent) and by the Conservation Law Foundation (as too lenient) and was upheld on appeal by the Environmental Appeals Board. 14 E.A.D __ (slip op. at 23).

EPA's application of the MERL experiments to determine an acceptable loading for the Seekonk River is based on its conclusion that those experiments provide a suitable analog to the actual river system. As EPA noted in the UBWPAD Response to Comments:

[7] Calculated from the 1X MERL load of 4.032 x 10^{-5} kg/m^2/day, times the area of the Seekonk River (2.81* 10^6 m^2), times the conversion factor (2.2046 lbs/kg), times 6.5. See 2004 RIDEM Report.

> The basic relationship demonstrated by the MERL tank experiments between the primary causal and response variables relative to eutrophication corresponds to what is actually occurring in the Providence/Seekonk River system. Both the MERL tank experiments and the data from the Providence/Seekonk River system indicate a clear correlation between nitrogen loadings, dissolved oxygen impairment and chlorophyll *a* levels.

Response to Comments, UBWPAD at 29; *see also id*. at 47-49.

EPA has also noted that the MERL experiments do not perfectly replicate the physical system, and accounted for that fact in applying the MERL loading analysis to determine a water quality target. This also was discussed in connection with the UBWPAD permit:

> EPA recognized, however, 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/Seekonk River system, and thus does not yield a precise level of nitrogen control required to restore uses in the system. For example, dissolved oxygen in Narragansett Bay is influenced by stratification, which was not simulated in the MERL tank experiment, in which waters were routinely mixed. In a stratified system there is little vertical mixing of water, so sediment oxygen deficits are exacerbated, due to the lack of mixing with higher DO waters above. In addition, the flushing rate used in the MERL tanks is not the same as seen in the Bay. Because the physical model does not generate a definitive level of nitrogen control that can be applied to a real world discharge, but instead a range of loading scenarios which are subject to some scientific uncertainty, EPA was required to exercise its technical expertise and scientific judgment based on the available evidence when translating these laboratory results and establishing the permit limit.

Response to Comments, UBWPAD at 49. Thus, while RIDEM has suggested that the MERL experiments might indicate a 4X condition as a goal for the Seekonk River, 2004 RIDEM Report at 25, EPA concluded that the differences between the MERL experiments and the actual physical system, particularly the difference in flushing rates, indicated that the 6.5X target was appropriate.

EPA continues to believe that the water quality target established in the UBWPAD permit development represents an appropriate level of water quality to ensure that standards are met in the Seekonk and Providence River, based on the best available current information. Therefore, EPA applies the 6.5X load target to determine whether the load allocation will comply with water quality standards.

(2) Effluent limits required to meet water quality standards

To determine whether the proposed effluent limits will meet the 6.5X target under current flows, EPA calculates the total load to the Seekonk River assuming that effluent concentrations are at the permit limits and flows are equal to the 2007 to 2009 May to October flows from the facilities' DMR submissions. Current flows are used in this analysis consistent with the analysis of the UBWPAD permit limit that has been upheld on appeal. *See In re Upper Blackstone Water*

Pollution Abatement District, 14 E.A.D. __(2010). A delivery factor is applied to account for attenuation in the Blackstone River (and the Ten Mile River for Attleboro and North Attleboro) before discharge to the Seekonk River; the derivation of these delivery factors is discussed in Attachment C. The contribution of each facility and the total load to the Blackstone River is shown in Table 6. Consistent with Table 5 showing the RIDEM load analysis update, totals are shown both with and without limits on Northbridge since Northbridge was originally omitted from the RIDEM analysis.

Table 6. Effluent limits to meet water quality standard

Source	Current Flow (MGD)	Limit (mg/l)	DIN component (mg/l)	DIN (lbs/day)	Delivery factor[1]	DIN load to Seekonk River (lbs/day)
UBWPAD	33.5	5	3	838	87%	729
Woonsocket	6.3	3	1	53	96%	50
Bucklin	17.9	5	3	448	100%	448
Attleboro	3.8	8	6	190	61%	116
North Attleboro	3.42	8	6	171	61%	104
Grafton WWTF	1.74	8	6	87	90%	78
Uxbridge WWTF	0.8	8	6	40	94%	38
Alternatives for Northbridge Discharge						
1. Northbridge at current concentration			Current DIN from DMR			
Northbridge	0.88	---	11.3	83	91%	75
			Total DIN load at mouth of Blackstone:			**1639**
2. Northbridge with permit limit of 8 mg/l			DIN component of limit			
Northbridge	0.88	8	6	44	91%	40
			Total DIN load at mouth of Blackstone:			**1604**

[1] For Blackstone River delivery factors, see Appendix A; Attleboro and North Attleboro delivery factors from 2004 RIDEM Report

Given the water quality target loading of 1,624 pounds per day, this analysis indicates that effluent limits on Uxbridge, Grafton and Northbridge are necessary to meet the water quality target at current flows.

c. Nitrogen Effluent Limit

As demonstrated above, an effluent limit of 8 mg/l on the Grafton and Uxbridge discharges satisfies both the RIDEM load allocation and the water quality target identified by EPA in the UBWPAD permit proceedings. Therefore, the draft permit includes a limit of 8 mg/l total nitrogen for the period May to October. The draft permit for Grafton WWTF, which is being issued concurrently with this draft permit, also establishes total nitrogen limit of 8 mg/l.

4. Total Residual Chlorine

Chlorine and chlorine compounds produced by the chlorination of wastewater can be extremely toxic to aquatic life. Effluent limits are based on water quality criteria for total residual chlorine (TRC) which are specified in EPA water quality criteria established pursuant to Section 304(a) of the Clean Water Act. The most recent EPA recommended criteria are found in National Recommended Water Quality Criteria: 2002 (EPA-822-R-02-047). The fresh water aquatic life criteria for TRC are 11 ug/l for protection from chronic toxicity and 19 ug/l for protection from acute toxicity.

The 1999 Fact Sheet, issued in connection with the existing permit, lists the 7Q10 flow of the Blackstone River at the Uxbridge WWTF as 53.3 MGD, or 82.7 cfs. This figure was based on the Waste Load Allocation model, as shown in the Response to Comments issued in connection with the current permit. See Attachment B. EPA will continue to use a 7Q10 Flow of 53.3 MGD to calculate the dilution factor for this facility. The dilution factor is calculated as follows:

$$\frac{\text{plant design flow + 7Q10 river flow}}{\text{plant design flow}} = \frac{\text{2.5 MGD + 53.3 MGD}}{\text{2.5 MGD}} = 22$$

The 7Q10 dilution multiplied by the chronic and acute criteria provides the appropriate TRC limits. Thus:

11 ug/l(chronic criterion) * 22 (dilution factor) = 242 ug/l or **0.24 mg/**l (avg mnthly limit)
19 ug/l (acute criterion) * 22 (dilution factor) = 418 ug/l or **0.42 mg/l** (max daily limit)

These are the same as the effluent limits contained in the current permit.

EPA and MassDEP recognize that there are limitations in using grab sampling for determining compliance with the chlorine limit. There are 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. Therefore, an alarm requirement has been established in this draft permit to assure that a proper range of chlorination is maintained at all times. See footnote 7 on Page 4 of the draft permit.

5. Whole Effluent Toxicity

National studies conducted by EPA have demonstrated that domestic sources contribute toxic constituents to POTWs. These constituents include metals, chlorinated solvents and aromatic hydrocarbons among others. The Region's current policy is to include toxicity testing requirements in all municipal permits, while Section 101(a)(3) of the CWA specifically prohibits the discharge of toxic pollutants in toxic amounts.

Based on the potential for toxicity resulting from domestic and industrial contributions, the low level of dilution at the discharge location, water quality standards, and in accordance with EPA regulation and policy, the draft permit includes acute toxicity limitations and monitoring requirements. (*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, *Technical Support Document for Water Quality-Based Toxics Control*). EPA Region I has developed a toxicity control policy. The policy requires wastewater treatment facilities to perform toxicity bioassays on their effluents. The MassDEP requires bioassay toxicity testing for state certification.

Pursuant to EPA Region 1 policy, discharges having a dilution ratio of between 20:1 and 100:1 are required to perform acute toxicity testing. The principal advantages of biological techniques are: (1) the effects of complex discharges of many known and unknown constituents can be measured only by biological analyses; (2) bioavailability of pollutants after discharge is best measured by toxicity testing including any synergistic effects of pollutants; and (3) pollutants for which there are inadequate chemical analytical methods or criteria can be addressed. Therefore, toxicity testing is being used in conjunction with pollutant specific control procedures to control the discharge of toxic pollutants.

Semiannual whole effluent toxicity (WET) testing has been conducted during the past five years. Results during the monitoring period have consistently shown an LC50 of 100%. The requirement to test the vertebrate species, *Pimephales promelas* was removed with the permit modification of May 18, 1993. The testing frequency was reduced with this modification from four to two tests per year due to past results which met the permit limits. The draft permit requires that the Town continue to conduct WET testing for Outfall 001 effluent two times per year and that each test include the use of the daphnid, *Ceriodaphnia dubia*, in accordance with EPA Region I protocol found in **Attachment A**.

By letter of October 18, 1990, the EPA granted the Town of Uxbridge the authorization to use an alternate dilution water to the Blackstone River water for its WET testing. The Blackstone River water was found to be unreliable for use as a dilution water for WET testing. In recent WET testing where receiving water controls were carried out, the receiving water has met test acceptability criteria for use as a dilution water. Therefore the draft permit requires the use of the receiving water for dilution. Procedures for substituting an alternate dilution water are available should toxicity issue arise again, as discussed in Footnote 11 on Page 5 of the permit. If alternate dilution water tests are conducted, the permittee must use a minimum of two controls, one of which must be Blackstone River water. Chemical analyses must be provided for the Blackstone River water as well as the effluent.

6. Other Toxic Pollutants

The draft permit includes a new monthly average effluent limit for aluminum.

The segment of the Blackstone River to which the Uxbridge WWTF discharges is listed on the Massachusetts 303(d) list for an impairment caused by “metals.” Examination of effluent analysis conducted in connection with WET testing in the past five years indicates that the Uxbridge WWTP discharges have included detectable levels of the metals aluminum, copper, lead and zinc. EPA therefore analyzed the available data on effluent and receiving water concentrations to determine whether these pollutants “are or may be discharged at a level that causes, has reasonable potential to cause, or contributes to an excursion above” the water quality standard. 40 CFR 122.44(d)(1)(i). Since there have been no discharges of cadmium above the detection limit, and the single lead result above the detection limit was below the water quality criteria, there is no reasonable potential for the Uxbridge effluent to contribute to excursion above the water quality criteria for cadmium and lead.

Table 5 shows the concentrations of metals in the Uxbridge effluent from April 2005 through April 2011, along with receiving water analyses beginning November 2009. Prior to 2010, Uxbridge's analyses were performed using insufficiently sensitive methods for metals, especially a concern with respect to cadmium and lead. Upon notice from EPA, Uxbridge corrected the issue with their contract laboratory. EPA has concluded that the data provided is sufficient for its analysis of effluent limits for this permit reissuance.

Table 7. Whole Effluent Testing Analytical Data and Water Quality Criteria

	Effluent Analytical Data[1]					Receiving Water Analytical Data[1]				
	Al	Cd	Cu	Pb	Zn	Al	Cd	Cu	Pb	Zn
	ug/l	ug/l$_{total\ recoverable}$[2]				ug/l	ug/l$_{total\ recoverable}$[2]			
4/26/2005	240	ND-5	13	ND-10	50					
11/15/2005	120	ND-5	20	ND-10	ND-50					
5/9/2006	198	ND-5	17	ND-10	74					
11/14/2006	210	ND-5	16	ND-10	ND-50					
5/15/2007	ND-100	ND-5	ND-10	ND-10	ND-50					
12/12/2007	120	ND-5	ND-10	ND-10	ND-50					
12/16/2008	270	ND-5	10.2	ND-10	ND-50					
1/23/2009	ND-100	ND-5	ND-10	ND-10	ND-50					
5/5/2009	120	ND-5	10	ND-10	ND-50					
11/3/2009	170	ND-5	12	ND-10	ND-50	120	ND-0.5	ND-10	ND-10	ND-50
5/11/2010	73	ND-0.2	10.9	ND-0.5	37.9	172	0.6	18.4	5.9	2.8
11/16/2010[2]	98	ND-0.5	10.6	ND-0.5	40	124	ND-0.5	8	2.2	19.7
4/26/2011	50	ND-0.2	6.4	ND-0.5	35	114	0.3	1.7	2.5	32
10/25/2011	76	ND-0.5	10.6	0.3	37.8	122	0.3	9.8	2.8	25.7
5/1/2012	32	ND-0.2	5	ND-1.0	37	324	0.6	13	6	24
Median	120	ND	10.6	ND	50	123	0.50	9.9	4.4	24.9
Max	270	ND	20	ND	74					

	Water Quality Criteria				
	ug/l	ug/l$_{dissolved}$[3]			
Chronic Criterion[4]	87	0.2	18.1	1.6	82.4
Acute Criterion[4]	750	1.3	27.2	41.0	83.0

[1] Non-detects noted as " ND - [minimum detection level]"

[2] Samples for effluent and receiving water were switched in initially submitted reports; these are corrected data

[2] Water quality criteria are expressed in terms of the dissolved fraction, while analytical results and permit effluent limits are expressed in terms of total recoverable metal; these are related by a conversion factor as set forth in EPA, National Recommended Water Quality Criteria 2002 ("NRWQC 2002")

[3] Criteria for Cd, Pb and Zn are hardness dependent and calculated using the formulas set forth in the NRWQC 2002 at a hardness of 66 (based on minimum hardness at low flow in Millville, MA from Louis Berger Report).

For aluminum, the effluent and receiving water monitoring data clearly indicate the need for an effluent limit. More than half of the effluent monitoring results indicate aluminum levels above the chronic water quality criterion of 87 ug/l. The receiving water is also above the chronic water quality criterion, as all of the receiving water samples were above 87 ug/l.

The receiving water does not provide dilution for discharges of aluminum, so the draft permit includes monthly average effluent limits set at the chronic criterion of 87 ug/l. The data does not indicate a reasonable potential to exceed the acute criterion for aluminum, so no maximum daily limit is set.

For copper and zinc, a more detailed analysis must be performed to determine the upper bound expected concentration and determine if the discharge has a reasonable potential to cause a violation. EPA bases its determination of "reasonable potential" on a characterization of the upper bound of expected effluent concentrations based on a statistical analysis of the available monitoring data. As noted in the *Technical Support Document for Water Quality Based Toxics Control* (EPA 1991) ("TSD"), "[a]ll monitoring data, including results for concentrations of individual chemicals, have some degree of uncertainty associated with them. The more limited the amount of test data available, the larger the uncertainty." Thus with a limited data set, the maximum concentration that has been found in the samples may not reflect the full range of effluent concentration. On the other hand, individual high data points may be outliers or otherwise not indicative of the normal range of effluent concentrations.

To account for this, EPA has developed a statistical approach to characterizing effluent variability in order to reduce uncertainty in the process. As "experience has shown that daily pollutant discharges are generally lognormally distributed," *TSD* at App. E, EPA uses a lognormal distribution to model the shape of the observed data, unless analysis indicated a different distributional model provides a better fit to the data. The model parameters (mean and variance) are derived from the monitoring data.

The lognormal distribution generally provides a good fit to environmental data because it is bounded on the lower end (i.e. you cannot have pollutant concentrations less than zero) and is positively skewed. It also has the practical benefit that if an original lognormal data set X is logarithmically transformed (i.e. Y = ln[X]) the resulting variable Y will be normally distributed. Then the upper percentile expected values of X can be calculated using the z-score of the standardized normal distribution (i.e. the normal distribution with mean = 0 and variance = 1), a common and relatively simple statistical calculation. The p^{th} percentile of X is estimated by

$$X_p = \exp(\mu_y + z_p\,\sigma_y),$$

where μ_y = mean of Y
σ_y = standard deviation of Y
Y = ln[X]

For the 95^{th} and 99^{th} percentiles, $z_{95} = 1.645$ and $z_{99} = 2.326$, so that

$$X_{95} = \mu_y + 1.645\,\sigma_y$$
$$X_{99} = \mu_y + 2.326\,\sigma_y$$

These upper percentile values are used to determine whether a discharge has a reasonable potential to cause or contribute to an exceedance of a water quality standard. For reasonable potential to exceed the acute criterion, which is based on acute effects with one hour of exposure to the pollutant, the 99th percentile is used to represent the maximum expected pollutant level. For the chronic criterion, representing a four day exposure, the 95th percentile value is used. The combination of these upper bound effluent concentrations with dilution in the receiving water is calculated to determine whether the water quality criteria will be exceeded. The *TSD* also includes a procedure for determine such percentiles when the dataset includes non-detect results, as is the case for Uxbridge, based on a delta-lognormal distribution.

The statistical analyses for copper and zinc in Uxbridge's discharges are set forth in Attachment D. For copper, the 95th percentile expected concentration is 20.1.8 ug/l, while the 99th percentile is 26.4 ug/l. For zinc, the 95th percentile expected concentration is 59.8 ug/l, while the 99th percentile is 73.6 ug/l.

The receiving water concentration is calculated taking into account dilution at 7Q10 conditions, through a mass balance equation that accounts for concentrations in the Blackstone River upstream of the discharge as reported in the facility's WET test reports:

$$\text{Receiving water concentration } (C_r) = \frac{(C_d * Q_d + C_s * Q_s)}{(Q_d + Q_s)} \quad ; \text{where}$$

C_d = upper bound effluent concentration data (99th percentile for acute criteria; 95th percentile for chronic criteria)
Q_d = Design flow of facility
C_s = Median concentration in Blackstone River upstream of discharge
Q_s = 7Q10 streamflow in Blackstone River upstream of discharge

Table 8 shows the result of the mass balance equations. The predicted receiving water concentration ($Cr_{dissolved}$) is less than the relevant criterion for each of these metals. Therefore the Uxbridge discharge does not present a reasonable potential to exceed water quality standards for these pollutants, and no effluent limits are required.

Table 8. Mass Balance calculations

	Qd	Cd	Qs	Cs	Qr = Qd+Qs	Cr_{tr}= (QdCd+QsCs)/Qr	$Cr_{dissolved}$	Criterion
Cu chronic	2.5	20.07	53.3	9.9	55.8	10.4	9.9	18.1
Cu acute		26.41		9.9		10.6	10.2	25.7
Zn chronic		59.82		24.9		26.5	26.1	79.9
Zn acute		73.59		24.9		27.1	26.5	79.2

VII. Sewer System Operation and Maintenance

EPA regulations set forth a standard condition for "Proper Operation and Maintenance" that is included in all NPDES permits. *See* 40 CFR § 122.41(e). This condition is specified in Part II.B.1 (General Conditions) of the draft permit and it requires the proper operation and maintenance of all wastewater treatment systems and related facilities installed or used to achieve permit conditions.

EPA regulations also specify a standard condition to be included in all NPDES permits that specifically imposes on permittees a "duty to mitigate." *See* 40 CFR § 122.41(d). This condition is specified in Part II.B.3 of the draft permit and it requires permittees to take all reasonable steps – which in some cases may include operations and maintenance work - to minimize or prevent any discharge in violation of the permit which has the reasonable likelihood of adversely affecting human health or the environment.

Proper operation of collection systems is critical to prevent blockages and equipment failures that would cause overflows of the collection system (sanitary sewer overflows, or SSOs), and to limit the amount of non-wastewater flow entering the collection system (inflow and infiltration or I/I[8]). I/I in a collection system can pose a significant environmental problem because it may displace wastewater flow and thereby cause, or contribute to causing, SSOs. Moreover, I/I could reduce the capacity and efficiency of the treatment plant and cause bypasses of secondary treatment. Therefore, reducing I/I will help to minimize any SSOs and maximize the flow receiving proper treatment at the treatment plant. MassDEP has stated that the inclusion in NPDES permits of I/I control conditions is a standard State Certification requirement under Section 401 of the CWA and 40 CFR § 124.55(b).

Therefore, specific permit conditions have been included in Part I.B. and I.C. of the draft permit. These requirements include mapping of the wastewater collection system, preparing and implementing a collection system operation and maintenance plan, reporting unauthorized discharges including SSOs, maintaining an adequate maintenance staff, performing preventative maintenance, controlling infiltration and inflow to the extent necessary to prevent SSOs and I/I related-effluent violations at the wastewater treatment plant, and maintaining alternate power where necessary. These requirements are intended to minimize the occurrence of permit violations that have a reasonable likelihood of adversely affecting human health or the environment.

Several of the requirements in the draft permit are not included in the current permit, including collection system mapping, and preparation of a collection system operation and maintenance plan. EPA has determined that these additional requirements are necessary to ensure the proper operation and maintenance of the collection system and has included schedules for completing these requirements in the draft permit.

VIII. Sewage Sludge Information and Requirements

According to its permit application, the Uxbridge WWTF generates about 262 dry metric tons of sludge per year. The sludge is aerated and then sent through a gravity thickener. This processed sludge is hauled to the Synagro site in Woonsocket, Rhode Island where it is dewatered and

[8] "Infiltration" is groundwater that enters the collection system through 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.

incinerated. In February 1993, (EPA promulgated standards for the use and disposal of sewage sludge. The regulations were promulgated under the authority of §405(d) of the (CWA. Section §405(f) of the CWA requires that these regulations be implemented through permits. This permit is intended to implement the requirements set forth in the technical standards for the use and disposal of sewage sludge, commonly referred to as the Part 503 regulations. Section 405(d) of the CWA requires that sludge conditions be included in all municipal permits. The sludge conditions in the draft permit satisfy this requirement and are taken from EPA's Standards for the Disposal of Sewage Sludge at 40 CFR Part 503. These conditions are outlined in the draft permit.

IX. Essential Fish Habitat Determination (EFH)

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq. (1998)), EPA is required to consult with the National Marine Fisheries Services (NMFS) if EPA's action or proposed actions that it funds, permits, or undertakes, may adversely impact any EFH such as: waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. § 1802 (10)). Adversely impact means any impact which reduces the quality and/or quantity of EFH (50 C.F.R. § 600.910 (a)). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

EFH is only designated for species for which federal fisheries management plans exist (16 U.S.C. § 1855(b) (1) (A)). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999. A review of the relevant essential fish habitat information provided by NMFS indicates that EFH has been designated for 33 managed species within the NMFS boundaries encompassing Narragansett Bay, which the Blackstone River discharges to, via the Seekonk River and the Providence River. *See* NOAA, Summary of Essential Fish Habitat, Narragansett Bay, RI (http://www.nero.noaa.gov/hcd/ri1.html). It is possible that a number of these species utilize the downstream Rhode Island waters for spawning, while others are present seasonally.

Based on the relevant information examined, EPA finds that the reissuance of this permit will adequately protect EFH for the following reasons:

- The Uxbridge discharge is located more than 20 miles upstream of designated EFH habitat;
- The dilution factor at the point of discharge is 22:1, and effective dilution in the area of EFH designated habitat will be significantly greater;
- The draft permit contains new nitrogen limits to ensure that the discharge does not contribute to nutrient-related water quality violations in the Seekonk and Providence River;
- The permit is designed to ensure that all water quality standards are met in the receiving water, both in Massachusetts and Rhode Island.

EPA believes that the draft permit limits adequately protect all designated EFH, and therefore additional mitigation is not warranted. If adverse impacts to EFH are detected as a result of this permit action, or if new information is received that changes the basis for our conclusion, NOAA Fisheries will be notified and an EFH consultation will be initiated.

X. Endangered Species Act

Section 7(a) of the Endangered Species Act (ESA) of 1973, as amended grants authority to and imposes requirements upon Federal agencies regarding endangered or threatened species of fish, wildlife, or plants ("listed species") and habitat of such species that has been designated as critical (a "critical habitat"). The ESA requires every Federal agency, in consultation with and with the assistance of the Secretary of Interior, to insure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. The U.S. Fish and Wildlife Service (USFWS) typically administers Section 7 consultations for bird, terrestrial, and freshwater aquatic species. NMFS typically administers Section 7 consultations for marine species and anadromous fish.

EPA has reviewed the list of federal endangered or threatened species of fish, wildlife, and plants to see if any such listed species might potentially be impacted by the reissuance of this NPDES permit and has not found any such listed species in the vicinity of the discharge. Therefore, EPA does not need to formally consult with NMFS or USFWS in regard to the provisions of the ESA.

XI. Monitoring and Reporting

The effluent monitoring requirements have been established to yield data representative of the discharge under authority of Section 308 (a) of the CWA in accordance with 40 CFR §§122.41 (j), 122.44 (l), and 122.48.

The Draft Permit requires that the permittee submit all monitoring data and other reports required by the permit to EPA using NetDMR. NetDMR is a national web-based tool for regulated CWA permittees to submit DMRs electronically via a secure Internet application to U.S. EPA through the Environmental Information Exchange Network. NetDMR allows participants to discontinue mailing in hard copy forms under 40 CFR § 122.41 and § 403.12. NetDMR is accessed from the following url: http://www.epa.gov/netdmr. Further information about NetDMR, including contacts for EPA Region 1, is provided on this website.

The Draft Permit requires the permittee to report monitoring results obtained during each calendar month using NetDMR, no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA as an electronic attachment to the DMR. Permittees must continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP.

XII. State Certification Requirements

EPA may not issue a permit unless MassDEP certifies that the effluent limitations included in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State water quality standards, or waives certification. EPA has requested permit certification by the State pursuant to 40 CFR §124.53 and expects the draft permit will be certified.

XIII. Comment Period, Public Hearing, and Procedures for Final Decisions

All persons, including applicants, who believe any condition of the permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period to Susan Murphy, U.S. Environmental Protection Agency, 5 Post Office Square, Suite 100 (OEP06-1), Boston, MA 02109. At the request of the applicant, the Regional Administrator finds significant public interest for the holding of a public hearing on this permit, scheduled for October 25, 2012 at the Uxbridge Senior Center. 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 the public hearing, if held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and to each person who has submitted written comments or requested notice.

XIV. EPA and MassDEP Contacts

Requests for additional information or questions concerning the draft permit may be addressed Monday through Friday, between the hours of 9:00 a.m. and 5:00 p.m., to :

Susan Murphy
U.S. Environmental Protection Agency
5 Post Office Square, Suite 100 (OEP06-1)
Boston, MA 02109
Telephone: (617) 918-1534 Fax: (617) 918-0534
Email: murphy.susan@epa.gov

Kathleen Keohane
Massachusetts Department of Environmental Protection
627 Main Street, 2nd Floor
Worcester, MA 01608
Telephone: (508)-767-2856 Fax: (508) 791-4131
Email: Kathleen.Keohane@state.ma.us

September 2012
Date

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

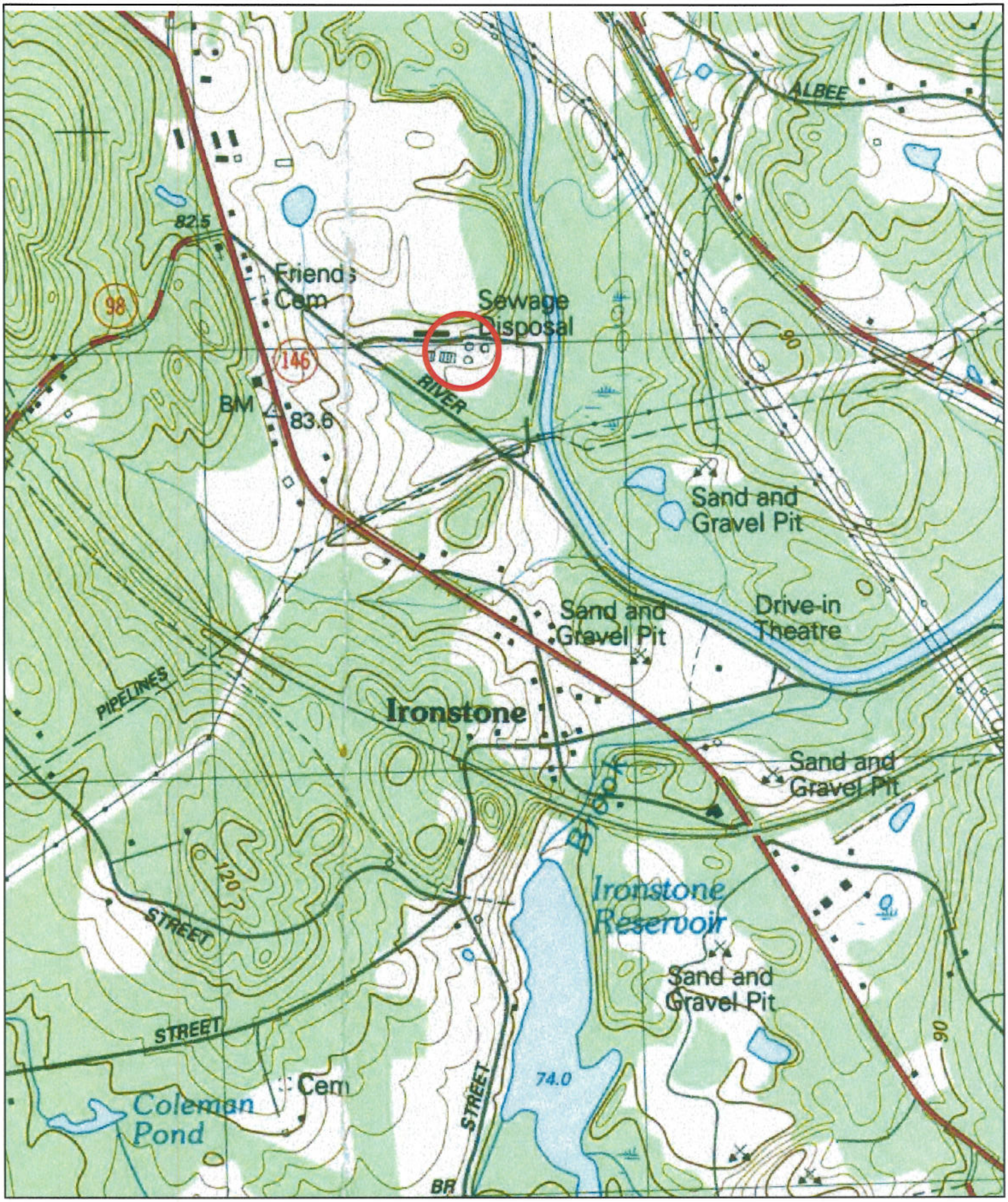
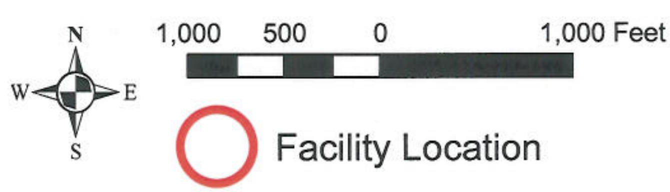
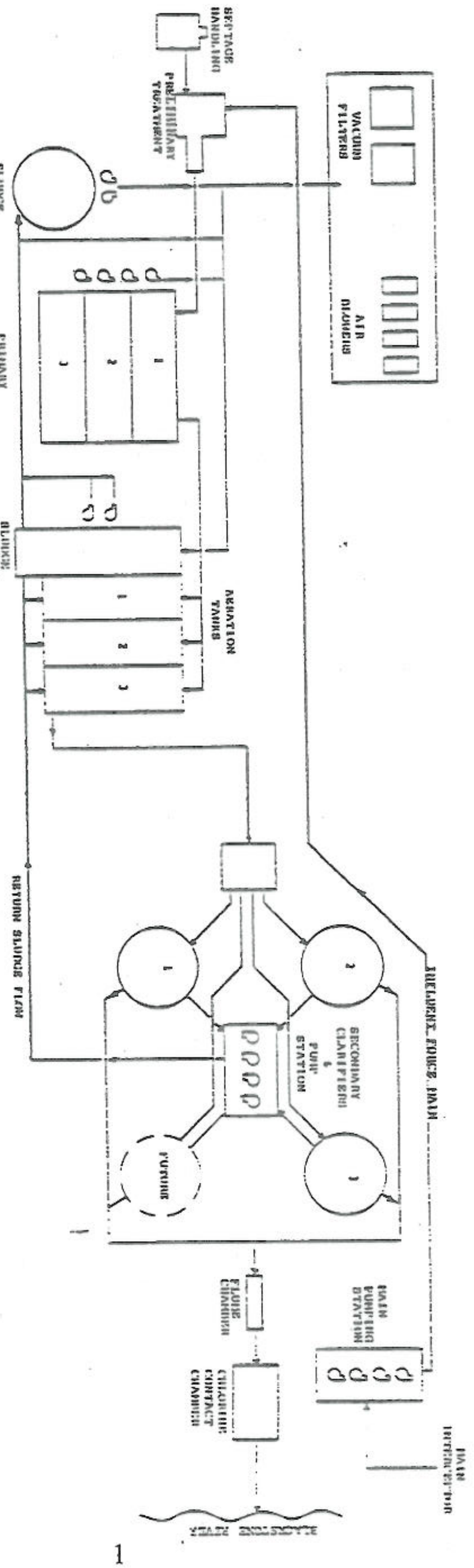


Figure 1. Location Map
Uxbridge WWTF
NPDES No. MA0102440



Uxbridge WWTF
Fact Sheet NPDES MA 0102440
Figure 2



TOWN OF UXBRIDGE
WASTEWATER TREATMENT
FACILITY
SYSTEM SCHEMATIC

FIGURE 1-1

1-4

Uxbridge Wastewater Treatment Facility
NPDES Permit No. MA0102440

Table 1 (page 2 of 2)
Two year facility DMR Data

	pH		NH3	NO2 + NO3	DO	Total P	TRC		fecal coliform	
	min (SU)	max (SU)	mo avg (mg/l)	mo avg (mg/l)	min (mg/l)	avg (mg/l)	avg (mg/l)	max (mg/l)	mo avg (cfu/100 ml)	max (cfl/100 ml)
	6	8.3	5/10/15 (seasonal)	Report	5	1.0 (seasonal)	0.24	0.42	200	400
January 2009	7.19	7.47	0.03	10.1	6.2					
February	7.16	7.47	0.04	10.4	5.84					
March	7.1	7.4	0.04	10.1	7					
April	7.15	7.5	0.04	10	7.09	0.53	0.2	0.75	8.6	373.3
May	7.15	7.68	0.04	10.3	6	0.37	0.15	0.23	14.58	160
June	7.3	7.6	0.03	10.7	5.4	0.6	0.16	0.32	25.2	193.3
July	7.3	7.8	0.15	10.3	5.2	0.5	0.18	0.4	12.7	53.3
August	7.37	7.78	0.04	1	4.4	0.5	0.13	0.2	90.4	393.3
September	7.3	7.8	0.04	15.1	4.8	0.7	0.11	0.27	139.5	353.3
October	7.49	7.81	0.04	12.21	5.02	0.53	0.15	0.26	27.9	346.7
November	7.2	7.6	0.03	7.4	5.26					
December	7.1	7.5	0.04	7.6	5.6					
January 2010	7.1	7.6	0.04	6.9	6.1					
February	7.1	7.5	0.05	6.7	6.58					
March	7	7.5	0.64	6.5	6					
April	7.1	7.5	0.1	7.2	6.5	0.54	0.17	0.34	8.6	360
May	7.2	7.7	0.03	10.9	5.2	0.8	0.16	0.27	3.7	20
June	7.18	7.68	0.04	9.92	5.12	0.69	0.11	0.14	5.38	43
July	7.59	7.76	0.07	7.8	4.04	0.54	0.12	0.2	7.12	30
August	7.18	7.8	0.05	8.17	4.37	0.47	0.13	0.28	4.1	26.7
September	7.38	7.74	0.05	9.61	4.47	0.56	0.12	0.29	8.5	305
October	7.46	7.73	0.05	9.21	4.74	0.43	0.15	0.39	51.12	335
November	7.24	7.57	0.34	11.61	5.94					
December	7.05	7.39	0.4	14.5	6.6					
Average:			0.10	9.34		0.55	0.15		29.10	
Maximum:	7.0 (min)	7.81 (max)			4.04 (min)			0.75		393.30

Uxbridge Wastewater Treatment Facility
NPDES Permit No. MA0102440

Table 1 (page 1 of 2)
Two year facility DMR Data

	Flow	BOD			CBOD		TSS		
	12mo avg (MGD)	mo avg (mg/l)	avg wkly (mg/l)	% rem	mo avg (mg/l)	avg wkly (mg/l)	mo avg (mg/l)	avg wkly (mg/l)	% rem
Effluent Limit	2.5	30	45	85	20	30	30	45	85
January 2009	1.06	2	2	99.1			1.1	2.4	99.8
February	1	2.2	2.5	99			2.1	2.9	99.7
March	1.08	2.3	2.9	98.9			2.2	3.2	99.7
April	1.05	3.5	4	98.4			3.3	3.9	99.4
May	0.89	2.4	3	99.2			2.4	3.4	99.6
June	0.78			99.2	2.1	2.3	1.9	2.6	99.7
July	0.86			99	2.2	2.8	2.2	2.9	99.4
August	0.8			99.2	2.1	2.2	2.4	5.1	99.5
September	0.73			99.4	2	2	1.7	2.6	99.6
October	0.78			99.64	1.18	1.63	1.38	1.93	99.99
November	0.86	2	2.8	99.4			1.1	2.2	99.8
December	0.96	1.3	1.6	99.5			1.1	2	99.9
January 2010	0.92	1.2	1.6	99.5			1.1	1.8	99.8
February	0.96	2.2	3.4	99.1			2.1	3.6	99.6
March	1.44	4	7.2	97.6			2.2	4.2	99.3
April	1.53	1.7	2.3	99.1			1.4	1.9	99.6
May	0.96	1.4	2.1	99.4			1	1.6	99.9
June	0.86			99.44	1.24	2.7	1.11	1.77	99.7
July	0.71			99.9	0.47	0.97	0.89	1.44	99.9
August	0.68			99.9	0.56	0.9	0.52	0.93	99.9
September	0.67			99.9	0.4	0.6	0.51	1.1	99.9
October	0.73			99.78	0.98	1.75	1.03	1.55	99.87
November	0.77	3.47	7.25	99.07			2.24	4.63	99.66
December	0.83	1.1	1.7	99.9			0.9	1.6	99.7
Average:	0.91	2.2		99.3	1.3		1.6		99.7
Maximum:			7.25			2.80		5.10	

ATTACHMENT A

CALCULATION OF MAXIMUM ALLOWABLE LOADS FROM CONCENTRATION-BASED LIMITS

Calculations of maximum allowable loads for average monthly and average weekly $CBOD_5$, BOD_5, TSS, ammonia, phosphorus, nitrogen and metals were calculated based on the following equation:

$L = C \times Q_D \times 8.34$ where:

L = Maximum allowable load in lbs/day
C = Maximum allowable effluent concentration for reporting period in mg/l
(Reporting periods are average monthly, average weekly, and daily maximum.)
Q_D = Design flow of facility in MGD = 2.5 MGD
8.34 = Factor to convert effluent concentration in mg/l and design flow in MGD to lbs/day

Therefore:

BOD, TSS (Nov-May):
(Concentration limit) [45] X 8.34 (Constant) X 2.5 (design flow) = 938 lbs/day
(Concentration limit) [30] X 8.34 (Constant) X 2.5 (design flow) = 626 lbs/day
CBOD, TSS (June-Oct):
(Concentration limit) [30] X 8.34 (Constant) X 2.5 (design flow) = 626 lbs/day
(Concentration limit) [20] X 8.34 (Constant) X 2.5 (design flow) = 417 lbs/day
Ammonia:
(Concentration limit) [5] X 8.34 (Constant) X 2.5 (design flow) = 104 lbs/day
(Concentration limit) [10] X 8.34 (Constant) X 2.5 (design flow) = 208.5 lbs/day
(Concentration limit) [15] X 8.34 (Constant) X 2.6 (design flow) = 313 lbs/day
Total phosphorus:
(Concentration limit) [.2] X 8.34 (Constant) X 2.5 (design flow) = 4.2 lbs/day
(Concentration limit) [1] X 8.34 (Constant) X 2.5 (design flow) = 21 lbs/day
Total nitrogen:
(Concentration limit) [8] X 8.34 (Constant) X 2.5 (design flow) = 167 lbs/day

Attachment B: 7Q10 and baseflow calculations

The 7Q10 flow in the Blackstone River was calculated based on the modeling study performed in connection with the Blackstone River Initiative, which was calibrated and validated using data from July and August of 1991 that were at near-7Q10 flows. The model generated a 7Q10 flow at Uxbridge of 117.15 cfs that included all upstream POTWs operating at design flow. The boundary conditions for the 7Q10 conditions of the model-generated flow are as follows:

Sources	Flow (cfs)
Headwaters	6.53
Quinsigamond R	3.03
Mumford R	5.89
West R	3.22
UBWPAD	86.6
Millbury	1.85
Grafton	2.46
Northbridge	2.77

Blackstone River Initiative, Table 5-18.

Calculating dilution factor

The model results were used in the 1999 permit issuance to determine dilution in the Blackstone River at Uxbridge for purposes of determining total residual chlorine limits and appropriate whole effluent toxicity testing requirements. As actual flows are not at design, the design flow from each facility was subtracted from the model-generated total flow to determine the base flow under 7Q10 conditions. Then, dry weather flows from each facility were calculated and added to the baseflow to determine current receiving water flow. The calculation was set forth in the Response to Comments in connection with the current permit as follows:

7Q10 @ Blackstone River near Uxbridge =

Blackstone River upstream flow –

(UBWPAD permitted flow – UBWPAD summer flow) –

(Milbury permitted WTP flow – Milbury summer flow) –

(Grafton permitted WTP flow – Grafton summer flow) –

(Northbridge WPCF permitted flow – Northbridge summer flow)

= 117.15 cfs – 32.35 cfs – 0.76 cfs – 0.13 cfs – 1.22 cfs

= **82.7 cfs (53.3 MGD)**

In table format this calculation can be displayed as below:

	Design Flow (cfs)	Summer Flow (cfs)	(Design Flow-Summer Flow)
7Q10 from WLA model at design flow	117.15	82.69	---
UBWPAD	86.6	54.25	32.35
Millbury	1.85	1.09	0.76
Grafton	2.46	2.33	0.13
Northbridge	2.77	1.55	1.22
Remaining flow at 7Q10	23.47	23.47	---

The resulting 7Q10 flow upstream of Uxbridge, including the existing upstream POTW flows, is 82.7 cfs. This value was used to calculate the dilution factor and the chlorine effluent limit. During the time period since the current permit was issued, the Millbury WWTP discharge was terminated and its flows were tied into UBWPAD. For purposes of determining the dilution factor for this permit it is assumed that these flows are now simply added to the UBWPAD flow and the dilution factor remains the same as in the current permit.

The calculations also indicate that 7Q10 flow in the Blackstone River, when the four major treatment plants are excluded, equals 23.47 cfs. This figure includes flows from two smaller treatment plants, Upton and Douglas, that are also upstream of Uxbridge. For purposes of calculating instream phosphorus concentrations, in which loads from the smaller treatment plants are specifically included based on their permit limits, a 7Q10 baseflow was calculated by subtracting the summer flow from Upton and Douglas. The resulting “Blackstone River baseflow” is 22.75 cfs, or 14.7 MGD.

ATTACHMENT C. Delivery Factors

In order to determine the appropriate delivery factors in the Blackstone River, EPA reviewed the available evidence from the RIDEM studies and other sources. In the 2004 RIDEM Report, RIDEM applied a delivery factor of 87% (i.e. 13% of the nitrogen is removed by uptake or denitrification) to both the UBWPAD and Woonsocket nitrogen loadings in calculating the resulting loads in the Seekonk River. This figure was based on RIDEM sampling in 1995 and 1996 as compared to monthly average WWTF monitoring data. 2004 RIDEM Report at 18.

Subsequent studies have produced conflicting evidence as to the extent of attenuation in the Blackstone River. A URI study based on biweekly sampling in the lower Blackstone River between April and August 2004 found "no direct evidence of DIN attenuation or removal in the lower Blackstone," with about a 20% increase in DIN that was not accounted for by WWTF discharges. The team also concluded that "[n]or can the results of a mass balance analysis unequivocally exclude DIN removal processes in the river itself," as non-WWTF inputs such as atmospheric deposition, individual septic system inputs or other sources could be in excess of the 20% increase and mask in-stream removal processes. Nixon, et al., "Investigation of the Possible Attenuation of Dissolved Inorganic Nitrogen and Phosphorus in the Lower Blackstone River" (April 2005), in *Anthropogenic Nutrient Inputs to Narragansett Bay - A Twenty Five Year Perspective* (2005), Appendix B. In contrast, the 2005 RIDEM RTC reported attenuation rates derived from a Qual2E water quality model, modified as part of a dissertation project at URI, that predicted an attenuation rate of 8% from the UBWPAD discharge to the state line, and an additional 21% from the state line to the mouth of the river, for a combined 27% attenuation. Total attenuation of the Woonsocket discharge was predicted to be 14%. 2005 RIDEM RTC, citing Michaelis, *Dissolve Oxygen Dynamics in a Shallow Stream System*, Dissertation in Civil and Environmental Engineering at the University of Rhode Island (2005).

Additional insight into the issue is provided in a regional study conducted by the U.S. Geological Service, which indicates that there is no significant attenuation of nitrogen in New England rivers with discharges greater than 2.83 m^3/s (100 cfs) or in reservoirs. Moore, et al., *Estimation of Total Nitrogen and Phosphorus in New England Streams Using Spatially Referenced Regression Models*, USGS Scientific Investigations Report 2004-5012. This study applied a water-quality model called SPARROW (Spatially Referenced Regressions on Watershed Attributes), a "spatially detailed, statistical model that uses regression equations to relate total nitrogen and phosphorus (nutrient) stream loads to nutrient sources and watershed characteristics." The regression analysis utilized a wide array of data sources, including nitrogen monitoring data from 65 sites, to derive coefficients in-stream loss as well as for source loading from particular land uses, point and atmospheric sources and for land-to-water delivery. As applied to the Blackstone River, the SPARROW model predicts no attenuation on an annual average basis based on its average annual flow.

The UBWPAD permit analysis was based on an estimated attenuation rate for the UBWPAD discharge of 13%, and EPA continues to believe that this represents the most reasonable and appropriate estimate of attenuation in the Blackstone River. While the 2005 RIDEM RTC suggests a higher rate, that modeling indicated that uptake of nitrogen decreased as phosphorus to the system are reduced. This would indicate that attenuation rates will be lower under the new

UBWPAD permit limit of 0.1 mg/l total P (as well as new limits on other WWTFs), as opposed to the limit of 0.75 mg/l total P that was used in the model. On the other hand, while the Nixon and USGS studies indicate there may be less than 13% attenuation even under current conditions, both studies leave open the possibility that some level of attenuation is occurring. The Nixon Report specifically notes that the results do not exclude the existence of in-stream removal processes, while the USGS study does not specifically address the potential for attenuation during occasional periods when river flow falls below the 100 cfs threshold (in the Blackstone, this occurs approximately 20% of the time at Northbridge and less than 3% of the time at Woonsocket, based on USGS gage data from those locations). The attenuation rate of 13% is thus squarely within the range of the possible values based on currently available information.

For these reasons, EPA has applied delivery factors to each discharge that are consistent with 13% attenuation of the UBWPAD discharge. In the absence of other information, we assume that attenuation is proportional to the distance traveled, as calculated in Table B.1. The resulting delivery factors are applied to determine the load to the Seekonk River.

Table B.1. Delivery Factors

Calculated from: $A_i = A_{UB} * Rm_i/RM_{UB}$

Source	River Mile	Attenuation	Delivery Factor
UBWPAD	44.4	13.0%	87%
Millbury	40.6	11.9%	88%
Grafton	35.4	10.4%	90%
Northbridge	29.2	8.5%	91%
Uxbridge	22.0	6.4%	94%
Woonsocket	12.4	3.6%	96%

Date	Cu* (ug/l)	lnCu (ug/l)	$(y_i - u_y)^2$	# samples per month
4/26/2005	13	2.5649	0.0109962	1
11/15/2005	20	2.9957	0.2869163	1
5/9/2006	17	2.8332	0.1392236	1
11/14/2006	16	2.7726	0.0976576	1
5/15/2007	ND-10			1
12/12/2007	ND-10			1
12/16/2008	10.2	2.3224	0.018961	1
1/23/2009	ND-10			1
5/5/2009	10	2.3026	0.0248067	1
11/3/2009	12	2.4849	0.000616	1
5/11/2010	10.9	2.3888	0.0050871	1
11/16/2010	8	2.0794	0.1448906	1
4/26/2011	6.4	1.8563	0.3645606	1

Daily Maximum Concentration - 99th percentile (some measurements < detection limit)

Detection Limit** =		10.000
u_y = Avg of Nat. Log of daily Discharge (mg/L) =		2.46009
$\Sigma (y_i - u)^2$ =		1.09372
k = number of daily samples =		13
r = number of non-detects =		3
σ_y^2 = estimated variance = $(\Sigma[(y_i - u_y)^2]) / (k-r-1)$ =		0.12152
σ_y = standard deviation = square root σ_y^2 =		0.34860
δ = number of nondetect values/number of samples =		0.23077
z=z-score[(0.99-δ)/(1-δ)] =	z-score of	0.98700
	=	2.226211769

RP analysis/Limit calculation:
99th percentile daily max limit = $\exp(u_y + \text{z-score}*\sigma_y)$

Daily Max Limit* = **25.44 ug/l**
TSD-Table E-1, 99th percentile with ND

Average Monthly Concentration - 95th percentile (some measurements < detection limit)

Number of samples per month, n =		1
$E(x)$ = Daily Avg = $\delta D + (1-\delta)\exp(u_y + 0.5\sigma_y^2)$ =		11.87627
$V(x)$ = Daily Variance = $(1-\delta)\exp(2u_y + \sigma_y^2)[\exp(\sigma_y^2)-(1-\delta)] + \delta(1-\delta)D[D-2\exp(u_y + 0.5\sigma_y^2)]$ =		16.43609
$A = V(x)/[n(E(x)-\delta^n D)^2]$ =		0.179516334
$B = -[\delta^n D^2(1-\delta^n)]/(E(x)-\delta^n D)^2$ =		-0.193883136
$C = (2\delta^n D)/(E(x)-\delta^n D)$		0.482348176
σ_n^2 = Monthly Average variance = $\ln\{(1-\delta^n)[1+A+B+C]\}$		0.12152
σ_n = Monthly Average standard deviation = σ_n^2^(0.5) =		0.34860
u_n = n-day monthly average = $\ln[(E(x)-\delta^n D)/(1-\delta^n)] - 0.5\sigma_n^2$ =		2.46009
z=z-score[(0.95-δ)/(1-δ)] =	z-score of	0.93500
	=	1.514101888

RP analysis/Limit calculation:
95th percentile monthly average limit = $\exp(u_n + \text{z-score}*\sigma_n)$
Monthly Avg Limit* = **19.84 ug/l**
TSD-Table E-2, 95th percentile with ND

Date	Zn* (ug/l)	lnZn (ug/l)	$(y_i - u_y)^2$	# samples per month
4/26/2005	50	3.9120	0.0550474	1
11/15/2005	ND-50			1
5/9/2006	74	4.3041	0.3927077	1
11/14/2006	ND-50			1
5/15/2007	ND-50			1
12/12/2007	ND-50			1
12/16/2008	ND-50			1
1/23/2009	ND-50			1
5/5/2009	ND-50			1
11/3/2009	ND-50			1
5/11/2010	37.9	3.6350	0.001802	1
11/16/2010	19.7	2.9806	0.4855059	1
4/26/2011	35	3.5553	0.014897	1

Daily Maximum Concentration - 99th percentile (some measurements < detection limit)

Detection Limit** =		10.000
u_y = Avg of Nat. Log of daily Discharge (mg/L) =		3.67740
$\Sigma (y_i - u)^2$ =		0.94996
k = number of daily samples =		13
r = number of non-detects =		8
σ_y^2 = estimated variance = $(\Sigma[(y_i - u_y)^2]) / (k\text{-}r\text{-}1)$ =		0.23749
σ_y = standard deviation = square root σ_y^2 =		0.48733
δ = number of nondetect values/number of samples =		0.61538
z=z-score[(0.99-δ)/(1-δ)] =	z-score of	0.97400
	=	1.943133751

RP analysis/Limit calculation:

99th percentile daily max limit = exp (u_y + z-score*σ_y)

Daily Max Limit* = **101.94 ug/l**

TSD-Table E-1, 99th percentile with ND

Average Monthly Concentration - 95th percentile (some measurements < detection limit)

Number of samples per month, n =		1
E(x) = Daily Avg = $\delta D + (1-\delta)\exp(u_y + 0.5\,\sigma_y^2)$ =		23.28048
V(x) = Daily Variance = $(1-\delta)\exp(2u_y + \sigma_y^2)[\exp(\sigma_y^2)\text{-}(1-\delta)] + \delta(1-\delta)D[D-2\exp(u_y + 0.5\sigma_y^2)]$ =		486.62777
A = $V(x)/[n(E(x)-\delta^n D)^2]$ =		1.659024921
B = $-[\delta^n D^2(1-\delta^n)]/(E(x)-\delta^n D)^2$ =		-0.080691783
C = $(2\delta^n D)/(E(x)-\delta^n D)$		0.71862884
σ_n^2 = Monthly Average variance = $\ln\{(1-\delta^n)[1+A+B+C]\}$		0.23749
σ_n = Monthly Average standard deviation = σ_n^2^(0.5) =		0.48733
u_n = n-day monthly average = $\ln[(E(x)-\delta^n D)/(1-\delta^n)] - 0.5\sigma_n^2$ =		3.67740
z=z-score[(0.95-δ)/(1-δ)] =	z-score of	0.87000
	=	1.126391129

RP analysis/Limit calculation:

95th percentile monthly average limit = exp (u_n + z-score*σ_n)

Monthly Avg Limit* = **68.47 ug/l**

TSD-Table E-2, 95th percentile with ND

***Take dilution and ambient conc into consideration to determine potential conc after mix, if conc after mix > criteria, then RP exists**

**detection limit =0.003

***TSD Table 3-1

****TSD Table 3-2

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
COMMONWEALTH OF MASSACHUSETTS
1 WINTER STREET
BOSTON, MASSACHUSETTS 02108

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ECOSYSTEM PROTECTION
REGION I
BOSTON, MASSACHUSETTS 02109

JOINT **PUBLIC COMMENT PERIOD** AND PUBLIC NOTICE OF A **PUBLIC HEARING** PERTAINING TO THE ISSUANCE OF A **DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT** TO DISCHARGE INTO THE WATERS OF THE UNITED STATES UNDER SECTIONS 301 AND 402 OF THE CLEAN WATER ACT, AS AMENDED, AND UNDER SECTIONS 27 AND 43 OF THE MASSACHUSETTS CLEAN WATERS ACT, AS AMENDED, AND REQUEST FOR STATE CERTIFICATION UNDER SECTION 401 OF THE CLEAN WATER ACT.

DATE OF NOTICE: September 21, 2012

PERMIT NUMBER: MA0102440

PUBLIC NOTICE NUMBER: MA-028-12

NAME AND MAILING ADDRESS OF APPLICANT:

Town of Uxbridge
Uxbridge Wastewater Treatment Facility
80 River Road
Uxbridge, MA 01569

NAME AND ADDRESS OF THE FACILITY WHERE DISCHARGE OCCURS:

Uxbridge Wastewater Treatment Facility
80 River Road
Uxbridge, MA 01569

RECEIVING WATER: Blackstone River

RECEIVING WATER CLASSIFICATION: Class B – warm water fishery

PREPARATION OF THE DRAFT PERMIT:

The U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) have cooperated in the development of a permit for the above identified facility. The effluent limits and permit conditions imposed have been drafted to assure compliance with the Clean Water Act, 33 U.S.C. sections 1251 et seq.,, the Massachusetts Clean Waters Act, G.L. c. 21, §§ 26-53, 314 CMR 3.00 and State Surface Water Quality Standards at 314 CMR 4.00. EPA has formally requested that the State certify this draft permit pursuant to Section 401 of the Clean Water Act and expects that the draft permit will be certified.

INFORMATION ABOUT THE DRAFT PERMIT:

A fact sheet (describing the type of facility; type and quantities of wastes; a brief summary of the basis for the draft permit conditions; and significant factual, legal and policy questions considered in preparing this draft permit) and the draft permit may be obtained at no cost at http://www.epa.gov/region1/npdes/draft_permits_listing_ma.html or by writing or calling EPA's contact person named below:

Susan Murphy
U.S. Environmental Protection Agency – Region 1
5 Post Office Square, Suite 100 (OEP06-1)
Boston, MA 02109-3912
Telephone: (617) 918-1534
Murphy.Susan@epa.gov

The administrative record containing all documents relating to this draft permit is on file and may be inspected at the EPA Boston office mentioned above between 9:00 a.m. and 5:00 p.m., Monday through Friday, except holidays.

PUBLIC HEARING:

The Regional Administrator has determined, pursuant to 40 C.F.R. §124.12, upon request by the applicant, that a significant degree of public interest exists in this proposed permit and that a public hearing should be held to consider this draft permit.

A public hearing and meeting (information session) will be held on the following date and time.

DATE: Thursday, October 25, 2012

MEETING TIME: 6:30pm – 7:00pm

HEARING TIME: 7:15pm

LOCATION: Town of Uxbridge Senior Center
36 South Main Street
Uxbridge, MA 01569

In accordance with 40 C.F.R. §124.12, the following is a summary of the procedures that shall be followed at the public hearing:

a. The Presiding Officer shall have the authority to open and conclude the hearing and to maintain order; and
b. Any person appearing at such hearing may submit oral or written statements and data concerning the draft permit.

PUBLIC COMMENT PERIOD:

All persons, including applicants, who believe any condition of this draft permit is inappropriate, must raise all issues and submit all available arguments and all supporting material for their arguments in full by midnight **November 19, 2012**, to the U.S. EPA, 5 Post Office Square, Boston, Massachusetts 02109-3912.

FINAL PERMIT DECISION:

Following the close of the comment period, and after a public hearing, 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.

DAVID FERRIS, DIRECTOR
MASSACHUSETTS WASTEWATER
MANAGEMENT PROGRAM
MASSACHUSETTS DEPARTMENT OF
ENVIRONMENTAL PROTECTION

STEPHEN S. PERKINS, DIRECTOR
OFFICE OF ECOSYSTEM PROTECTION
ENVIRONMENTAL PROTECTION
AGENCY – REGION 1