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 Grafton
Board of Sewer Commissioners

is authorized to discharge from the facility located at

Grafton Wastewater Treatment Plant
9 Depot Street
Grafton, MA 01560

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 the first day of the calendar month immediately following sixty days after signature.

This permit expires 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 April 30, 2002.

This permit consists of 15 pages in Part I including effluent limitations, monitoring requirements, and state permit conditions, Attachment A (Freshwater Chronic Toxicity Test Procedure and Protocol, May 2007), and 25 pages in Part II, Standard Conditions.

Signed this **23rd** day of **May, 2013**.

/S/ SIGNATURE ON FILE
Ken Moraff, Acting Director
Office of Ecosystem Protection
Environmental Protection Agency
Region 1
Boston, MA

____
David Ferris, Director
Massachusetts Wastewater Management Program
Department of Environmental Protection
Commonwealth of Massachusetts
Boston, MA

PART I

A.1.During the period beginning the effective date and lasting through expiration, the permittee is authorized to discharge treated effluent from outfall serial number **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]	***	***	***	2.4 MGD	***	***	Continuous	Recorder
FLOW[2]	***	***	***	Report MGD	***	Report MGD	Continuous	Recorder
$CBOD_5$ [3] (June 1 to October 31)	400 lbs/day	600 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)	600 lbs/day	901 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)	400 lbs/day	600 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)	600 lbs/day	901 lbs/day	Report lbs/day	30 mg/l	45 mg/l	Report mg/l	2/Week	24-Hour Composite[4]
Total Residual Chlorine[6]	***	***	***	0.21 mg/l	***	0.36 mg/l	2/Day[16]	Grab
Escherichia Coli[5,7] (April 1 to October 31)	***	***	***	126 cfu/100 ml	***	409 cfu/100 ml	2/Week	Grab
Enterococci[7,8]	***	***	***	153 cfu/100 ml	***	497 cfu/100 ml	1/Week	Grab
pH RANGE[5]	6.5 - 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
TOTAL AMMONIA, as N (June 1- October 31)	100 lbs/day	***	Report lbs/day	5 mg/l	10 mg/l	Report mg/l	1/Week	24-Hour Composite[4]
TOTAL AMMONIA, as N (December 1 to April 30)	300 lbs/day	***	Report lbs/day	15 mg/l	***	Report mg/l	1/Week	24-Hour Composite[4]
TOTAL AMMONIA, as N (May 1-31and November 1-30)	200 lbs/day	***	Report lbs/day	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 PHOSPHORUS (April 1- October 31)	4.0 lbs/day	***	***	0.2 mg/l	***	Report mg/l	2/Week	24-Hour Composite[4]
TOTAL PHOSPHORUS (November 1- March 31)	20 lbs/day	***	***	1.0 mg/l	***	Report mg/l	2/Month	24-Hour Composite[4]
ORTHO PHOSPHORUS, DISSOLVED, as P [12] (November 1- March 31)	Report lbs/day	***	***	Report mg/l	***	Report mg/l	2/Month	24-Hour Composite[4]
TOTAL NITROGEN[13] (May 1- October 31) Total Nitrate+Nitrite as N Total Kjeldahl Nitrogen	160 lbs/day Report lbs/day Report lbs/day	***	***	8 mg/l Report mg/l Report mg/l	***	Report mg/l	2/Week	24-Hour Composite[4]
TOTAL NITROGEN[13] (November 1 – April 30) Total Nitrate+Nitrite as N Total Kjeldahl Nitrogen	Report lbs/day Report lbs/day Report lbs/day	***	***	Report mg/l Report mg/l Report mg/l	***	Report mg/l	1/Week	24-Hour Composite[4]
TOTAL LEAD[14]	***	***	***	1.8 ug/l	***	Report ug/l	4/Year	24-Hour Composite[4]
Whole Effluent Toxicity[9,10,11]	Acute LC50 ≥ 100% C-NOEC Report						4/Year	24-Hour Composite[4]
Hardness[15]	***	***	***	***	***	Report mg/l	4/Year	24-Hour Composite[4]
Ammonia Nitrogen as N[15]	***	***	***	***	***	Report mg/l	4/Year	24-Hour Composite[4]
Total Recoverable Aluminum[15]	***	***	***	***	***	Report mg/l	4/Year	24-Hour Composite[4]
Total Recoverable Cadmium[15]	***	***	***	***	***	Report mg/l	4/Year	24-Hour Composite[4]
Total Recoverable Copper[15]	***	***	***	***	***	Report mg/l	4/Year	24-Hour Composite[4]
Total Recoverable Nickel[15]	***	***	***	***	***	Report mg/l	4/Year	24-Hour Composite[4]
Total Recoverable Lead[15]	***	***	***	***	***	Report mg/l	4/Year	24-Hour Composite[4]
Total Recoverable Zinc[15]	***	***	***	***	***	Report mg/l	4/Year	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. All samples shall be 24 hour composites unless specified as a grab sample in 40 CFR §136.

2. This 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 proportional to flow.

5. Required for Massachusetts State Certification.

6. 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 or dechlorination 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 or dechlorination chemicals occurred.

7. Bacteria samples shall be collected concurrently with a TRC sample.

8. The enterococci limits are a requirement of the EPA permit and are not a requirement of the Massachusetts Department of Environmental Protection (MassDEP) permit. The enterococci sample shall be collected concurrently 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 demonstrates that compliance with the E.coli limit is adequate to ensure compliance with the enterococcus limit. 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.

9. The permittee shall conduct chronic (and modified acute) toxicity tests four times per year. The chronic test may be used to calculate the acute LC_{50} at the 48 hour exposure interval. The permittee shall test the daphnid, Ceriodaphnia dubia, only. Toxicity test samples shall be collected during the months of January, April, July 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 February 28th, May 31st, August 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	Chronic Limit C-NOEC
January April July October	February 28 May 31 August 31 November 30	Ceriodaphnia dubia (Daphnid)	LC50 $\geq$ 100%	Report

10. 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.

The C-NOEC (chronic-no observed effect concentration) is defined as the highest concentration of toxicant or effluent to which organisms are exposed in a life cycle or partial life cycle test which causes no adverse effect on growth, survival, or reproduction at a specific time of observation as determined from hypothesis testing where the test results exhibit a linear dose-response relationship. However, where the test results do not exhibit a linear dose-response relationship, the permittee must report the lowest concentration where there is no observable effect.

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**.

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

13. The nitrogen requirements are conditions of the 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.

14. The minimum level (ML) for lead is defined as 0.5 ug/ l. This value is the minimum level for this metal using the Furnace Atomic Absorption analytical method (EPA Method 220.2). Sample results of 0.5 ug/l or less shall be reported in accordance with the DMR instructions. The metals sampling from the WET testing may be used to satisfy this requirement.

15. For each whole effluent toxicity test the permittee shall report on the appropriate discharge monitoring report, (DMR), the concentrations of the hardness, ammonia nitrogen as nitrogen, total recoverable aluminum, cadmium, copper, lead, nickel, and zinc found in the 100 percent effluent sample. All these aforementioned chemical parameters shall be determined to at least the minimum quantification level shown in **Attachment A**. Also the permittee should note that all chemical parameter results must still be reported in the appropriate toxicity report.

16. Two samples per day Monday to Friday; one sample per day Saturday, Sunday and holidays.

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 6.5 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 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 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 is http://www.mass.gov/eea/agencies/massdep/service/approvals/sanitary-sewer-overflow-bypass-backup-notification.html. Notification of SSOs to EPA shall be made by a telephone call within 24 hours to the EPA Water Technical Unit, followed by a copy of the state reporting form.

C. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

Operation and maintenance 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 thirty (30) 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 <u>Overflow Emergency Response Plan</u> 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, beginning with the first year after either (i) submittal of the information required in C.5.b. or (ii) expiration of the 30 month deadline for submittal of such information. 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.

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.

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

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]

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 than1500	1 /quarter
1500 to less than 15000	6 /year
15000 +	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.

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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

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

1. **For a period of one year from the effective date of the permit**, the permittee may either submit monitoring data and other reports to EPA in hard copy form or report 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. **Beginning no later than one year after the effective date of the permit**, the permittee shall begin reporting using NetDMR, unless the facility is able to demonstrate a reasonable basis that precludes the use of NetDMR for submitting DMRs and reports. Specific requirements regarding submittal of data and reports in hard copy form and for submittal using NetDMR are described below:

   a. Submittal of Reports Using NetDMR

      NetDMR is accessed from: http://www.epa.gov/netdmr. **Within one year of the effective date of this permit**, the permittee shall begin submitting DMRs and reports required under this permit electronically to EPA using NetDMR, unless the facility is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for submitting DMRs and reports ("opt-out request").

      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. Once a permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA and will no longer be 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) to MassDEP until further notice from MassDEP.

b. Submittal of NetDMR Opt-Out Requests

Opt-out requests must be submitted in writing to EPA for written approval at least sixty (60) days prior to the date a facility would be required under this permit to begin using NetDMR. This demonstration shall be valid for twelve (12) months from the date of EPA approval and shall thereupon expire. At such time, DMRs and reports shall be submitted electronically to EPA unless the permittee submits a renewed opt-out request and such request is approved by EPA. All opt-out requests should be sent to the following addresses:

Attn: NetDMR Coordinator
U.S. Environmental Protection Agency, Water Technical Unit
5 Post Office Square, Suite 100 (OES04-4)
Boston, MA 02109-3912

And

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

c. Submittal of Reports in Hard Copy Form

Monitoring results shall be summarized for each calendar month and reported on separate hard copy Discharge Monitoring Report Form(s) (DMRs) postmarked no later than the 15th day of the month following the completed reporting period. All reports required under this permit, including MassDEP Monthly Operation and Maintenance Reports, shall be submitted as an attachment to the DMRs. Signed and dated originals of the DMRs, and all other reports or notifications required herein or in Part II 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 addresses:

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

Copies of toxicity test reports only to:

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. 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.

FRESHWATER CHRONIC
TOXICITY TEST PROCEDURE AND PROTOCOL
USEPA Region 1

I. GENERAL REQUIREMENTS

The permittee shall be responsible for the conduct of acceptable chronic (and modified acute) toxicity tests using three fresh samples collected during each test period. The following tests shall be performed as prescribed in Part 1 of the NPDES discharge permit in accordance with the appropriate test protocols described below. (Note: the permittee and testing laboratory should review the applicable permit to determine whether testing of one or both species is required).

- **Daphnid (Ceriodaphnia dubia) Survival and Reproduction Test.**
- **Fathead Minnow (Pimephales promelas) Larval Growth and Survival Test.**

Chronic and modified acute toxicity data shall be reported as outlined in Section VIII. The chronic fathead minnow and daphnid test data can be used to calculate an LC50 at the end of 48 hours of exposure when both acute (LC50) and chronic (C-NOEC) test endpoints are specified in the permit.

II. METHODS

Methods to follow are those recommended by EPA in: Short Term Methods For Estimating The Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Fourth Edition. October 2002. United States Environmental Protection Agency. Office of Water, Washington, D.C., EPA 821-R-02-013. The methods are available on-line at http://www.epa.gov/waterscience/WET/ . Exceptions and clarification are stated herein.

III. SAMPLE COLLECTION AND USE

A total of three fresh samples of effluent and receiving water are required for initiation and subsequent renewals of a freshwater, chronic, toxicity test. The receiving water control sample must be collected immediately upstream of the permitted discharge's zone of influence. Fresh samples are recommended for use on test days 1, 3, and 5. However, provided a total of three samples are used for testing over the test period, an alternate sampling schedule is acceptable. The acceptable holding times until initial use of a sample are 24 and 36 hours for on-site and off-site testing, respectively. A written waiver is required from the regulating authority for any hold time extension. All test samples collected may be used for 24, 48 and 72 hour renewals after initial use. All samples held for use beyond the day of sampling shall be refrigerated and maintained at a temperature range of 0-6^{o} C.

All samples submitted for chemical and physical analyses will be analyzed according to Section VI of this protocol.

Sampling guidance dictates that, where appropriate, aliquots for the analysis required in this protocol shall be split from the samples, containerized and immediately preserved, or analyzed as per 40 CFR Part 136. EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection. Testing for the presence of total residual chlorine (TRC) must be analyzed immediately or as soon as possible, for all effluent samples, prior to WET testing. TRC analysis may be performed on-site or by the toxicity testing laboratory and the samples must be dechlorinated, as necessary, using sodium thiosulfate prior to sample use for toxicity testing.

If any of the renewal samples are of sufficient potency to cause lethality to 50 percent or more of the test organisms in any of the test treatments for either species or, if the test fails to meet its permit limits, then chemical analysis for total metals (originally required for the initial sample only in Section VI) will be required on the renewal sample(s) as well.

IV. DILUTION WATER

Samples of receiving water must be collected from a location in the receiving water body 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. EPA strongly urges that screening for toxicity be performed prior to the set up of a full, definitive toxicity test any time there is a question about the test dilution water's ability to achieve test acceptability criteria (TAC) as indicated in Section V of this protocol. The test dilution water control response will be used in the statistical analysis of the toxicity test data. All other control(s) required to be run in the test will be reported as specified in the Discharge Monitoring Report (DMR) Instructions, Attachment F, page 2,Test Results & Permit Limits.

The test dilution water must be used to determine whether the test met the applicable TAC. When receiving water is used for test dilution, an additional control made up of standard laboratory water (0% effluent) is required. This control will be used to verify the health of the test organisms and evaluate to what extent, if any, the receiving water itself is responsible for any toxic response observed.

If dechlorination of a sample by the toxicity testing laboratory is necessary a "sodium thiosulfate" control, representing the concentration of sodium thiosulfate used to adequately dechlorinate the sample prior to toxicity testing, must be included in the test.

If the use of an alternate dilution water (ADW) is authorized, in addition to the ADW test control, the testing laboratory must, for the purpose of monitoring the receiving water, also run a receiving water control.

If the receiving water diluent is found to be, or suspected to be toxic or unreliable an ADW of known quality with hardness similar to that of the receiving water may be substituted. Substitution is species specific meaning that the decision to use ADW is made for each species and is based on the toxic response of that particular species. Substitution to an ADW is authorized in two cases. The first is the case where repeating a test due to toxicity in the site dilution water requires an **immediate decision** for ADW use be made by the permittee and toxicity testing laboratory. The second is in the case where two of the most recent documented incidents of unacceptable site dilution water toxicity requires ADW use in future WET testing.

For the second case, written notification from the permittee requesting ADW use **and** written authorization from the permit issuing agency(s) is required **prior to** switching to a long-term use of ADW for the duration of the permit.

Written requests for use of ADW must be mailed with supporting documentation to the following addresses:

Director
Office of Ecosystem Protection (CAA)
U.S. Environmental Protection Agency-New England
One Congress St., Suite 1100
Boston, MA 02114-2023

and

Manager
Water Technical Unit (SEW)
U.S. Environmental Protection Agency
One Congress Street, Suite 1100
Boston, MA 02114-2023

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.

V. TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA

Method specific test conditions and TAC are to be followed and adhered to as specified in the method guidance document, EPA 821-R-02-013. If a test does not meet TAC the test must be repeated with fresh samples within 30 days of the initial test completion date.

V.1. Use of Reference Toxicity Testing

Reference toxicity test results and applicable control charts must be included in the toxicity testing report.

If reference toxicity test results fall outside the control limits established by the laboratory for a specific test endpoint, a reason or reasons for this excursion must be evaluated, correction made and reference toxicity tests rerun as necessary.

If a test endpoint value exceeds the control limits at a frequency of more than one out of twenty then causes for the reference toxicity test failure must be examined and if problems are identified corrective action taken. The reference toxicity test must be repeated during the same month in which the exceedance occurred.

If two consecutive reference toxicity tests fall outside control limits, the possible cause(s) for the exceedance must be examined, corrective actions taken and a repeat of the reference toxicity test must take place immediately. Actions taken to resolve the problem must be reported.

V.1.a. Use of Concurrent Reference Toxicity Testing

In the case where concurrent reference toxicity testing is required due to a low frequency of testing with a particular method, if the reference toxicity test results fall slightly outside of laboratory established control limits, but the primary test met the TAC, the results of the primary test will be considered acceptable. However, if the results of the concurrent test fall well outside the established **upper** control limits i.e. ≥3 standard deviations for IC25s and LC50 values and ≥ two concentration intervals for NOECs or NOAECs, and even though the primary test meets TAC, the primary test will be considered unacceptable and must be repeated.

V.2. For the *C. dubia* test, the determination of TAC and formal statistical analyses must be performed using only the first three broods produced.

V.3. Test treatments must include 5 effluent concentrations and a dilution water control. An additional test treatment, at the permitted effluent concentration (% effluent), is required if it is not included in the dilution series.

VI. CHEMICAL ANALYSIS

As part of each toxicity test's daily renewal procedure, pH, specific conductance, dissolved oxygen (DO) and temperature must be measured at the beginning and end of each 24-hour period in each test treatment and the control(s).

The additional analysis that must be performed under this protocol is as specified and noted in the table below.

Parameter	Effluent	Receiving Water	ML (mg/l)
Hardness[1, 4]	x	x	0.5
Total Residual Chlorine (TRC)[2, 3, 4]	x		0.02
Alkalinity[4]	x	x	2.0
pH[4]	x	x	--
Specific Conductance[4]	x	x	--
Total Solids [6]	x		--
Total Dissolved Solids [6]	x		--
Ammonia[4]	x	x	0.1
Total Organic Carbon [6]	x	x	0.5
Total Metals [5]			
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
- USEPA 1983. Manual of Methods Analysis of Water and Wastes
  - -Method 330.5

3. Required to be performed on the sample used for WET testing prior to its use for toxicity testing
4. Analysis is to be performed on samples and/or receiving water, as designated in the table above, from all three sampling events.
5. Analysis is to be performed on the initial sample(s) only unless the situation arises as stated in Section III, paragraph 4
6. Analysis to be performed on initial samples only

VII. TOXICITY TEST DATA ANALYSIS AND REVIEW

A. Test Review

1. Concentration / Response Relationship

A concentration/response relationship evaluation is required for test endpoint determinations from both Hypothesis Testing and Point Estimate techniques. The test report is to include documentation of this evaluation in support of the endpoint values reported. The dose-response review must be performed as required in Section 10.2.6 of EPA-821-R-02-013. Guidance for this review can be found at http://www.epa.gov/waterscience/methods/wet/pdf/wetguide.pdf . In most cases, the review will result in one of the following three conclusions: (1) Results are reliable and reportable; (2) Results are anomalous and require explanation; or (3) Results are inconclusive and a retest with fresh samples is required.

2. Test Variability (Test Sensitivity)

This review step is separate from the determination of whether a test meets or does not meet TAC. Within test variability is to be examined for the purpose of evaluating test sensitivity. This evaluation is to be performed for the sub-lethal hypothesis testing endpoints reproduction and growth as required by the permit. The test report is to include documentation of this evaluation to support that the endpoint values reported resulted from a toxicity test of adequate sensitivity. This evaluation must be performed as required in Section 10.2.8 of EPA-821-R-02-013.

To determine the adequacy of test sensitivity, USEPA requires the calculation of test percent minimum significant difference (PMSD) values. In cases where NOEC determinations are made based on a non-parametric technique, calculation of a test PMSD value**,** for the sole purpose of assessing test sensitivity, shall be calculated using a comparable parametric statistical analysis technique. The calculated test PMSD is then compared to the upper and lower PMSD bounds shown for freshwater tests in Section 10.2.8.3, p. 52, Table 6 of EPA-821-R-02-013. The comparison will yield one of the following determinations.

- The test PMSD exceeds the PMSD upper bound test variability criterion in Table 6, the test results are considered highly variable and the test may not be sensitive enough to determine the presence of toxicity at the permit limit concentration (PLC). If the test results indicate that the discharge is not toxic at the PLC, then the test is considered insufficiently sensitive and must be repeated within 30 days of the initial test completion using fresh samples. If the test results indicate that the discharge is toxic at the PLC, the test is considered acceptable and does not have to be repeated.

- The test PMSD falls below the PMSD lower bound test variability criterion in Table 6, the test is determined to be very sensitive. In order to determine which treatment(s) are statistically significant and which are not, for the purpose of reporting a NOEC, the relative percent difference (RPD) between the control and each treatment must be calculated and compared to the lower PMSD boundary. See *Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program*, EPA 833-R-00-003, June 2002, Section 6.4.2. The following link: Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program can be used to locate the USEPA website containing this document. If the RPD for a treatment falls below the PMSD lower bound, the difference is considered statistically insignificant. If the RPD for a treatment is greater that the PMSD lower bound, then the treatment is considered statistically significant.

- The test PMSD falls within the PMSD upper and lower bounds in Table 6, the sub-lethal test endpoint values shall be reported as is.

B. Statistical Analysis

1. General - Recommended Statistical Analysis Method

Refer to general data analysis flowchart, EPA 821-R-02-013, page 43

For discussion on Hypothesis Testing, refer to EPA 821-R-02-013, Section 9.6

For discussion on Point Estimation Techniques, refer to EPA 821-R-02-013, Section 9.7

2. *Pimephales promelas*

Refer to survival hypothesis testing analysis flowchart, EPA 821-R-02-013, page 79

Refer to survival point estimate techniques flowchart, EPA 821-R-02-013, page 80

Refer to growth data statistical analysis flowchart, EPA 821-R-02-013, page 92

3. *Ceriodaphnia dubia*

Refer to survival data testing flowchart, EPA 821-R-02-013, page 168

Refer to reproduction data testing flowchart, EPA 821-R-02-013, page 173

VIII. TOXICITY TEST REPORTING

A report of results must include the following:

- Test summary sheets (2007 DMR Attachment F) which includes:
  - Facility name
  - NPDES permit number
  - Outfall number
  - Sample type
  - Sampling method
  - Effluent TRC concentration
  - Dilution water used
  - Receiving water name and sampling location
  - Test type and species
  - Test start date
  - Effluent concentrations tested (%) and permit limit concentration
  - Applicable reference toxicity test date and whether acceptable or not
  - Age, age range and source of test organisms used for testing
  - Results of TAC review for all applicable controls
  - Test sensitivity evaluation results (test PMSD for growth and reproduction)
  - Permit limit and toxicity test results
  - Summary of test sensitivity and concentration response evaluation

In addition to the summary sheets the report must include:

- A brief description of sample collection procedures
- Chain of custody documentation including names of individuals collecting samples, times and dates of sample collection, sample locations, requested analysis and lab receipt with time and date received, lab receipt personnel and condition of samples upon receipt at the lab(s)
- Reference toxicity test control charts
- All sample chemical/physical data generated, including minimum limits (MLs) and analytical methods used
- All toxicity test raw data including daily ambient test conditions, toxicity test chemistry, sample dechlorination details as necessary, bench sheets and statistical analysis
- A discussion of any deviations from test conditions
- Any further discussion of reported test results, statistical analysis and concentration-response relationship and test sensitivity review per species per endpoint

NPDES PART II STANDARD CONDITIONS
(January, 2007)

TABLE OF CONTENTS

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. <u>Definitions for NPDES Permit Sludge Use and Disposal Requirements</u>.

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.

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: **MA0101311**

PUBLIC NOTICE START AND END DATES: September 25, 2012 – November 26, 2012

NAME AND MAILING ADDRESS OF APPLICANT:

Board of Sewer Commissioners
Grafton Wastewater Treatment Plant
9 Depot Street
South Grafton, MA 01560

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Grafton Wastewater Treatment Plant
9 Depot Street
South Grafton, MA 01560

RECEIVING WATER: **Blackstone River (MA51-04)**
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. **Figure 1** shows the location of the facility.

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**.

The Grafton WWTP is a 2.4 MGD secondary wastewater treatment facility located in South Grafton, Massachusetts. It serves approximately 11,000 people in the town and two significant industrial users. The collection system consists entirely of separate sewers.

Figure 2 is a diagram of the treatment facility. The Grafton WWTP uses a mechanical bar rack to remove coarse sewage solids and other materials before primary sedimentation in two clarithickeners. The wastewater then enters aeration tanks, followed by secondary clarifiers and a chlorine contact chamber for seasonal disinfection Seasonal phosphorous removal is achieved through addition of ferric chloride prior to the clarithickeners.

III. Receiving Water Description

The Grafton WWTP discharges to the Blackstone River in South Grafton, MA. The Blackstone River is an interstate water that 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 seventeen miles downstream of the Grafton 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, including the Fisherville Dam approximately one mile upstream of Grafton WWTP, and the Riverdale Dam in Northbridge, approximately three miles downstream.

The 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* 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 Grafton WWTP discharges to, Segment MA51-04, is listed for impairments caused by unknown toxicity, priority organics, metals, nutrients, organic enrichment/low DO, 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. 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 Rhode Island Water Quality Regulations (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 Section 402(o) 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, CBOD, TSS and ammonia nitrogen while also expressing those limits as mass load limits. 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 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 2.4 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 2.4 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). The Grafton WWTP has had a number of individual months where flows have exceeded the 2.4 MGD limit; the average flow from the facility was 2.0 MGD over the period 2009-2010. See Table 1.

2. Conventional Pollutants

a. CBOD, BOD and TSS

The concentration-based effluent limits for these pollutants remain the same as in the current permit. For the period of November through May, effluent limitations for monthly and weekly average Biochemical Oxygen Demand (BOD5) and Total Suspended Solids (TSS) are based on secondary treatment requirements. CWA § 301(b)(1)(B); 40 CFR § 133.102. The CBOD and TSS draft permit limits for the period from June to October are water-quality based limits based on the WLA. There have been no CBOD, BOD or TSS violations between 2005 and December 2010.

Mass loading effluent limits for average monthly and average weekly BOD, CBOD 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, with long term average concentrations of approximately 50% of the monthly average permit limits for these pollutants.

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 1999 Update of Ambient Water Quality Criteria for Ammonia* (EPA 822-R-99-014, December 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 no 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 will transition 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*, November 12, 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.

Enterococci limits

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 limits, 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 Grafton 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 Grafton, 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 winter bacteria limit EPA has estimated the amount of bacteria die-off that is expected to occur between Grafton 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 17.2 miles, or 90,128 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 the Grafton WWTP (35.4 miles) and that of Reach 16 which crosses over into Rhode Island (18.2). Using these values results in an estimated travel time of 1.04 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 35.2% (0.352). In other words, 35.2% of the bacteria that is discharged at the Grafton WWTP would be present at the state line.

Using the die-off estimate of 64.8%, EPA has set the enterococci limits at a monthly geometric mean of 153 colonies/100 ml and a daily maximum of 497 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)

$\frac{54}{0.352}$ = **153 colonies/100 ml**

Daily maximum:

$\frac{175}{0.352}$ = **497 colonies/100 ml**

The draft permit limit does not take into account dilution, consistent with EPA policy (see EPA Memorandum, November 12, 2008), 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 WQS 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 Publicly Owned Treatment Works (POTW) under Section 401(d) of the CWA, 40 CFR 124.53 and 124.55, and water quality standards and remain the same as in the current permit, at 6.5 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 dissolved oxygen (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 Grafton 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 Grafton WWTP discharge is located to be non-supportive of aquatic life uses based on evidence of organic enrichment and an impaired benthic macroinvertebrate community, among other things. 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 downstream of the discharge. MassDEP's monthly monitoring from May to October 2003 documented total phosphorus levels ranging from 0.18 to 1.1 mg/l in Sutton, upstream of the discharge, and ranging from 0.16 to 0.69 mg/l downstream of the discharge in Northbridge. *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 Grafton discharge, with dissolved phosphorus concentrations averaging 0.47 mg/l (and as high as 0.9 mg/l) between 2005 and 2008 at their monitoring site on the Blackstone River at the outlet of Fisherville Pond in Grafton, upstream of the Grafton WWTP. 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,* 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 Grafton WWTP under the current permit limit "will cause, have reasonable potential to cause, or contribute to" an excursion above the narrative criterion for nutrients. The Grafton facility currently discharges under a seasonal monthly average effluent limit of 1.0 mg/l, with concentrations averaging 0.87 mg/l during the 2009-10 phosphorus control seasons. Concentrations outside the treatment season (indicative of the full potential of the facility to contribute to water quality exceedances) have been as high as 1.8 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 upstream POTWs and other sources. Therefore the setting of a more stringent effluent limit is required. 40 CFR § 122.44(d)(1)(ii) and (iii).

ii. Effluent limitation

As noted above, the Massachusetts Water Quality Standards 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 Massachusetts 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 – the Upper Blackstone Water Pollution Abatement District and the Grafton WWTP, are set forth 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. 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).[1]

[1] 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).

Source	Flow (MGD)	P limit
UBWPAD	56.0	0.1 mg/l
Grafton	2.4	0.2 mg/l*

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

$$Q_r C_r = \Sigma \; Q_d C_d + Q_s C_s$$

Where

Q_r = receiving water flow downstream of the discharge (Σ Qd + Qs)
C_r = total phosphorus concentration in the receiving water downstream of the discharge
Q_d = design flow from each facility
C_d = total phosphorus concentration in each discharge (assumed to be permit limit)
Q_s = Blackstone River base flow at 7Q10 = 13.35 cfs = 8.6 MGD[2]
C_s = phosphorus concentration in baseflow, from sampling upstream of all POTWs = 0.04 mg/l

Solving for C_r yields:

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

$$C_r = \frac{56 * 0.1 + 2.4 * 0.2 + 8.6 * 0.04}{67}$$

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

This calculation indicates that an effluent limit of 0.2 mg/l, consistent with the "highest and best practical treatment" mandated under the Massachusetts SWQS, is sufficient to ensure that the narrative water quality standard for nutrients is met. The draft permit therefore includes a monthly average seasonal phosphorus limit of 0.2 mg/l.

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

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[2] 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 7Q10 flow of 69 cfs used as the basis for permit limits in the current permit includes summer flows for UBWPAD and the Millbury WWTP of 54.55 cfs and 1.10 cfs respectively (see Response to Public Comments (1999)). The baseflow component of the 7Q10 flow is calculated by subtracting the upstream POTW flows from the total 7Q10 as follows:

69 cfs (7Q10 including POTWs) – 54.55 cfs (UBWPAD) – 1.10 cfs (Millbury) = 13.35 cfs

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 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[3] 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[4], 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).[5] The HSPF

[3] 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.

[4] 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.

[5] 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

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.

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 (for both orthophosphorus and total phosphorus) is 1/week.

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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.

b. Nitrogen

The draft permit contains an effluent limitation of 8 mg/l total nitrogen, 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.

Rhode Island Water Quality Regulations, 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, 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. *Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers,* Rhode Island Department of Environmental Management (December 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* (March 3, 2004); *Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers,* Rhode Island Department of Environmental Management (December 2004); *Plan for Managing Nutrient Loadings to Rhode Island Waters*, RIDEM (February 1, 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* 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. 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. In addition a number of 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.

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 UBWPAD WWTP (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 Grafton WWTF, in 2005 (see section 3(b)(ii)(a)(1) at page 19 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 Grafton WWTP 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 Grafton 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 Grafton WWTP has reported its discharges of ammonia and of "nitrite plus nitrate". Together these represent the dissolved inorganic nitrogen ("DIN") component of the facility's 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 Grafton discharge from 2005 through 2010, based on the DMRs, was 13.5 mg/l, giving a total load at design flow of 122 kg/day (268 lb/day).

The Grafton discharge is located approximately 33 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 10% for the Grafton 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 Grafton discharge to the Seekonk River is 110 kg/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 Providence River sewage. 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 Grafton 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 Grafton WWTP 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 Grafton 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 current loadings 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 Grafton discharge is not controlled.

Based on the available evidence, the Grafton 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 *Performance Partnership Agreement Between the Rhode Island Department of Environmental Management and US Environmental Protection Agency Region 1* (January 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) at __ ("2004 RIDEM Report"). This is an accepted approach under EPA guidance for wasteload allocations. See *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. Of this load, 219 lbs/day (5% of the total) is from the Grafton discharge.

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").

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%.

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 B.

(2) EPA Update of RI analysis

In applying this load allocation analysis to the reissuance of permits to the Grafton and Uxbridge facilities, EPA notes that (1) several other wastewater treatment 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. The current MA dischargers to the Blackstone River system are set forth in Table 4, along with their seasonal loads based on monitoring data from 2007-09.

Table 4. Current DIN Loadings to Blackstone River from WWTFs

	May-Oct, 2007 to 2009 DMR data		
POTW	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, which excludes the Millbury WWTF but includes 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 Attachment B.

As shown in Table 3, 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 has included an 8 mg/l TN limit in the draft Northbridge WWTF permit that has recently been released for public comment.

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. This requires an effluent limit of 8 mg/l TN. 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 U.S.EPA, *Fact Sheet, Upper Blackstone Water Pollution Abatement District*, NPDES No. MA0102369 (2006); U.S.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[6] 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 analysis of the application of the MERL experiment results to the Seekonk River. See *Response to Comments, UBWPAD*, at 28-29 and documents cited. 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:

> 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.

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[6] 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.

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 B. The contribution of each facility and the total load to the Blackstone River is shown in Table 6.

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] Blackstone River delivery factors, see Attachment b; Attleboro and North Attleboro, 2004 RIDEM Rep

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 (May to October). The draft permit for Uxbridge 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.

TRC effluent limts are established with the use of a calculated available dilution factor. The Massachusetts Water Quality Standards, 314 CMR 4.03(3)(a), require that effluent dilution be calculated based on the receiving water 7Q10. The 7Q10 is the lowest observed mean river flow for 7 consecutive days, recorded over a 10 year recurrence interval. Additionally, the plant design flow is used to calculate available effluent dilution.

The 1999 Fact Sheet, issued in connection with the existing permit, lists the 7Q10 flow of the Blackstone River at the Grafton WWTP as 44 MGD, or 68 cfs. This figure was based on the Waste Load Allocation model (1999 Fact Sheet, Attachment A), although the exact derivation of the figure is not longer available. EPA notes that standard statistical methods for calculating 7Q10 flows from streamgage data (such as that available for the Northbridge USGS streamgage approximately 2 miles downstream) are not reliable for heavily regulated rivers such as the Blackstone, where a substantial proportion of dry weather flow consist of upstream POTW effluent discharges. However, the figure of 68 cfs is reasonably consistent with the actual reported flows at Northbridge during August 2002, a very dry summer in which 7Q10 (and more severe) conditions were encountered throughout central and eastern Massachusetts. Average flow at Northbridge in August 2002 was 69 cfs. Therefore EPA will continue to use a 7Q10 Flow of 44 MGD to calculate the dilution factor for this facility. This is calculated as follows:

$$\frac{\text{plant design flow} + \text{7Q10 river flow}}{\text{plant design flow}} = \frac{2.4\text{ MGD} + 44\text{ MGD}}{2.4\text{ MGD}} = 19$$

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

11 ug/l(chronic criterion) * 19 (dilution factor) = 209 ug/l or **0.21 mg/**l (avg mnthly limit)
19 ug/l (acute criterion) * 19 (dilution factor) = 361 ug/l or **0.36 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 the Environmental Protection Agency 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. The MassDEP requires bioassay toxicity testing for state certification.

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.

Consistent with MassDEP and EPA Region 1 policy for discharges having a dilution ratio of between 10:1 and 20:1, the current permit requires acute and chronic toxicity testing four times per year. MassDEP, *Implementation Policy for the Control of Toxic Pollutants in Surface Waters* (February 23, 1990). The current permit requires testing on one organism, the daphnid Ceriodaphnia dubia. The acute limit (LC50) is $\geq$ 100%, while the permit contains no chronic limit.

In order to evaluate the potential for chronic toxicity of the discharge, EPA reviewed monitoring data from 2005 to 2010. These data indicate a minimum C-NOEC of 25% (two occasions), with 19 out of 23 results showing a C-NOEC of 100%. Pursuant to the MassDEP *Implementation Policy*, the minimum C-NOEC must be greater than the receiving water concentration at critical (7Q10) conditions. The receiving water concentration is equal to the inverse of the dilution factor calculated above, so the required minimum C-NOEC is (1/19 * 100% =) 5.2%. The monitoring data does not indicate a reasonable potential to fall below 5.2%, so no limit is established in the draft permit. The WET testing does indicate episodes of acute toxicity, with LC50 below 100% in June 2009.

Therefore consistent the draft permit requires that the Town continue to conduct chronic and modified acute WET testing for Outfall 001 effluent four 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 to the Draft Permit. EPA notes that the Town of Grafton received permission during the permit term to use alternate dilution water due to toxicity of the receiving water. However since 2008 Grafton WWTP has conducted 15 modified acute and chronic whole effluent toxicity tests between July 2008 and April 2012 with the river water used as the diluents and has met test acceptability requirements for the receiving water. Therefore the draft permit requires continued use of river water as diluent.

6. Other toxic pollutants

To determine if the Grafton WWTP discharges any other toxic pollutants, EPA reviewed the expanded effluent data submitted in connection with the facility's permit application as well as analytical data submitted in connection with the facility's WET Reports. EPA determined that five potentially toxic metals have been identified in the discharge: aluminum, copper, lead, nickel 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).

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 *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 99^{th} percentile is used to represent the maximum expected pollutant level. For the chronic criterion, representing a four day exposure, the 95^{th} 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.

As applied to the Grafton discharge, the analysis is as follows. Table 7 shows effluent concentration data for aluminum, copper, nickel and zinc, along with the log-transformed data. (Lead, which has only two values over the detection limit, is analyzed below). Based on the mean (μ) and the standard deviation (σ) of the log-transformed data the 95^{th} and 99^{th} percentile expected concentrations are calculated and compared with the relevant water quality criteria.

Table 7. WET analytical data statistical analysis

	Effluent analytical data ($ug/l_{total\ recoverable}$) and log-transformed data							
	Al	**ln(Al)**	**Cu**	**ln(Cu)**	**Ni**	**ln(Ni)**	**Zn**	**ln(Zn)**
1/10/2005	48	3.8712	14	2.6391	ND-4	*1.3863*	22	3.0910
4/20/2005	46	3.8286	12	2.4849	ND-4	*1.3863*	21	3.0445
7/18/2005	55	4.0073	21	3.0445	7.3	1.9879	41	3.7136
11/16/2005	34	3.5264	15	2.7081	6.6	1.8871	27	3.2958
1/20/2006	42	3.7377	10	2.3026	3.3	1.1939	20	2.9957
4/10/2006	28	3.3322	17	2.8332	5.9	1.7750	40	3.6889
7/10/2006	58	4.0604	29	3.3673	6.9	1.9315	42	3.7377
10/16/2006	39	3.6636	47	3.8501	12	2.4849	52	3.9512
2/5/2007	24	3.1781	21	3.0445	9.4	2.2407	29	3.3673
7/9/2007	34	3.5264	36	3.5835	6.6	1.8871	35	3.5553
10/17/2008	15	2.7081	17	2.8332	8.2	2.1041	27	3.2958
1/7/2008	25	3.2189	27	3.2958	5.3	1.6677	36	3.5835
4/14/2008	41	3.7136	29	3.3673	4	1.3863	38	3.6376
7/14/2008	37	3.6109	21	3.0445	7	1.9459	37	3.6109
10/20/2008	34	3.5264	23	3.1355	11	2.3979	18	2.8904
1/26/2009	82	4.4067	25	3.2189	8	2.0794	41	3.7136
4/6/2009	70	4.2485	26	3.2581	16	2.7726	41	3.7136
7/20/2009	38	3.6376	22	3.0910	6	1.7918	48	3.8712
1/25/2010	162	5.0876	32	3.4657	13	2.5649	37	3.6109
4/26/2010	28	3.3322	12	2.4849	28	3.3322	29	3.3673
7/26/2010	17	2.8332	9	2.1972	10	2.3026	20	2.9957
10/18/2010	ND-10	*2.3026*	15	2.7081	18	2.8904	23	3.1355
1/24/2011	117	4.7622	41	3.7136	11	2.3979	59	4.0775
μ = mean of ln(X))		3.66		3.03		2.08		3.48
σ = standard deviation of ln(X)		0.627		0.442		0.526		0.334
95th percentile = exp(μ + 1.645 σ)	108.7		42.8		19.0		56.0	
99th percentile = exp(μ + 2.326 σ)	166.7		57.8		27.1		70.3	

	MA WQS Standard ($ug/l_{dissolved}$)							
Chronic Criterion[2]	87		18.1		58.7		78.8	
Acute Criterion[2]	750		25.7		312.5		78.8	

Shaded entries indicate use of detection limit for non-detect results

[1] Non-detects noted as "ND - [minimum detection level]"
[2] Criteria for Cd, Ni, Pb and Zn are hardness dependent and calculated using the formulas set forth in the *National Recommended Water Quality Criteria 2002* at a hardness of 63 based on median receiving water hardness per Table 2.

For lead, the monitoring data primarily consists of non-detect values. Therefore EPA characterizes the data using a "delta-lognormal" distribution as recommended in the *TSD*. Based on that analysis, shown in Attachment C, the upper bound expected pollutant concentrations for lead are 2.05 ug/l (95th percentile) and 8.67 ug/l (99th percentile).

As Table 7 indicates, the upper bound nickel and zinc concentrations are below the relevant criteria even for pure effluent, so no further analysis is necessary. For the other metals, 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. For aluminum and copper the resulting receiving water concentration is below the relevant criteria, so no effluent is required. For lead, however, the resulting receiving water concentration is above the chronic criterion of 1.5 ug/l. The effluent concentrations have been above the criterion on one occasion within the past five years (a maximum concentration of 5.2 ug/l), and the receiving water upstream of the discharge exceeds the chronic criterion in more than half the samples (see Table 2). Therefore the Grafton discharge has a reasonable potential to cause or contribute to a water quality violation with respect to that chronic criterion, and an effluent limit must be set. In this case the receiving water provides no dilution to the discharge. Therefore a monthly average limit of 1.8 $ug/l_{total\ recoverable}$ (equivalent to the criterion of 1.5 $ug/l_{dissolved}$, which is expressed in terms of dissolved form) is included in the draft permit.

Table 8 Mass balance calculations

	Qd	$Cd_{total\ recoverable}$	Qs	$Cs_{total\ recoverable}$	Qr = Qd+Qs	Cr_{tr}= (QdCd+QsCs)/Qr	$Cr_{dissolved}$	Criterion
Al chronic	2.4	110.65	44	81	46.4	82.5	82.5	87
Al acute		168.19		81		85.5	85.5	750
Cu chronic		42.3		8		9.8	9.4	18.1
Cu acute		56		8		10.5	10.1	25.7
Pb chronic		2.19		2		2.0	1.7	1.5
Pb acute		8.91		2		2.4	2.0	38.9

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[7]). 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.

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[7] "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.

VIII. Sewage Sludge Information and Requirements

The Grafton WWTP generates about 472 dry metric tons of sludge per year. The sludge is transported to the Upper Blackstone WPAD facility in Worcester where it is dewatered and incinerated. In February 1993, the Environmental Protection Agency (EPA) promulgated standards for the use and disposal of sewage sludge. The regulations were promulgated under the authority of §405(d) of the Clean Water Act (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 no EFH has been designated in the Blackstone River. The permit is also designed to protect the downstream waters of the Seekonk and Providence Rivers in Rhode Island, and NMFS information indicates that EFH has been designated for 33 managed species within the Providence River. *See* NOAA, Summary of Essential Fish Habitat, Providence River (http://www.nero.noaa.gov/hcd/STATES4/Rhode_Island/41407120.html). It is possible that a number of these species utilize the downstream Rhode Island marine 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 Grafton discharge is located more than 20 miles upstream of designated EFH habitat;
- The dilution factor at the point of discharge is 19, 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. The National Marine Fisheries Service (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 includes new provisions related to Discharge Monitoring Report (DMR) submittals to EPA and the State. The Draft Permit requires that, no later than one year after the effective date of the permit, the permittee submit all monitoring data and other reports required by the permit to EPA using NetDMR, unless the permittee is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for submitting DMRs and reports ("opt-out request").

In the interim (until one year from the effective date of the permit), the permittee may either submit monitoring data and other reports to EPA in hard copy form, or report electronically using NetDMR.

NetDMR is a national web-based tool for regulated Clean Water Act permittees to submit discharge monitoring reports (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.

EPA currently conducts free training on the use of NetDMR, and anticipates that the availability of this training will continue to assist permittees with the transition to use of NetDMR. To participate in upcoming trainings, visit http://www.epa.gov/netdmr for contact information for Massachusetts.

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. Once a permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA and will no longer be required to submit hard copies of DMRs to MassDEP. However, permittees must continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP.

The Draft Permit also includes an "opt-out" request process. Permittees who believe they can not use NetDMR due to technical or administrative infeasibilities, or other logical reasons, must demonstrate the reasonable basis that precludes the use of NetDMR. These permittees must submit the justification, in writing, to EPA at least sixty (60) days prior to the date the facility would otherwise be required to begin using NetDMR. Opt-outs become effective upon the date of written approval by EPA and are valid for twelve (12) months from the date of EPA approval. The opt-outs expire at the end of this twelve (12) month period. Upon expiration, the permittee must submit DMRs and reports to EPA using NetDMR, unless the permittee submits a renewed opt-out request sixty (60) days prior to expiration of its opt-out, and such a request is approved by EPA.

Until electronic reporting using NetDMR begins, or for those permittees that receive written approval from EPA to continue to submit hard copies of DMRs, the Draft Permit requires that submittal of DMRs and other reports required by the permit continue in hard copy format. Hard copies of DMRs must be postmarked no later than the 15th day of the month following the completed reporting period.

XII. State Certification Requirements

EPA may not issue a permit unless the Massachusetts Department of Environmental Protection 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. 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, Hearing Requests, 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. Any person prior to such date may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues to be raised in the hearing. A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. 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
Grafton WWTP
NPDES No. MA0101311

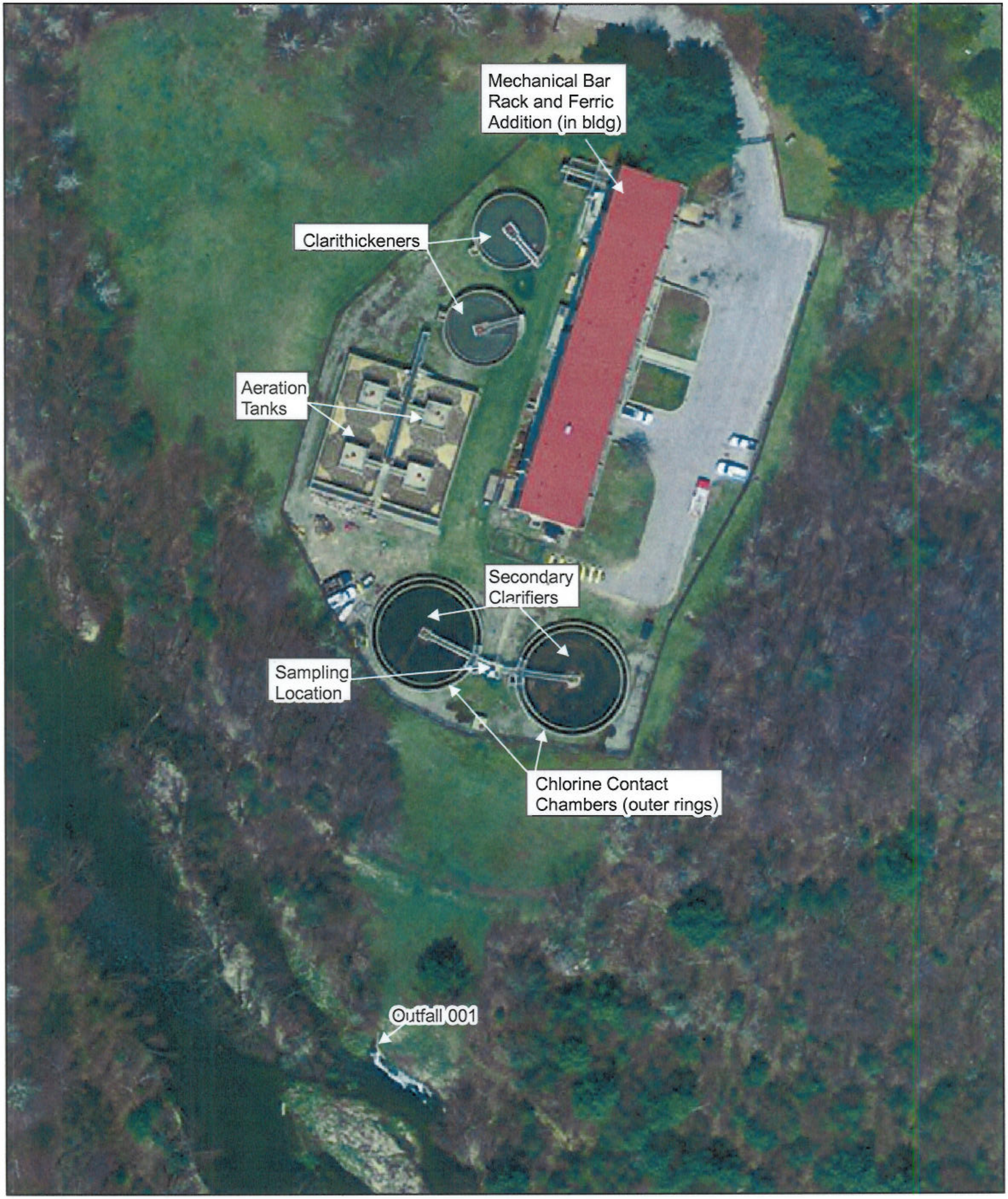
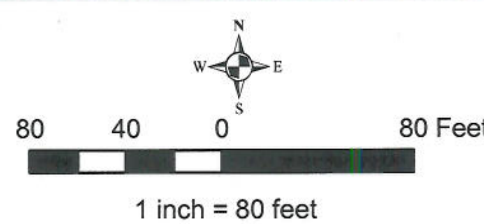


Figure 2. Facility Diagram
Grafton WWTP
NPDES No. MA0101311



Grafton Wastewater Treatment Plant
NPDES Permit No. MA0101311

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

	Flow	BOD			CBOD		TSS			WET	
	mo avg (MGD)	mo avg (mg/l)	max (mg/l)	% rem	mo avg (mg/l)	max (mg/l)	mo avg (mg/l)	max (mg/l)	% rem	LC50 (%)	CNOEC
Effluent Limit	2.4	30 (November-May)	45 (November-May)	85	20 (June-October)	30 (June-October)	20 (Jun-Oct) 30 (Nov-May)	30 (Jun-Oct) 45 (Nov-May)	85	100	Report
January 2009	2.37	21	36	94			10	15	96		
February	1.99	13	20	96			7	14	98		
March	2.46	8	21	95			8	23	97	100	100
April	2.29	13	19	96			4	9	99		
May	1.89	9	16	97			5	16	99		
June	1.71			97	9	16	6	12	99	62.6	53.5
July	2.52			97	6	10	8	17	98		
August	2.16			99	3	4	6	11	99		
September	1.66			98	5	9	7	11	99	100	100
October	1.69			97	9	14	14	30	98		
November	1.88	22	41	94			19	29	96		
December	2.3	21	43	91			18	35	94	100	25
January 2010	2	17	22	95			20	27	95		
February	1.95	20	28	93			24	29	88		
March	3.36	21	29	94			25	29	93	100	100
April	2.85	13	22	96			15	27	97		
May	1.73	16	20	96			24	28	95		
June	1.64			93	19	53	17	28	94	100	100
July	1.41			97	11	15	11	18	98		
August	1.34			97	10	20	10	24	98		
September	1.38			97	10	15	10	36	97	100	100
October	1.52			96	11	20	9	19	98		
November	1.62	22	37	94			12	20	97		
December	1.68	17	29	95			10	20	98	100	100
Average:	1.98	16.6		95.6	9.3		12.5		96.7		
Maximum:			43			53		36			

Grafton Wastewater Treatment Plant
NPDES Permit No. MA0101311

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)
Effluent Limit		6.5	8.3	15 (Dec-Apr) 10 (May,Nov) 5 (Jun-Oct)	Report	5	Report	0.21	0.36	200	400
January	2009	6.6	7.5	8.4	7.72	9.8	1.8				
February		6.8	7.5	10.2	4.67	9.5	1.2				
March		6.5	7.3	7.4	9.34	9.7	1.3				
April		6.5	7	6.2	9.64	9	0.9	0.15	0.23	97	204
May		6.5	6.8	1.3	16.01	8.4	0.85	0.16	0.26	16	158
June		6.5	6.9	2	18.11	7.2	0.91	0.16	0.22	89	219
July		6.5	7.1	1.9	10.94	7.4	0.87	0.15	0.26	199	224
August		6.5	6.9	1	8.14	7.4	0.82	0.16	0.27	42	269
September		6.5	7.1	3.2	10.78	7	1.05	0.17	0.29	10	78
October		6.6	7.3	3.9	11.15	7	0.87	0.16	0.29	52	251
November		6.6	7	3.5	2.57	7.2	1				
December		6.5	6.9	12.9	1.06	7.5	1.4				
January	2010	6.6	7.2	9.6	1.14	7.8	1.4				
February		6.7	7.2	11	0.94	7.8	1.77				
March		6.6	7.3	6	1.58	8.6	0.7				
April		6.6	7.7	9	1.27	8.5	0.81	0.18	0.48	110	162
May		6.8	7.7	6	1.97	7	0.89	0.15	0.22	153	214
June		6.7	7.8	3	2.05	7.3	0.93	0.14	0.24	76	263
July		6.8	7.3	3	2.83	7	0.86	0.15	0.27	63	178
August		6.7	7.2	5	7.54	7.3	0.99	0.16	0.29	18	237
September		6.7	7.1	4	11.52	7	0.8	0.14	0.23	50	208
October		6.6	7.1	3.3	7.41	6.9	0.68	0.14	0.26	61	176
November		6.7	7	7	3.23	7.1	1.3				
December		6.6	7	15	4.2	7.6	1.8				
	Average:			6.0	6.5		1.1	0.16		74	
	Maximum:	6.5 (min)	7.8			6.9 (min)			0.48		269

Grafton Wastewater Treatment Plant
NPDES Permit No. MA 0101311

Table 2
Metals Effluent Data and Criteria Calculations

	Effluent Analytical Data (ug/l_{tr})							Receiving Water Analytical Data (ug/l)						
	Hardness	Al	Cd[1]	Cu	Ni	Pb[1]	Zn	Hardness	Al	Cd[1]	Cu	Ni	Pb[1]	Zn
1/10/2005	81	48	ND-1	14	ND-4	ND-1	22							
4/20/2005	67	46	ND-1	12	ND-4	ND-1	21							
7/18/2005	66	55	ND-1	21	7.3	ND-1	41							
11/16/2005	184	34	ND-1	15	6.6	ND-1	27							
1/20/2006	77	42	ND-1	10	3.3	ND-1	20							
4/10/2006	79	28	ND-1	17	5.9	ND-1	40							
7/10/2006	76	58	ND-1	29	6.9	5.2	42							
10/16/2006	96	39	ND-1	47	12	ND-1	52							
2/5/2007	102	24	ND-1	21	9.4	ND-1	29							
7/9/2007	87	34	ND-1	36	6.6	1.2	35							
10/17/2008	97	15	ND-1	17	8.2	ND-1	27							
1/7/2008	94	25	ND-0.5	27	5.3	ND-1	36							
4/14/2008	84	41	ND-1	29	4	ND-1	38							
7/14/2008	102	37	ND-1	21	7	ND-1	37	76	36	ND-1	21	6	ND-1	37
10/20/2008	84	34	ND-1	23	11	ND-1	18	60	34	ND-1	8	3	ND-1	26
1/26/2009	76	82	ND-1	25	8	ND-1	41	64	81	ND-1	25	8	ND-1	41
4/6/2009	82	70	ND-1	26	16	ND-1	41	60	136	ND-1	8	4	3	21
7/20/2009	80	38	ND-1	22	6	ND-2	48	58	160	ND-1	10	2	7	47
1/25/2010	74	162	ND-1	32	13	ND-1	37	68	40	ND-1	7	3	ND-1	24
4/26/2010	72	28	ND-1	12	28	ND-2	29	62	62	ND-1	7	5	2	23
7/26/2010	92	17	ND-1	9	10	ND-2	20	66.5	138	ND-1	13	3	7	22
10/18/2010	112	ND-10	ND-1	15	18	ND-2	23	57.5	81	ND-1	7	3	ND-2	23
1/24/2011	98	117	ND-1	41	11	ND-2	59	80	135	ND-1	5	4	4	43
Median	84	39	ND-1	21	8	ND-1	36	63	81	ND-1	8	4	2	25
Max		162	ND-1	47	28	5.2	59							

		MA WQS Criteria ($ug/l_{dissolved}$)					
Chronic Criterion[2]		87	0.2	18.1	59.5	1.5	79.9
Acute Criterion[2]		750	1.3	25.7	316.7	38.9	79.9

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

[2] Criteria for Cd, Ni, Pb and Zn are hardness dependent and calculated using the formulas set forth in the *National Recommended Water Quality Criteria 2002* (EPA 2002) at a hardness of 63

Criteria Calculations

EPA, *National Recommended Water Quality Criteria 2002* ("NRWQC 2002") formula

Criteria in terms of dissolved fraction:

Acute CMC (dissolved) = $\exp\{m_A [\ln(\text{hardness})] + b_A\} (CF_A)$
Chronic CCC (dissolved) = $\exp\{m_C [\ln(\text{hardness})] + b_C\} (CF_C)$
hardness = 63

	m_A	b_A	m_C	b_C	CF_A	CF_C	CF_A	CF_C	Criteria Acute	Criteria Chronic
Cadmium	1.0166	-3.924	0.7409	-4.719	1.136672-ln(h)*(0.0418	1.101672-[(ln hardness)(0.	0.963331529	0.928331529	1.284736	0.178402
Lead	1.273	-1.46	1.273	-4.705	1.46203-[ln(h)*(0.145712)]		0.858325553		38.91729	1.516551
Nickel	0.846	2.255	0.846	0.584	0.998	0.0997	0.998	0.997	316.7428	59.50661
Zinc	0.8473	0.884	0.8473	0.884	0.978	0.986	0.978	0.986	79.22029	79.86831

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 = 2.4 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 2.4 (design flow) = 901 lbs/day
(Concentration limit) [30] X 8.34 (Constant) X 2.4 (design flow) = 600 lbs/day
CBOD, TSS (June-Oct):
(Concentration limit) [30] X 8.34 (Constant) X 2.4 (design flow) = 600 lbs/day
(Concentration limit) [20] X 8.34 (Constant) X 2.4 (design flow) = 400 lbs/day
Ammonia:
(Concentration limit) [5] X 8.34 (Constant) X 2.4 (design flow) = 100 lbs/day
(Concentration limit) [10] X 8.34 (Constant) X 2.4 (design flow) = 200 lbs/day
(Concentration limit) [15] X 8.34 (Constant) X 2.4 (design flow) = 300 lbs/day
Total phosphorus:
(Concentration limit) [.2] X 8.34 (Constant) X 2.4 (design flow) = 4.0 lbs/day
(Concentration limit) [1] X 8.34 (Constant) X 2.4 (design flow) = 20 lbs/day
Total nitrogen:
(Concentration limit) [8] X 8.34 (Constant) X 2.4 (design flow) = 160 lbs/day

ATTACHMENT B

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%

Attachment C: Lead RP Analysis
non-detect, >10 samples

Date	Pb* (ug/l)	lnPb (ug/l)	$(y_i - u_y)^2$
1/10/2005	ND-1		
4/20/2005	ND-1		
7/18/2005	ND-1		
11/16/2005	ND-1		
1/20/2006	ND-1		
4/10/2006	ND-1		
7/10/2006	5.2	1.6487	0.537536
10/16/2006	ND-1		
2/5/2007	ND-1		
7/9/2007	1.2	0.1823	0.537536
10/17/2008	ND-1		
1/7/2008	ND-1		
4/14/2008	ND-1		
7/14/2008	ND-1		
10/20/2008	ND-1		
1/26/2009	ND-1		
4/6/2009	ND-1		
7/20/2009	ND-2		
1/25/2010	ND-1		
4/26/2010	ND-2		
1/26/2010	ND-2		
10/18/2010	ND-2		
1/24/2011	ND-2		

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

	Detection Limit** =	1.000
u_y = Avg of Nat. Log of daily Discharge (mg/L) =		0.91549
$\Sigma (y_i - u)^2$ =		1.07507
k = number of daily samples =		23
r = number of non-detects =		21
σ_y^2 = estimated variance = $(\Sigma[(y_i - u_y)^2]) / (k-r-1)$ =		1.07507
σ_y = standard deviation = square root σ_y^2 =		1.03686
δ = number of nondetect values/number of samples =		0.91304
z=z-score[$(0.99-\delta)/(1-\delta)$] =	z-score of	0.88500
	=	1.200359

RP analysis/Limit calculation:
99th percentile daily max limit = exp (u_y + z-score*σ_y)
Daily Max Limit* = **8.67 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 = $\delta D + (1-\delta)\exp(u_y + 0.5\,\sigma_y^2)$ =		1.28487
V(x) = Daily Variance = $(1-\delta)\exp(2u_y + \sigma_y^2)[\exp(\sigma_y^2)-(1-\delta)] + \delta(1-\delta)D[D-2\exp(u_y + 0.5\sigma_y^2)]$ =		3.92104
A = $V(x)/[n(E(x)-\delta^n D)^2]$ =		28.36052
B = $-[\delta^n D^2(1-\delta^n)]/(E(x)-\delta^n D)^2$ =		-0.57426
C = $(2\delta^n D)/(E(x)-\delta^n D)$		4.911092
σ_n^2 = Monthly Average variance = $\ln\{(1-\delta^n)[1+A+B+C]\}$		1.07507
σ_n = Monthly Average standard deviation = σ_n^2^(0.5) =		1.03686
u_n = n-day monthly average = $\ln[(E(x)-\delta^n D)/(1-\delta^n)] - 0.5\sigma_n^2$ =		0.91549
z=z-score[$(0.95-\delta)/(1-\delta)$] =	z-score of	0.42500
	=	-0.18912

RP analysis/Limit calculation:
95th percentile monthly average limit = exp (u_n + z-score*σ_n)
Monthly Avg Limit* = **2.05 ug/l**
TSD-Table E-2, 95th percentile with ND

Grafton Wastewater Treatment Plant - Response To Comments

On September 25, 2012, the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) public noticed a Draft Permit (MA0101311) for the Grafton Wastewater Treatment Plant.

EPA received comments from the Town of Grafton, the Blackstone River Coalition and the Rhode Island Department of Environmental Management (RIDEM). The following are responses to all significant comments received and descriptions of any changes made to the public-noticed permit as a result of those comments. Additional changes to clarify permit language have also been made and are summarized at the end of this document.

In many cases, EPA has included original comments nearly verbatim for the convenience of the reader. In others, EPA summarized a comment without repeating here the entirety of the commenter's original text. Many of the details presented in the original comments were not repeated in such digested comments. EPA did not limit its analysis of the comments submitted to the digest presented below, but rather reviewed each original comment in its entirety. Where EPA has summarized a comment, we have done so simply to make this response to comments more accessible to the interested public. No significance should be attached to the form in which EPA cited or summarized the original comment in this response document.

A. The following comments were received from the Town of Grafton Board of Selectmen in a letter dated November 8, 2012:

Comment A1. The Town of Grafton is very concerned with the sustainability of the proposed permit levels. The lack of grants to complete the needed upgrades will result in raising sewer rates to cover the costs which our residents cannot afford. We understand that there may be low interest loans, but given the 8% unemployment rate in Grafton this will provide to be a hardship on our residents. Raising the rates has a direct impact on everyone even those who do not directly use the system. The higher rates impact economic development, business growth and expansion. Higher rates also have an impact on the municipal operating budget (schools, police, fire) all who pay sewer use fees. Other organizations that are affected include Federal Funded Programs like Jobs Corps, the Grafton Housing Authority and Tufts University.

The Town of Grafton has limited revenues and with the pending Storm Water Permit we have serious concerns of funding such programs and un-funded mandates. The town has a proven record of being environmentally friendly; the recent clean-up and ECO machine at the Fisherville Mill site, Solar Field project, and the Honeywell (ESCO) project.

We respectfully request a waiver on these unattainable permit levels. Thank you in advance for your support and understanding.

> **Response to Comment A1.** We recognize that improvements to meet the new limits will increase costs. Cost considerations or technological feasibility, however, are not permissible factors in **setting** water quality based effluent limits. *Upper Blackstone Water Pollution Abatement District v. U.S. EPA*, __ F.3d __ (August 3, 2012); *United States*

Steel Corp. v. Train, 556 F. 2d 822, 838 (7th Cir. 1977); *see also In re City of Moscow*, 10 E.A.D. 135, 168 (EAB 2001). Such factors can be taken into account, however, in establishing a compliance schedule. EPA encourages the permittee to engage with EPA's compliance staff with respect to development of a reasonable compliance schedule that will be issued in an EPA enforcement order. Such a schedule will take affordability into account. In determining affordability for such an analysis, EPA uses *Interim Economic Guidance for Water Quality Standards,* EPA-823-B-95-002 (March 1995).

In addition, "waivers" from permit requirements are not allowable under the Clean Water Act. However, under certain circumstances, permittees can conduct an analysis of affordability issues for the purposes of determining whether a designated use cannot be obtained or for obtaining a variance. *See* Massachusetts Surface Water Quality Standards, 314 CMR 4.03(4); Rhode Island Water Quality Regulations, Rules 19 and 20; 40 CFR §131.10(g).

EPA recognizes that the pending Stormwater Permit and other programs also require funding, and affordability analyses should incorporate those costs consistent with EPA guidelines. However, EPA notes that sewer rates in Grafton are currently quite low. According to 2010 survey data of sewer rates in Massachusetts, the typical household sewer cost in Grafton in 2010 was $270, as compared to a statewide average of $638. Tighe and Bond, *2010 Massachusetts Sewer Rate Survey*, at 13.

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

EPA recognizes the Town's commitment to environmental progress in other areas and looks forward to working with the Town to establish a reasonable compliance schedule to meet the important environmental goals reflected in this permit.

Changes to permit: none.

B. The following comments were received from the Town of Grafton, Board of Sewer Commissioners, in a cover letter and attached comments dated November 21, 2013. The more detailed comments in the attachment are addressed first below, followed by the summary comments in the cover letter.

Comment attachment

Comment B1. The Town of Grafton operates a small (2.4 mgd design flow)[1] wastewater treatment plant that serves only 11,000 customers. The Grafton plant has operated in full

[1] Grafton's actual discharge in 2009-2010 was 2.0 mgd. EPA Fact Sheet, p. 6.

compliance with the requirements set forth in its existing National Pollutant Discharge Elimination System (NPDES) permit since the permit was issued in 1999. The principal question posed by the renewal permit proposed by the United States Environmental Protection Agency (EPA or Agency) is whether new, more stringent, standards for the discharge of two nutrients – phosphorus and nitrogen – are justified, especially when the proposed standards are considered in the content of the small size of the Grafton treatment plant, the very substantial cost of the new construction that would be necessary to comply with the new standards, the most current scientific data, and the applicable legal requirements.

> **Response to Comment B1.** EPA recognizes that the Grafton WWTP (2.4 MGD design flow) is substantially smaller than the Upper Blackstone Water Pollution Abatement District facility (56 MGD design flow) located upstream in Millbury. However the Grafton WWTP is designated as a major discharger pursuant to EPA's permitting regulations, and there is little assimilative capacity in the river since most of the flow under dry conditions is effluent from the UBWPAD (the natural 7Q10 flow of the river is 8.6 MGD, see Fact Sheet at 13; the Grafton WWTP design flow is more than 25% of this natural base flow). EPA appreciates the succinct description of the primary issue with respect to this permit, which is discussed in much greater detail in response to specific comments below. EPA notes, however, that the cost of compliance is not a permissible consideration in the setting of water quality based permit limits. *Upper Blackstone Water Pollution Abatement District v. U.S. EPA*, __ F.3d __ (August 3, 2012); *U.S. Steel Corp. v. Train*, 556 F.2d 822, 838 (7th Cir. 1977).
>
> *Changes to permit: none.*

Comment B2. The Grafton plant is one of 7 publicly owned wastewater treatment plants located in the Blackstone River watershed in Massachusetts. There are another 2 publicly owned wastewater treatment plants in the Blackstone River watershed in Rhode Island. The Blackstone River flows south into the Seekonk River and then into the Providence River in Rhode Island that discharges into the Narragansett Bay in Rhode Island (a small portion of the bay is located in Massachusetts but has no connection with the Blackstone River watershed).

The Grafton plant is dwarfed by the Upper Blackstone Water Pollution Abatement District wastewater treatment plant (UBWPAD) that is located upstream of the Grafton plant at the headwaters of the Blackstone River and serves the City of Worcester, Massachusetts, and surrounding communities. In its recent NPDES decision, the First Circuit Court of Appeals stated that the UBWPAD plant is responsible for 70% of the pollution discharged into the Blackstone River. The Woonsocket, Rhode Island, plant, the Court said, is the second largest plant discharging into the Blackstone River.[2] The small remainder must therefore be allocated among the 7 other publicly owned treatment plants located in the Blackstone River watershed.

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[2] Upper Blackstone Water Pollution Abatement District v. United States Environmental Protection Agency, __ F.3d. __ (1st Cir. 2012), Slip Opinion at 17, 18. (Dkt. No. 11-1474 (8/3/12)) (hereafter cited as First Circuit Slip Opinion). The First Circuit's conclusions are based on the factual record compiled by the EPA and UBWPAD before the Agency's Environmental Appeals Board.

Figure 1 (copy attached), reaffirms that Grafton is a minor actor as compared to other publicly owned treatment plants. Even more significantly, Figure I shows that all of the treatment plants have less impact on the Narragansett Bay than non-point sources -- consistent with national data that more than 50% of water pollutants come from non-point sources. See, e.g., C. Copeland, Clean Water Act: A Summary of the Law, p. 1 (Congressional Research Service (April 23, 2010)).

The EPA should pay particular attention to the data presented in Figure 1 as part of the Grafton permitting process. In the first place, the data is the most recent publicly reported data, having been compiled in March 2012, and is more up-to-date than data presented in the EPA Fact Sheet for the Grafton permit renewal. The data is also part of a comprehensive study on the Narragansett Bay being conducted for the EPA's own Office of Research and Development and EPA Region I. Thus, the EPA should attribute a high degree of reliability to the data compared to the older data and reports set forth in the EPA Fact Sheet for the Grafton permit. See Narragansett Bay Sustainability Pilot (March 20, 2012) (hereafter EPA Narragansett Bay Study).[3]

> **Response to Comment B2.** EPA agrees that the Grafton plant is smaller than both the Upper Blackstone WPAD (56 MGD design flow) and the Woonsocket WWTP in Rhode Island (16 MGD design flow). While Grafton is the largest of the remaining treatment plants on the Blackstone River, and a "major discharger" under EPA's permitting regulations (defined as POTWs with design flow ≥ 1.0 MGD), EPA's permitting in the Blackstone River basin has focused on the implementation of stringent permit limits on the UBWPAD first, while the Woonsocket, RI plant is upgrading to meet a permit limit of 3 mg/l pursuant to its permit issued by RIDEM. EPA recognizes that until these larger reductions were achieved, the incremental improvement to be obtained from permit limits on the Grafton WWTP would likely be indiscernible. However, POTW discharges remain the largest source of nitrogen to the Providence/Seekonk Rivers and an even more dominant source under dry weather conditions.
>
> Figure 1 (shown below, with the heading Exhibit A-7) is somewhat misleading in the context of this permit action as it includes all sources to the entire Narragansett Bay/Mount Hope Bay estuary system. As the Fact Sheet makes clear, the permit limits are based on meeting loading targets to achieve water quality standards in the Providence and Seekonk Rivers. These are the tidal extensions of the Blackstone River and are not directly impacted by the majority of discharges listed in Figure 1. Similarly, the scale of nonpoint sources in Figure 1 reflects loadings to the entire Narragansett Bay/Mount Hope Bay estuary system, which covers approximately 147 square miles and dwarfs the limited tidal river area that receives the most impact from Blackstone River discharges. Whether permits limits would be warranted on Grafton's discharge to control nitrogen impacts in the greater Narragansett Bay/Mount Hope Bay estuary, a context in which it might be reasonable to describe Grafton as a relatively small source, is an entirely different question than that addressed in this permit, which is to establish nitrogen limits necessary to achieve water quality standards in the Seekonk and Providence Rivers.

[3] http://www.epa.gov/research/waterscience/water-nutrients.htm

EPA is also aware that nonpoint source and stormwater nitrogen sources should receive further attention and analysis in this watershed, and that they are likely significant sources of nitrogen, particularly in wet weather. However, the Narragansett Bay Sustainability Pilot findings indicate that as of 2011, even with the implementation of nitrogen reduction at all the Rhode Island facilities, significant reductions from UBWPAD, and nitrogen limits on the Attleboro and North Attleboro plants, the "Sewered Population" **remains the single largest source of annual nitrogen loads** to the Narragansett Bay/Mount Hope Bay estuary system at over 3.4 million kilograms per year, and larger than the **combined** loads of the next two largest categories, "Unsewered Population" and "Urban Stormwater" (totaling just over 3.1 million kilograms per year). See Figure 1. In dry weather, treatment plant discharges are an even more dominant nitrogen source, and eutrophication impacts are greatest during the dry summer season.

EXHIBIT A-7. ESTIMATED NITROGEN LOADINGS IN THE NARRAGANSETT BAY WATERSHED IN 2011, BY NITROGEN LOADING AREA AND SOURCE CATEGORY

NITROGEN LOADING AREA	ANNUAL NITROGEN LOADINGS (THOUSAND KG)							
						ATMOSPHERIC DEPOSITION		
	SEWERED POPULATION	NON-SEWERED POPULATION	ANIMALS (LIVESTOCK)	URBAN STORMWATER	AGRICULTURAL FERTILIZER	VIA WATERSHED (NON-URBAN)	DIRECT TO BAY*	TOTAL
Blackstone Above Manville (RI Portion)	73	31	5	76	48	38	0	271
Blackstone Above Millville (MA Portion)	312	183	46	220	37	59	0	858
Lower Bay	196	350	33	197	82	31	0	889
Pawtuxet	102	99	10	100	63	59	0	433
Small Watersheds	398	253	34	251	78	50	0	1,065
Taunton Above Bridgewater	599	192	27	284	100	58	0	1,260
Mid/Lower Taunton	180	198	25	236	61	37	0	737
Upper Bay	1,558	192	16	253	63	23	0	2,106
Total	**3,419**	**1,499**	**195**	**1,617**	**533**	**356**	**276**	**7,893**

Note:
* Loadings in this category are not divided by nitrogen loading area because they are deposited directly from the atmosphere to Narragansett Bay.

Figure 1. From Industrial Economics *Narragansett Bay Sustainability Pilot, Phase 1 Report*, Appendix A (March 2012).

Nor is it accurate to consider a category such as "unsewered population" or "urban stormwater" a monolithic source, such that a reduction in these categories would somehow be more efficient or effective than permit limits on a "small" wastewater treatment plant. For example, the achievement of reductions in nitrogen loads from urban stormwater requires an enormous number of individual projects targeting individual sites of impervious area (e.g. parking lots, roadways). The incremental benefit of even a substantial investment in such projects is far less than what can be achieved via permit limits at a wastewater treatment plant. EPA notes that based on cost estimates developed in connection with the Chesapeake Bay TMDL, the median annualized cost of nitrogen reduction from urban stormwater BMPs is more than $300 per pound per year. Using this estimate, achieving an equivalent nitrogen reduction to that resulting from this permit limit (100 pounds per day, or 36,500 lbs/year), the cost from urban stormwater reductions would be upwards of an annualized $11 million dollars per year, with a 20 year present value of over $180 million (assuming a 2% SRF loan interest rate). While EPA recognizes the significant investment required from the Town of Grafton, it is clearly only a fraction of the cost of an equivalent stormwater load reduction. See, Stearns & Wheeler and CDM. 2008. *Engineering Feasibility & Cost Analyses of Nitrogen Reduction from Selected POTWs in Massachusetts* at 3-34 (20 year present value of cost to achieve 8 mg/l reduction at Grafton WWTP projected at $32 million); Town of Grafton comment B9 (projecting capital cost of $30 million and operating cost of $500 thousand per year). Moreover, urban stormwater reduction calculations are based on assumed removal efficiencies from BMPs, and it is extremely difficult and costly to monitor these loads to ensure that the projected reductions are being achieved. While cost is not a consideration in setting NPDES permits, the permittee should be aware that wastewater treatment plant upgrades are among the most cost effective, certain and reliable nutrient load reduction approaches.

EPA also disagrees that the data reported in the March 2012 study is more up to date than that used in the Fact Sheet. While the study was published in 2012, the sources cited for nitrogen loading are from 2005, 2008 and 2010 with the single exception of UBWPAD, for which a 2011 source is provided. See Table A-3 footnotes. While Grafton is omitted from this table, the data for Uxbridge and Northbridge is derived from a 2008 report which itself relied on older data from 2004 to 2006. Stearns & Wheeler and CDM. 2008. *Engineering Feasibility & Cost Analyses of Nitrogen Reduction from Selected POTWs in Massachusetts*, at 3-21. (http://www.mass.gov/dep/water/resources/potwc3a.pdf).[4]

Changes to permit: none.

Comment B3. The real significance of the Narragansett Bay Study – which is scheduled to be completed this year – is that its Triple Value Simulation (3VS) integrated assessment model will allow policymakers to "identify sustainable solutions to avoid, reduce, or manage the negative effects of nutrient pollution on the bay and its watershed." Such an integrated assessment model is a new tool for EPA. It allows the EPA to use a "systems approach" to its decision-making that takes into account the "three pillars of sustainability: economic prosperity, environmental protection, and social well-being." EPA Narragansett Bay Study, p. 1. That is precisely the type of analytical model and information that is needed to make a sustainable permit renewal decision for Grafton. The user can input various scenarios that simulate the impact of different regulatory responses, including both affordability and effectiveness. Id. Using such a model would assure that there is an actual benefit to the watershed without risking unneeded and costly construction at the Grafton plant that might have to be redone in the future.

[4] In addition, it is not entirely clear that the smaller facilities are accurately represented. For example, Uxbridge's loading is calculated at 8.47 kg/per person/year (Table A.3), two to three times the per capita loading from the other POTWs. While Uxbridge accepts a considerable amount of septage, which would tend to increase its per capita loading, this figure is implausible and does not appear to be accurate. Using the 2008 source, Uxbridge's average flow was 0.93 MGD and its average DIN concentration was 13.5, roughly equivalent to a TN concentration of 15.5. With Uxbridge's service population of 6,618 (from the permit application) this equates to 3.0 kg/person/year. The discrepancy may be due to the population figure source, which indicates that Uxbridge's service population is only 2,089. As Grafton is not in the relevant Table, EPA has not been able to confirm that the Grafton loads are accurately represented. While these discrepancies may not be greatly significant in the context of the overall Narragansett Bay/Mount Hope Bay system, they are important in determining more localized impacts.

Indeed, the EPA Narragansett Bay Study is already quantifying the future impacts of NPDES permit standards on the Bay. It shows, for example, that there will be a change in nitrogen loading by the UBWPAD plant in 2014 assuming compliance with its renewed permit, but no change at all for 14 other wastewater treatment plants in Massachusetts (Grafton is too insignificant to even be listed in the EPA's own study). What the study shows is that the real change comes from 10 plants in Rhode Island (the change in 8 R.I. plants is greater than the UBWPAD change and the change is less in only 2 R.I. plants). EPA Narragansett Bay Study, Exhibit A-3. The EPA Fact Sheet neglects the EPA Narragansett Bay Study, but EPA should use this tool to determine whether its proposed changes in the Grafton NPDES permit will have any practical effect.

> **Response to Comment B3.** EPA appreciates the benefits of the Triple Value approach to overall planning and assessment of strategies in the Narragansett Bay/Mount Hope Bay watershed. For NPDES permitting, however, the setting of permit limits is clearly limited to the requirement of ensuring that discharges do not cause or contribute to a violation of water quality standards, prohibiting consideration of cost or even of technological feasibility.
>
> In addition, as noted above, the assessment tool provided in the Narragansett Bay Sustainability Study is limited to evaluating impacts on the greater Narragansett Bay/Mount Hope Bay estuary as a whole, and is unfortunately limited in its ability to reflect the localized impacts that are inherent in NPDES permitting. Discharges in different subwatersheds, while part of a larger problem, also have localized impacts in entirely different portions of the estuary and cannot necessarily be traded off against each other on the basis of cost effectiveness or social well-being, even if such tradeoffs were permissible in the context of NPDES permits. While there is clear value in such a global planning tool, it is not of great use in NPDES permitting where the localized impacts of specific discharges is the primary focus. Thus, as noted above, the impact of reductions at Grafton on the overall Narragansett Bay/Mount Hope Bay system is not the basis for the permit limits at issue.
>
> *Changes to permit: none.*

Comment B4. Updated information is also available from the UBWPAD plant, acknowledged as the dominant source of pollution in the Blackstone River watershed. UBWPAD started operating a major upgrade to its wastewater treatment plant in 2009 that substantially reduced the discharge of nitrogen, phosphorus, and other pollutants into the river upstream of the Grafton plant. The conditions imposed by UPWPAD's 2012 revised permit will result in further reductions. The EPA should make use of the UBWPAD actual data resulting from the plant upgrades and projections based on the revised permit conditions – and not older, out-dated data -- when it assesses the justification for more stringent nutrient standards in the Grafton permit.

The EPA should also give appropriate consideration to the Blackstone River watershed study conducted by the University of Massachusetts-Amherst and CDMSmith (the UMass Study). Grafton appreciates that the UMass Study was a source of controversy in the recently concluded administrative and judicial appeals over the renewal of the UBWPAD permit because the data was not yet available. See First Circuit Slip Opinion at 22-24 & n. 18. The data is now available, however, and the EPA should not neglect this valuable source of information and the model it provides of the Blackstone River watershed. We understand from conversations that study representatives can address any remaining questions that the EPA may have about the UMass Study, and we urge you to take advantage of this opportunity.

The UMass Study is a publicly available source of updated information. After the 2009 UBWPAD plant upgrade, for example, phosphorus was reduced by 80% and nitrogen reduced by 50%. Thus, the study shows that non-point sources are now more than double the UBWPAD phosphorous and nitrogen load. UMass Study Project Summary, pp. 4, 8. The non-point sources, in particular, are a critical factor that the EPA should take into account. Applying more stringent – but expensive -- standards to small sources like the Grafton treatment plan cannot result in cleaner waters without a comprehensive plan that addresses the dominant sources. It is important to look forward, not backward.[5]

An important contribution made by the UMass study is its analysis of the importance of the 19 dams (or impoundments) on the Blackstone River, with the largest impoundments located downstream in Rhode Island. The dams create quiescent water flows that allow slow growing algae to proliferate, thus off-setting improvements made by wastewater treatment plants. UMass Study Project Summary, pp. 2-3. See also <u>id.</u> at 7 ("River flow conditions play a role in river water quality") The UMass Study is sobering. It concludes that the nutrient targets can be achieved only if the stagnant river stretches caused by the dams are eliminated. UMass Study Project Summary, p. 14.

The EPA's approach to NPDES permits fails to address the significant effects that the dams have on water quality in the Blackstone River, and ultimately on the Narragansett Bay. Consequently, the EPA cannot determine whether the more stringent nutrient standards that it proposes will actually benefit water quality – or whether more improvements are required in the Rhode Island portion of the river, as opposed to the upstream Massachusetts wastewater treatment facilities. The EPA should use the UMass model hand-in-hand with its own Narragansett Bay Study as an essential policy-making tool. Only then can the EPA determine if mandating the large public expenditures caused by more stringent NPDES permit renewals will be effective or if the scarce public resources should instead be directed to the dams on the Blackstone River.

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[5] The UMass Hydrologic Simulation Program-FORTRAN (HSPF) model covers both point and non-point sources based on 35,000 measurements drawn from many of the same studies referenced in the EPA Fact Sheet. The list includes USGS, U.S. Army Corps of Engineers, MassDEP, RIDEM, Blackstone River Initiative, Blackstone River Coalition, FEMA, and the 2009 USGS/MassDEP study incorporating various volunteer river water sampling groups. UMass Study Project Summary, pp. 5, 6.

The independent Technical Advisory Committee concluded that the UMass "'HSPF model is the best watershed management tool currently available for studying the relative impacts of point and non-point sources of nitrogen and phosphorus nutrients on growing season average water quality constituent concentrations throughout the river, downstream of the UBWPAD discharge.'" U.Mass Study Project Summary, p. 8.

Response to Comment B4. In determining the permit limits for Grafton, EPA relied not on "older, out-dated data" for the UBWPAD, but rather on projected loads that are expected from UBWPAD when the limits in its newest permit (0.1 mg/l TP and 5 mg/l TN) are implemented. These calculations are shown on page 13 of the Fact Sheet for phosphorus, and page 25 of the Fact Sheet for nitrogen. EPA is of course aware that the UBWPAD has achieved nutrient reductions in connection with its most recent upgrade, but these are insufficient to achieve water quality standards and, if they were used as the baseline for the setting of permit limits on other facilities, would require more stringent limits to be set on downstream facilities such as the Grafton WWTP.

With respect to the HSPF model, as indicated in the Fact Sheet EPA has given due consideration to the data available from that project, including reviewing the project reports and the underlying input files for the modeling effort. EPA has determined that the model is unsuitable for setting permit limits on the smaller Blackstone River facilities. This is in part because, far from being a "publicly available source of updated information" as characterized by the permittee, the model relies on outdated and unrepresentative data for the Grafton, Uxbridge and Northbridge facilities. As explained in the Fact Sheet:

> 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[6] 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[7], 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

[6] 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.

[7] 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.

(87,400 to 69,900 lbs/yr). *Blackstone River HSPF Model 2009 Scenario Report*, Tables 15 and 16 (2010).[8] 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.

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.

Aside from suggesting that EPA contact the study authors with questions, the permittee does not dispute any aspect of EPA's analysis of the HSPF model.

[8] 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.

The HSPF modeling effort does provide insight into the importance of dams, which clearly exacerbate the impact of nutrients by creating areas of slow-moving water and sediment accumulation. However, EPA's responsibility in setting permit limits is to protect water quality in the receiving water as it actually is, not under some hypothetical future condition in which nineteen dams, several of which are located in another state and/or are FERC-licensed hydropower facilities, have been removed. EPA notes the presence of contaminated sediment behind the dams is an obstacle to removal, even where the dam owner is interested in seeing the dam removed (Fuss & O'Neill, 2007 (re the Millbury dam)); that a number of the dams are active hydropower facilities; that there has been no progress on the actual removal of even a single dam on the river; and that the HSPF model results indicate that removal of the non-FERC licensed dams, while improving conditions in the Massachusetts portion of the river, would actually increase 90^{th} percentile chlorophyll-a concentrations in the Rhode Island impoundments. To the extent that certain water quality violations may be uncorrectable in the Blackstone River due to dams, the appropriate process is a Use Attainability Analysis that would establish the level of water quality that is achievable in the river and provide a new baseline for water quality analysis through a variance or change in designated uses of the river. See also Response to Comment B9. EPA cannot revise the water quality standards applicable to the Blackstone River in a permit proceeding.

With respect to nonpoint sources, see the response to comment B2. EPA also notes that the NHSPF model scenarios indicate that there would be essentially no improvement in 90^{th} percentile chlorophyll-a downstream of Woonsocket from either 20% or 60% NPS reduction, see *2009 Scenario Report*, Figure 36, as opposed to a moderate improvement from implementation of the new UBWPAD permit limit for phosphorus, see *id.*, Figure 26. Whether this is an indication of the weakness of the model in reflecting conditions in Rhode Island (see above regarding concerns about data sufficiency in Rhode Island reaches), or an indication that POTW discharges are a more effective target for nutrient reductions, is unclear based on information available.

Changes to permit: none.

Comment B5. Instead of looking to updated data the EPA Fact Sheet places primary reliance on the EPA Goldbook as the basis for the more stringent nutrient standards in the proposed Grafton permit. But the Goldbook sets forth a single, undifferentiated national standard that was adopted in 1986 – a quarter of a century ago – and that was based on still older material published in the late 1960s. Notably, the EPA did not use the Goldbook standard in Grafton's existing permit issued in 1999, and it offers no satisfactory reason for turning back now.

The Goldbook standards are merely recommendations for the States – they are not binding standards. The Goldbook itself says this as it states it provides "draft" criteria.[9] Likewise, the EPA's website for National Recommended Water Quality Criteria makes clear that it sets forth "recommended" criteria for the "guidance" for States in the adopting State water quality

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[9] http:// water.epa.gov/scitech/swguidance/standards/criteria/aqlife/upload/2009_01_13_criteria_goldbook.pdf

standards.[10] See also First Circuit Slip Opinion, p. 10 ("States have primary responsibility for designating the ambient water quality of the waters within their territory.").

The EPA seeks to sidestep the advisory nature of the Goldbook standards by suggesting that the Massachusetts Department of Environmental Protection (MassDEP) has adopted the standard as part of its State Surface Water Quality Standards. This effort is unconvincing for two reasons. The first is that the EPA Fact Sheet (page 2) offers no citation for the Massachusetts policy, and it is doubtful that the policy has ever been formally adopted.[11] The EPA cannot, of course, rely on a policy-in-development draft document as an actual, final MassDEP adoption of a numerical criterion. Instead, EPA must apply the narrative water quality standard set forth in the Massachusetts regulations – a standard that Grafton satisfies along with the Rhode Island standard. See 314 Code of Massachusetts Regulations (CMR) 4.05 (3) (b) (Massachusetts narrative standard); EPA Fact Sheet, p. 6 (Massachusetts standard is similar to or more stringent than the Rhode Island standard).

> **Response to Comment B5.** The comment misapprehends EPA's use of the Gold Book standard. EPA's use of the Gold Book standard (an instream concentration of 100 ug/l) is governed by EPA regulations regarding the use of narrative criteria, such as the Massachusetts SWQS for nutrients. As set forth in 40 CFR § 122.44(d)(1)(vi):
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>> Where a State has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits using one or more of the following options:
>> (A) Establish effluent limits using a calculated numeric water quality criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and will protect the designated use. Such a criterion may be derived using a proposed State criterion, or an explicit State policy or regulation interpreting its narrative water quality criterion, supplemented with other relevant information which may include: EPA's Water Quality Standards Handbook, October 1983, risk assessment data, exposure data, information about the pollutant from the Food and Drug Administration, and current EPA criteria documents . . .
>
> Thus while EPA agrees that the Gold Book standards are not binding standards, they do represent "relevant information" that is appropriately used for the purposes of calculating a numeric water quality criterion that will attain the applicable narrative criterion. EPA also considered criteria and guidelines adopted by other states for total phosphorus, as

[10] See http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients (last updated 3/6/12).

[11] The only copy of a MassDEP policy that Grafton and its consultants have been able to obtain to date is prominently labeled "INTERNAL REVIEW DRAFT." The signature line is blank, as are the effective date and the policy number.

well as other EPA Guidance, *see, e.g., Nutrient Criteria Technical Guidance Manual: Rivers and Streams* (EPA 2000). (See Fact Sheet at 12).

Nor does the Fact Sheet indicate that the Gold Book standard has been adopted as part of the Massachusetts SWQS. With respect to Massachusetts standards and policy the Fact Sheet states that the narrative criterion contains a requirement of "highest and best practical treatment" ("HBPT"), and this has been interpreted by MassDEP as equivalent to a permit limit of 0.2 mg/l. While the draft MassDEP policy document identified by the permittee in footnote 11 was not used by EPA in development of this or any other permit and has not been formally adopted by MassDEP, it is consistent with this interpretation of HBPT. For further discussion of the draft policy see Response to Comment B6.

Changes to permit: none.

Comment B6. But even if the MassDEP policy had been finally adopted, the EPA errs by ignoring the conditions set forth in the policy. At the outset, the MassDEP draft document observes that there has been a decrease in phosphorus in surface waters over the past decade due to less reliance on phosphate-based products in every-day use -- further emphasizing the need to look to current data as well as to other sources and other solutions. Moreover, as MassDEP points out, there are environmental costs involved in reducing phosphorus to levels lower than 0.5 mg/l, such as increased concentrations of alum (aluminum) and a 50% increase in the amount of sludge produced. Draft Policy, p. 2. However, there is no indication that EPA recognizes that its proposed NPDES permit standards generate other environmental costs, but this is a factor that ought to be taken into account.

More importantly, MassDEP states that publicly-owned wastewater treatment plants (POTWs) can reduce phosphorous discharges to a "level of 1.0 mg/l or less without significant facility modifications or significant costs." Draft Policy, p. 2. Needless to say, the 1.0 mg/l level described in the MassDEP draft policy is identical to the standard set forth in Grafton's existing permit. While Grafton meets the existing standard, it cannot achieve the EPA's proposed 0.2 mg/l standard without both significant facility modifications and significant cost increases (as discussed further below). It is clear that MassDEP takes these other considerations seriously, as its draft policy also refers to "significant irretrievable capital costs and considerable increases in operating costs" and the need to "effectively and economically reduce phosphorus". Draft Policy, p. 3. But the EPA Fact Sheet nowhere addresses the economics of Grafton's facility modifications or costs. EPA should do so, both as required by its reliance on the MassDEP policy and as reasoned public policy decision-making.

What the draft MassDEP policy emphasizes – and what EPA overlooks -- is that its Highest and Best Treatment standard (HBPT) must be "economically achievable." Draft Policy, pp. 4, 5. Where, as in this case, no approved TMDL is already in place, the MassDEP adopts a "phased approach" to achieving the HBPT goals until a TMDL is established. Under these circumstances, MassDEP also requires that the permit holder conduct a "phosphorus evaluation study" that establishes the maximum removal achievable with the current facility or with minor physical or operational modifications to the existing facility. Draft Policy, pp. 4, 5. Grafton proposes, in Part IIC below, that it conduct such a phosphorus study.

In other words, EPA cannot simply borrow and impose the MassDEP numerical standard without also adhering to the conditions set forth in balance of the MassDEP draft policy. Since EPA has not done so, the proposed nutrient standards and the need for accompanying conditions must be reconsidered. Grafton suggests that this might best be done, in the first instance, by direct discussions between EPA and Grafton representatives, along with the participation of the MassDEP.

> **Response to Comment B6.** As noted in the comment and response to comment B5, the draft policy document cited in this comment was not used in developing the draft permit, is not a final approved MassDEP policy document and therefore has limited relevance to this permit revision. However, to the extent the permittee suggests that EPA adopt the reasoning set forth in this document, we note that it is consistent with the approach taken to the phosphorus limit in the draft permit.
>
> First, while EPA recognizes that NPDES standards generate other environmental costs such as increased sludge production, this is not a factor that may be taken into account in setting water quality based effluent limits. See Response to Comment B1. EPA also notes that progress is continually being made in reducing environmental costs and improving sustainable of nutrient reduction treatment processes, including development of phosphorus recovery technologies and improved energy efficiency.
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> Second, while the draft document considers cost, the references in that document to “significant irretrievable capital costs and considerable increases in operating costs” and the need to “effectively and economically reduce phosphorus” are specifically made in the context of phosphorus levels *less than* 0.2 mg/l, to 0.1 mg/l or below thru ultrafiltration. The permit limit here does not require the more advanced technologies that raise the cited cost concerns.
>
> Finally, the draft document does indicate that HBPT must be economically achievable but states that 0.2 mg/l is being established as HBPT based on that standard. The comment misstates the discussion of a “phased approach.” The actual language from the document is:
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>> The Department will require a “phased” approach to meet water quality goals by requiring “highest and best practical treatment” per the Massachusetts Surface Water Quality Standards (314 CMR 4.04(5) until a TMDL or WQBEL is established.
>
> This does not establish a phased approach to *achieving HBPT,* but a phased approach of initial limits of HBPT along with a phosphorus study, until a TMDL or WQBEL is established. Thus, the approach in this permit is consistent with the reasoning in the draft document as well as the actual policy of MassDEP. The 0.2 mg/l limit remains in the final permit.
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> *Changes to permit: none.*

Comment B7. The referenced TMDL standards (Total Maximum Daily Loads) are also critical. MassDEP states that it will complete TMDL standards for the Blackstone River in 2013.[12] Thus, there is an opportunity for the TDML standards to be completed while Grafton completes the phosphorus study set forth in the MassDEP policy discussed above and while the EPA receives the completed EPA Narragansett Bay Study.

The Clean Water Act (CWA) requires that States must "set a total maximum daily load (TMDL) of pollutants at a level that ensures that applicable water quality standards can be attained and maintained." C. Copeland, supra at 3 (Congressional Research Service). See CWA, § 303 (d); 40 C.F.R. § 130.2. The TMDL serves a dual purpose. It is both a planning process for attaining water quality standards and a "quantitative assessment for pollution problems, sources, and pollutant reductions needed to restore and protect a river." C. Copeland, id. The EPA's Introduction and Executive Summary Concerning TMDLs underscores this point: "More intensive assessments of water quality and an evaluation of pollution sources should be conducted where water quality standard violations occur or where indications of declining water quality or habitat loss are observed. A TMDL should be developed and appropriate control actions taken on all pollution sources and follow-up monitoring should be conducted to assure that water quality standards are met."[13]

Here, again, the EPA should look to the most current and most reliable scientific data that is available as a basis for its NPDES permit decisions. See 40 C.F.R. § 131.11 (a) ("criteria must be based on sound scientific rationale"). In particular, EPA should not displace the MassDEP from the role given to States under the Clean Water Act. And it should not risk imposing a standard that might prove, upon more careful analysis, not to provide any real benefit to the Narragansett Bay or Blackstone River but that poses a costly, and unnecessary, burden on taxpayers and ratepayers.

In some cases, of course, it has been necessary to proceed without a TDML because the development of TDMLs can be a lengthy process. Thus, it was reasonable to issue the 1999 Grafton permit without a TMDL. But a TMDL is now at hand, along with the EPA Narragansett Bay Study, the UMass Study, and updated discharge data from the UBWPAD plant improvements. Wise and responsible public policy decision-making requires careful consideration of these models and updated data.

> **Response to Comment B7.** Unfortunately, there is no realistic prospect of a TMDL for the Blackstone River being completed in 2013. Despite the projected date stated in the 2012 303(d) list, MassDEP has informed EPA that the TMDL will not be completed in 2013. Nor has MassDEP provided a projected timeframe for completion, stating that the TMDL is not actively being worked on.

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[12] See Massachusetts Year 2012 Integrated List of Waters, pp. 22, 23 (prepared by MassDEP under federal Clean Water Act).

[13] http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/dec1.cfm (last updated 3/6/12).

As the NPDES permitting authority in Massachusetts, it would certainly be EPA's strong preference that nutrient limits be determined in conjunction with the TMDL process. As the permittee notes, the TMDL process provides for a more comprehensive watershed-wide assessment of pollutant sources, impacts and reductions than is possible in individual permitting actions, especially with respect to addressing the role of nonpoint sources. From a permitting perspective, TMDLs would relieve the extensive individualized technical analyses, requirements of reassessment of technical analyses with each permit issuance, and piecemeal litigation of individual permits, that has characterized nutrient permitting in Massachusetts. However, as the permittee notes, EPA is not the lead agency for developing TMDLs. Rather, this role has been given to the state under the Clean Water Act. Where a TMDL has not been completed for an impaired water and a permit to the affected receiving water has expired, EPA has little choice but to proceed with permit issuance nonetheless.

EPA's regulations are quite clear: where a discharge plant "will cause, have reasonable potential to cause, or contribute to' a water quality violation, EPA must include effluent limits designed to ensure that the discharge does not cause or contribute to water quality violations. EPA does not have authority to wait for a TMDL to be completed prior to setting water quality based permit limits.

Changes to permit: none.

Comment B8. Finally, the EPA states that the Grafton wastewater treatment plant is causing pollution downstream in Rhode Island. See EPA Fact Sheet, p. 19. On the facts presented, there is little basis for this determination that is required under 40 C.F.R. § 122.44 (d) (1) (i).

EPA acknowledges that the "worst conditions" are found at the upper boundary of the Seekonk River, where the Blackstone River discharges. EPA Fact Sheet, p. 16. Grafton does not challenge this conclusion, but it notes that the Grafton plant is located 33 miles upstream from this point. EPA Fact Sheet, p. 18. That means that other treatment plants in both Massachusetts and in Rhode Island -- as well as the dams that the UMass Study identifies as a major contributor to the problem -- lie between Grafton and the Seekonk River. Significantly, the Woonsocket, R.I., treatment plant that the First Circuit identified as the second largest point source for pollution in the Blackstone River lies just south of the Massachusetts/Rhode Island border and upstream from the Seekonk River. It also means that any nutrients from the Grafton plant are well-diluted before they travel 33 miles to the Seekonk River (and even more diluted before they reach the Providence River and Narragansett Bay). See 40 C.F.R. § 122.22 (d) (1) (ii) ("dilution of the effluent in the receiving water"); EPA Fact Sheet, p. 18.[14]

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[14] The factual record is inadequate to support a determination that Grafton's exceedingly small nutrient discharges actually reach Rhode Island waters, much less that the discharge pollutes the Rhode Island waters. The dams located between Grafton and the Rhode Island waters are one indication that this is not so. See, e.g., EPA Fact Sheet, p. 3 (Slater Mill Dam marks upstream boundary of Seekonk River).

In any event, the EPA may reissue the Grafton NPDES permit without a change in the nitrogen and phosphorus standards. For example, in Arkansas v. Environmental Protection Agency, 503 U.S. 91 (1992), the Supreme Court held that the EPA was authorized to issue a NPDES permit to an Arkansas wastewater treatment plant even if there was evidence that discharges would reach downstream waters in Oklahoma and reversed the Court of Appeals ruling

EPA also looks exclusively to the treatment plants for a cause of the Seekonk River pollution. Its regulations, however, say that "existing controls on point and nonpoint sources of pollution" must be considered. 40 C.F.R. § 122.22 (d) (1) (ii). The EPA's own data shows that non-point sources are the more significant sources of nutrients in the Rhode Island rivers and Narragansett Bay, but EPA has failed to address the non-point sources. Figure 1, above. See also UMass Study Project Summary, p. 8 (non-point source pollution is double point source pollution after recent UBWPAD plant upgrade).

The EPA's determination, as applied to Grafton, also fails to take into account the predominant effect that the large treatment plants and nonpoint sources have on the Blackstone River and the Narragansett Bay. See Figure 1, above. The small size of the Grafton plant is a crucial factor, as Grafton is neither the cause nor the solution to the Rhode Island water quality problem. Ultimately, however, the EPA's determination founders because it relies on out-dated data. Critical policy choices and findings must rest on what the UBWPAD is doing now and what it will be doing in the future – not on what it did in the past.

Response to Comment B8. The factual finding made in the fact sheet is that the Grafton wastewater treatment plant "will cause, have reasonable potential to cause, or contribute to" a violation of water quality standards in the Seekonk River." Fact Sheet at 19. EPA has not stated that the Grafton discharge is *the* cause or *the* solution to downstream water quality violations. The Grafton discharge does however contribute to the nitrogen load that is the cause of the water quality violations, and an effluent limit must therefore be set.

Contrary to the assertion in the comment, the factual record clearly indicates that the nitrogen load from Grafton reaches Rhode Island waters and that it is a meaningful contributor to the total loads. The Fact Sheet provides the basis for EPA's determination of attenuation rates, which indicate that 90% of Grafton's load reaches the Seekonk River. While there have been alternative estimates of attenuation rates for nitrogen in the Blackstone River these fall within a relatively narrow range and all indicate that the vast majority of the nitrogen discharged from Grafton reaches the Seekonk River. In addition to the estimates ranging between 0 and 23% cited in the Fact Sheet, the HSPF modeling effort indicated an overall watershed nitrogen attenuation rate of between 20 and 25% (*Blackstone River HSPF Model 2009 Scenario Report* at 31 (2010)); while the USGS *New England SPARROW Model* regression analyses indicated that there was negligible attenuation of nitrogen in larger rivers such as the Blackstone (with mean annual discharge > 100 cfs). As noted in the Fact Sheet, when distributed over the area of the Providence and Seekonk Rivers the Grafton load at design flow is nearly equal to the MERL "1X" condition, which represents the natural background load from all watershed sources to Narragansett Bay. This is a clear contribution to downstream nitrogen loads.

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to the contrary. Id. at 105, 107, citing 40 C.F.R. § 112 (d). The standard set forth at page 5 of the EPA Fact Sheet concerning downstream affected states is not consistent with the Supreme Court's decision. See also EPA Fact Sheet, p. 16 (nitrogen standard imposed to "meet the water quality standards of Rhode Island").

The role of larger treatment plants has clearly been taken into account, as both the UBWPAD and Woonsocket facilities have received more stringent limits, and years earlier, than the limit on Grafton. The Grafton WWTP is currently the largest POTW discharging to the watershed of the Providence and Seekonk Rivers that does not have a nitrogen limit. EPA also recognizes the role of nonpoint sources as discussed in the Response to Comment B2, although wastewater treatment plants are the largest single source and even more predominant in dry weather.

Finally, EPA's analysis does not rely on outdated data and uses more current data than any of the studies cited in the comments. See Response to Comment B2.

Changes to permit: none.

Comment B9. [NUTRIENTS - Introduction] As mentioned earlier, the EPA proposes more stringent standards for nutrients – phosphorus and nitrogen – than the standards set forth in Grafton's existing NPDES permit. Before turning to the specifics, it is important to note that the presence of nutrients in the river is essential, as the nutrients support the food chain for fish, plants, and other life in the water. An excess of nutrients, however, results in undesirable cultural eutrophication. However wastewater treatment plants are not the only source of nutrients, the EPA's Narragansett Bay Study lists seven sources, with the treatment plants in Rhode Island and Massachusetts grouped together as only one source of nutrients. EPA Narragansett Bay Study, A-1.

For Grafton, the compliance cost associated with the proposed change in nutrient standards is significant. The existing wastewater treatment plant cannot meet the proposed standards, so the construction of an addition to the plant would be necessary. The construction cost is an estimated $30 million. An additional increase of $500 thousand in annual operating costs would also be required.

We repeat that Grafton has complied with the phosphorus standard in its existing permit. We will continue to do so and propose to make improvements, as described below. But the unlikely benefit to the Rhode Island waters, especially when considered in connection with the cost of complying with the proposed standards, indicates that some adjustment in approach is appropriate. We urge EPA to reconsider mandating these substantial public expenditures, especially in a period of shrinking public revenues, for the proverbial "drop in the bucket" improvement that might (or might not) be accomplished by more stringent nutrient standards.

Response to Comment B9. The relative contribution of Grafton and other sources is discussed in Response to Comment B2. EPA recognizes that the cost of nutrient reduction is significant. As discussed in Response to Comment B1, cost is not a consideration in the setting of water quality based permit limits. However as discussed in Response to Comment B2, the cost per pound of nutrient reduction, and the scale of available reduction, are not likely to be more economically or effectively achieved from other source categories.

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

Changes to permit: none.

Comment B10. [Nitrogen] The proposed permit imposes a new total nitrogen limit of 8 mg/l for the period May through October and a limit expressed in pounds per day of 160 pounds per day. Total nitrogen in Grafton's effluent now averages 13 mg/l, or about 200 pounds per day. Thus, there is a net decrease of 5 mg/l or 40 pounds per day. Extrapolated to the whole year, the proposed nitrogen standard reduces the Grafton discharge by 14,600 pounds per year. According to recent studies conducted on behalf of the Agency[15], the total annual nitrogen load on Narragansett Bay is approximately 17.4 million pounds per year, and on the Providence and Seekonk Rivers, almost 4.8 million pounds per year. The decrease in Grafton's nitrogen load that would be achieved under the EPA's proposed standard is thus an insignificant fraction of these overall loads, amounting to a mere 0.4%.[16] And this sliver would be reduced even further by the time the Grafton discharge travels 33 miles to the Seekonk River and then on to the Narragansett Bay. $30 million is a lot for a small town to invest for a virtually nonexistent gain, most especially when there are other sewer treatment plant investments that Grafton needs to plan for.[17]

Moreover, the Grafton nitrogen discharge is dwarfed by the contributions from unsewered properties, atmospheric deposition, livestock, agricultural fertilizer and urban runoff. And the UMass Study shows the problems posed by dams on the Blackstone River in both Rhode Island and Massachusetts (none of which are controlled by Grafton) must be addressed to achieve improvements in the Narragansett Bay. Until such time as the Agency has developed plans to deal with these much larger, and apparently more problematic sources, we suggest that chasing small sources such as Grafton's discharge, is a futile and likely unproductive effort. It is, however, exceptionally expensive, adding $30 million in capital costs to a small town. Postponing the imposition of these limits on small discharges would appear to be consistent with the practices of the State of Rhode Island. The Rhode Island Department of Environmental Management (RIDEM) has recently reissued a RIPDES discharge permit for the Town of

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[15] See http://www.epa.gov/research/waterscience/water-nutrients.htm

[16] Under the nitrogen standard Grafton's discharge is a mere 0.4% of the total nitrogen load in the two Rhode Island rivers and the Narragansett Bay. This figure would also be reduced by dilution.

[17] The EPA relies on RIDEM studies, but even Rhode Island agrees that Grafton is the smallest contributor to nitrogen at the state line. Out of five Massachusetts wastewater treatment plants included in RIDEM's 2005 study, Grafton's contribution was the smallest (5%). EPA Fact Sheet, p. 21 and Figure 3.

Burrillville, RI.[18] Burrillville has a 1.5 mgd treatment plant discharging to a tributary of the Blackstone River. That permit contains no numeric limit on Total Nitrogen. Rather, it requires the Town to "operate the treatment facility to reduce the discharge of Total Nitrogen to the maximum extent possible using all available treatment equipment in place at the facility". Grafton requests that the proposed numeric limit in our NPDES permit be replaced with the language used by the Rhode Island regulators in the Burrillville permit. Grafton will achieve improvements in nitrogen discharges under the "maximum extent possible" formulation, along with a consequent increase in our annual operating costs. As stated earlier, however, Grafton cannot meet the proposed 8 mg/l standard without major construction and substantial capital costs. There is scant justification for requiring an upstream wastewater treatment plant to adhere to more stringent standards than a comparable plant located in a downstream State.[19] That is especially true in this case, where the EPA says that it is borrowing the proposed Grafton standard from Rhode Island. EPA Fact Sheet, p. 20. Burrillville shows that RIDEM is not, in fact, using that nitrogen standard.

Response to Comment B10. The net decrease in Grafton's nitrogen discharges under an 8 mg/l permit limit is more than 40 lb/day. The permit limit of 8 mg/l represents a 38.5% reduction from the current average concentration of 13 mg/l cited by the permittee. Based on a current load of 200 lb/day, the reduction would be 77 lb/day at current flows. The projected reduction at design flow would be even greater, approximately 100 lb/day. The vast majority of that load reaches the Narragansett Estuary. See Response to Comment B8.

The permittee's characterization of other sources as "larger, and apparently more problematic" misunderstands the nature of these sources. Every category of sources identified in the Narragansett Bay study represents a multitude of individual locations and activities that individually represent even smaller increments of total nitrogen loads than the Grafton WWTP. The "sewered population" category is in fact by far the largest contributor of nitrogen to Narragansett Bay and to the Providence/Seekonk River on an annual basis, and an even larger portion of the load during the drier summer months which are most critical for eutrophication impacts. See also Response to Comment B2. The permit limit on Grafton represents close to a 40% reduction in Grafton's nitrogen load, a reduction that is significant and is not realistically achievable for most nonpoint source loads.

With respect to Burrillville, RIDEM states that the basis for the permit conditions on the Burrillville POTW is its lower design flow of 1.5 mgd (operating at 0.85 mgd at last reissuance). RIDEM's position is that at that small flow, a reduction in nitrogen would not be that significant in pounds per day. (*Personal communication, Joseph Haberak, RIDEM, March 4, 2013*). Based on the Burrillville DMR data this appears to be the case.

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[18] Copy attached.

[19] EPA states that it has adopted the proposed Grafton nitrogen standard from RIDEM, even though EPA recognizes it is not bound to do so and also recognizes that the RIDEM analysis, prepared in 2005, is not based on current data. EPA Fact Sheet, pp. 20, 21. But RIDEM has not applied its numeric standard to its own plant in Burriville, R.I. Rhode Island, and like MassDEP, has not prepared a TMDL for the Blackstone River. EPA Fact Sheet, p. 20.

Burrillville's average total nitrogen concentration in the summers of 2010 to 2012 was 9 mg/l. An equivalent permit limit of 8 mg/l TN would achieve a 1 mg/l reduction, or 12.5 lb/day at Burrillville's design flow. In comparison, as discussed above, the reduction in Grafton's discharge at design flow is approximately 100 lb/day, or eight times the Burrillville reduction. This is a significant difference and is a reasonable basis for differing treatment of the two facilities.

Changes to permit: none.

Comment B11. [**Phosphorus]** As with nitrogen, we are very concerned that reducing our small phosphorus contribution will result in no net benefit in terms of water quality (phosphorus primarily affects the Blackstone River, not the Narragansett Bay).

The proposed permit restricts Grafton's phosphorus discharge to 0.2 mg/l, down from the current 1.0 mg/l standard. But the proposed standard will reduce our load by only 16 pounds per day as compared to our current permitted limit, so the effect on the river will be quite limited. The reduction will be even less during periods of low river flow when the plant flow is also low. We are concerned that the implementation of effluent filtration (MassDEP's presumptive "highest and best practicable treatment technology") will increase our costs significantly, without any commensurate benefit.

Accordingly, we request that the following course of action be incorporated into the Grafton permit:

- That the permit be written to require that we operate the treatment facility to reduce the discharge of phosphorus to the maximum extent possible using all available treatment equipment in place at the facility.
- That within 18 months, the Town be required to complete studies that will attempt to quantify the level of phosphorus reduction that can be achieved using existing facilities,
- That the Agency work with others to develop a comprehensive plan to address phosphorus problems in the river, including the problems induced by non-point sources of phosphorus and hydrologic modifications to the flow regimen of the river. We understand, from conversations with individuals involved with the development of the UMass model of the Blackstone River, that the concerns expressed in the EPA Fact Sheet about that model can be resolved. Indeed, we understand that the MassDEP has committed to considering the model for the development of a phosphorus TMDL of the River in 2013[20]. If those studies show that additional phosphorus controls by the town are warranted, we will undertake them.

We believe this reflects a strategy that reduces our phosphorus loadings in a practical manner, and avoids the potential that we might be spending significant sums of money on effluent filtration that might not materially benefit the river. What we propose is, moreover, consistent with the MassDEP draft policy that was discussed earlier.

Response to Comment B11. EPA's analysis of the need for a water quality based phosphorus limit is based specifically on conditions at the point where Grafton's discharge enters the Blackstone River. While the permittee may view its discharge as

[20] See http://www.mass.gov/dep/water/resources/12list2.pdf, page 23

small in the context of overall phosphorus loads to the entire system, EPA's analysis of the localized impacts of the discharge indicates that the Grafton discharge would cause an exceedance of the 100 ug/l Gold Book target under low flow conditions, and that Grafton's load is significantly higher than nonpoint source loads under those conditions.

As set forth in the mass balance equation in the Fact Sheet at page 15, at the point of Grafton's discharge there are three sources of phosphorus load, the UBWPAD, instream loads at baseflow (nonpoint source and atmospheric), and the Grafton WWTP:

- UBWPAD makes up the majority of flow, and that portion of flow is assumed to be at the new permit limit of 0.1 mg/l (100 ug/l). This does not represent current conditions, but projected conditions after the UBWPAD achieves the permit limits. This flow is at the water quality target concentration.

- The instream concentration of the baseflow is calculated as 40 ug/l, based on the phosphorus concentration in tributaries to the Blackstone River upstream of point sources. This represents the contribution of nonpoint sources and atmospheric deposition to the river in dry conditions. The baseflow under 7Q10 conditions is 8.6 mgd, giving a load of 2.9 lb/day. The only flow available to offset the Grafton phosphorus discharge is this baseflow, since UBWPAD is discharging at the water quality target.

- The Grafton WWTP is assumed to discharge at its design flow of 2.4 mgd. At its current permit limit of 1.0 mg/l (1,000 ug/l), its load contribution is 20 lb/day. This is approximately 7 times the nonpoint source contribution in dry conditions.

Using the same equation as in the Fact Sheet, the instream concentration under the current permit limit is determined using a mass balance equation as follows:

$$Q_rC_r = \Sigma\ Q_dC_d + Q_sC_s$$

Where

Q_r = receiving water flow downstream of the discharge (Σ Qd + Qs)
C_r = total phosphorus concentration in the receiving water downstream of the discharge
Q_d = design flow from each facility
C_d = total phosphorus concentration in each discharge (assumed to be permit limit)
Q_s = Blackstone River base flow at 7Q10 = 13.35 cfs = 8.6 MGD[21]

[21] 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 7Q10 flow of 69 cfs used as the basis for permit limits in the current permit includes summer flows for UBWPAD and the Millbury WWTP of 54.55 cfs and 1.10 cfs respectively (see Response to Public Comments (1999)). The baseflow component of the 7Q10 flow is calculated by subtracting the upstream POTW flows from the total 7Q10 as follows:

69 cfs (7Q10 including POTWs) – 54.55 cfs (UBWPAD) – 1.10 cfs (Millbury) = 13.35 cfs

C_s = phosphorus concentration in baseflow, from sampling upstream of all POTWs = 0.04 mg/l

Solving for C_r yields:

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

$$C_r = \frac{56*100 + 2.4*1{,}000 + 8.6*40}{67}$$

$$C_r = 120 \text{ ug/l}$$

This value exceeds the water quality target of 100 ug/l. The exceedance is entirely due to the Grafton WWTP discharge, as the UBWPAD is assumed to be discharging at 100 ug/l and the baseflow is below the water quality target and is providing dilution to the Grafton discharge. In contrast, as shown in the Fact Sheet, at the HBPT permit limit of 0.2 mg/l the receiving water concentration will meet the water quality target.

At the point of Grafton's discharge, the impact of Grafton's load on the Blackstone River is quite significant and greater than that of nonpoint sources at low flows. The permit limit of 0.2 mg/l will be maintained. EPA encourages the permittee to pursue its third bullet and "work with others to develop a comprehensive plan to address phosphorus problems in the river, including the problems induced by non-point sources of phosphorus and hydrologic modifications to the flow regimen of the river," although that activity is not required as a permit condition.

Changes to permit: none.

Comment B12. [Nitrogen and Phosphorus] We request that the limits for phosphorous and nitrogen be changed to 60 day rolling average values. We are concerned that unintended problems in compliance, even if they are corrected rather quickly, will lead to extreme difficulties in meeting the limits for that month. Using a 60 day rolling average will mitigate against this problem, while ensuring long term compliance. We believe that our small size relative to other sources, and the fact that limits have been set for low flow periods indicates that a 60 day rolling average should not pose any threat to the environment.

Response to Comment B12. Monthly average limits are a regulatory standard in NPDES permits for POTWs, and longer averaging periods are used only where there is a demonstrated basis for their use. 40 CFR 122.45(d)(2). With respect to the nutrient limits in the Draft Permit, EPA's experience has been that permit limits of 0.2 mg/l TP and 8 mg/l TN are achievable on a monthly average basis. The impact of short term problems should be muted by the increased frequency of sampling of 2 per week. The monthly average is retained in the Final Permit.

Changes to Permit: none.

Comment B13. [TESTING AND MONITORING REQUIREMENTS - Lead] We request that the testing frequency for total lead be reduced to four times/year during the WET testing periods. A test result of greater than 1.8 ug/l has only occurred once in the past ten years, and during that decade Grafton had only one other detectable result, 1.2 ug/l (well under the limit). The remaining 38 test results from January 2002 to the present were all reported as ND (non detectable). It is our opinion that the one result of 5.2 ug/l in July 2006 was an outlier and not a true representation of our discharge.

Our concern is that we do not now have a need to conduct monthly sampling for metals of any sort, and that this requirement will add to the expense and paperwork required on the part of the Town. Recognizing that our historical operations suggest virtually complete compliance, we believe a quarterly test reflects an appropriate level of testing. Grafton does not, however, object to the EPA's introduction of a lead discharge standard in the proposed NPDES permit.

Response to Comment B13. EPA agrees that the Grafton WWTP overall has a good recent record of compliance with the new lead limit and that quarterly testing will therefore be sufficient. The Final Permit has been revised accordingly.

Change to permit: The monitoring frequency for lead on page 3 of the Final Permit as been modified to 4/year.

Comment B14. [TESTING AND MONITORING REQUIREMENTS - Total Residual Chlorine] We request that the sampling frequency be reduced from twice per/day to once per/day for weekends and holidays. The facility is only staffed for a short time (<1hr) during those periods, and we would like to avoid the expense of bringing in additional staff to take the additional sample. From our operating records we know of no reason to change the current requirements from once to twice a day samples on the weekends and holidays.

We also request that the time to install a chlorination alarm system be adjusted to correspond with other system improvements that will be required. Our historical operating records do not suggest that over or under chlorination is an issue. We understand the value of having the alarm system, but we want to avoid the expense of developing a bid package for this one item, and thus are willing to commit to including this in the next construction contract.

Response to Comment B14. EPA agrees that the sampling frequency may be reduced on weekends and holidays and has changed the requirement in the Final Permit.

While EPA is amenable to extending the period for implementation of a chlorination alarm system, we are unable to include a schedule within this permit that coordinates with other upgrades required to meet the new permit limits, as a number of them are water quality based limits based on RI water quality standards, and do not allow compliance schedules within permits. EPA expects that this requirement can be incorporated into a compliance schedule set through an EPA enforcement order.

Changes to permit: Footnote 15 has been added to the chlorine monitoring requirement, staing: "Two samples per day Monday to Friday, one sample per day Saturday, Sunday and holidays."

Comment B15. [TESTING AND MONITORING REQUIREMENTS - Sewer System Operation &Maintenance] We request that the implementation time in Section C be increased to within 30 months from the effective date of the permit. The work outlined in number 4 sec a. through k. and number 5 sec b.1 through b.8 will be done concurrently and is very codependent. Having the same time period for implementation of number 4 sec a. through k. and number 5 sec b.1 through b.8 will reduce duplicated work and reduce the associated costs.

We also request that the requirements of item C.6, Annual Reporting Requirement be modified to say:

"The report shall be submitted to EPA and MassDEP annually by March 31*, beginning with the first full year after submittal of the information required in C.5.b."*

Response to Comment B15. EPA is willing to accommodate the permittee's approach to the phasing of this work and agrees to increase the implementation time period for Section C.5.b. requirements to "within 30 months from the effective date of the permit."

EPA also agrees that reporting on implementation of the Collection System Operation and Maintenance Plan may be deferred while the plan is being developed in accordance with the permit schedule, but expects to receive such reports even if the first report year is not a full year. EPA has therefore revised the permit language to require such reporting "beginning with the first year after either (i) submittal of the information required in C.5.b. or (ii) expiration of the 30 month deadline for submittal of such information."

Changes to permit: Part C.5.b. has been modified from "twenty-four (24) months" to "thirty (30) months". The second sentence of Part C.6. has been revised as follows:

> *The report shall be submitted to EPA and MassDEP annually by March 31, beginning with the first year after either (i) submittal of the information required in C.5.b. or (ii) expiration of the 30 month deadline for submittal of such information.*

Comment B16. [COMPLIANCE SCHEDULE] As allowed by regulation[22], we request that the proposed NPDES permit be modified to include a compliance schedule.

Unless the EPA modifies the stringent nitrogen and phosphorus standards (as we urge it to do), the proposed nitrogen and phosphorus permit limits will require that Grafton conduct planning to select appropriate technologies, develop design plans of the selected alternative, and finally to

[22] See http://www.dem.ri.gov/pubs/regs/regs/water/ripdes03.pdf, Rule 20 and 314 CMR 4.03(b).

bid and award construction contracts to install the new components. Concurrently, the town has a need to undertake a comprehensive wastewater management plan. The last time that such planning took place in the Town was in the 1970's, when original planning took place. Since the planning includes an assessment of effluent disposal options and the need for sewerage in parts of town not presently sewered, it leads to a somewhat extended project.

Based on our understanding of the project as it now stands, we suggest that the following be included as milestone schedules for the project:

Secure Project Funding:	Town Meeting, 2013
Initiate Planning:	2 months after securing funding
Complete Planning	24 months after initiation of planning
Commence Design	4 months after completion of planning
Complete Design	20 Months after commencement of design
Bid Construction	3 months after design completed and SRF funding obtained
Complete Construction	24 months after award of construction

The actual schedule for each of these elements is dependent on the date by which the current draft permit is finalized, and the dates by which the Town can get Town Meeting approval and State Revolving Fund (SRF) approval for funding.

Response to Comment B16. EPA recognizes that a compliance schedule is both reasonable and necessary in the context of the new nutrient limits. However, Rhode Island water quality standards do not provide for compliance schedules to be included within NPDES permits. While Rhode Island's regulations governing NPDES permit issuance contain a provision regarding compliance schedule, authorization for such schedules must be contained within a state's water quality standards to be effective under EPA's regulations. *In The Matter of Star-Kist Caribe, Inc.,* 3 E.A.D. 172, 175, 177 (1990). Accordingly RIDEM does not include compliance schedules within its RIPDES permits but in enforcement orders. EPA anticipates a reasonable compliance schedule being provided in an enforcement order.

Changes to permit: none.

<u>Cover letter</u>

Comment B17. This permit is a renewal of a permit that was last reissued in 1999. The permit imposes new limits on nutrients (nitrogen and phosphorus) that will result in significant costs to the Town, both operating and construction. Our preliminary estimates indicate that the construction costs for compliance may approach as much as $30 million and our operating costs may increase by as much as $500 thousand annually.

The purpose of these limits is to control excessive plant growth in the Narragansett Bay and the Blackstone River. When developing a permit the most up to date science should be used as a guide along with an accurate and reasonable cost/benefit analysis. The EPA has chosen to base this permit on science, water quality standards, and studies that were developed in the 1980s and 1990s even though there are more recent and ongoing studies of the Blackstone River and

Narragansett Bay. A number of publicly owned wastewater treatment facilities (POTWs) are currently removing nutrients and discharging a much better quality effluent than they were during the 1980s and 1990s. We urge the EPA to base its decisions on the most up-to-date information and decision-making tools that are available, but it does not appear that the EPA has yet met that goal.

Response to Comment B17. As discussed in Response to Comment B9, EPA is aware of the significant burden and cost imposed by the new nutrient limits in this permit and has based its analysis on the best available scientific information. Cost/benefit analyses are not part of NPDES permit analyses, as EPA is explicitly precluded from considering cost in setting water quality-based permit limits. See Responses to Comment B1 and B3. EPA's analysis incorporates both early studies and more up to date information, include more recent data regarding POTW discharges than was used in the studies cited in these comments. See Response to Comment B4. The ongoing studies, while useful for large scale watershed planning, do not reflect the impacts of changes in smaller scale nutrient discharges from POTWs such as Grafton and are not amenable to setting permit limits on these facilities. See Responses to Comment B2 and B4. However, EPA notes that the general conclusions of these studies are consistent with EPA's analysis, as they support the need for widespread reduction of nutrient discharges from all sources.

Changes to permit: none.

Comment B18. We have reviewed a variety of documents associated with these new nitrogen and phosphorus limits. We understand that the reduction in nitrogen and phosphorus in Narragansett Bay and the Blackstone River required of Grafton is a tiny fraction of the overall nutrient load on the Bay and River. For example, according to EPA studies, the Bay receives approximately 17,400,000 pounds of nitrogen a year. The Grafton plant now discharges about 73,000 pounds per year of nitrogen, or about 0.4 % of the total Bay loading. A similar conclusion can be reached concerning phosphorus, using information from the Upper Blackstone Water Pollution Abatement District's study of the river.

Response to Comment B18. EPA's analysis is based on the impacts of Grafton's discharge on the Providence/Seekonk River (for nitrogen) and the Blackstone River at the points of Grafton's discharge (for phosphorus). Grafton's discharge is significant when these localized impacts are considered, rather than viewing the load in the context of the entire Narragansett Bay/Mount Hope Bay estuary system. See Responses to Comment B8 and B11. Even in the larger context, however, it is clear that reductions from smaller sources are a necessary part of the approach to addressing these important water quality problems.

Changes to permit: none.

Comment B19. The existing treatment facility has consistently met our current permit requirements. Unfortunately it cannot possibly meet the proposed limits without substantial upgrades. While we are prepared to do our share to update the facility, we are concerned that the money we will spend to meet these limits will never bear fruit unless other sources of water quality problems are also addressed in a timely manner. The EPA's Fact Sheet claims that other sources of nutrients are being addressed. But that claim rings hollow, because we know of no comprehensive plan for the Blackstone River or the Narragansett Bay that has been developed to address all sources in a coordinated manner, grant funding is extremely limited and little to no effort appears to have been made to address nitrogen or phosphorus from nonpoint sources. It appears, from their "List of Impaired Waters"[23] that the Massachusetts Department of Environmental Protection (MassDEP) will not develop a plan for its section of the Blackstone River until 2013 and that Rhode Island will not do so until 2018 for phosphorus in the Blackstone River, and 2016 for nitrogen in the Narragansett Bay

Response to Comment B19. EPA is aware that a substantial upgrade will be necessary to meet the proposed limits and expects that a compliance schedule will be provided allowing sufficient time to complete the necessary upgrade. EPA agrees that there is a need for comprehensive planning for the Blackstone River and Narragansett Bay. However, this does not obviate EPA's regulatory mandate to incorporate effluent limits in NPDES permits necessary to attain water quality standards. These are mandated by the Clean Water Act and federal regulations, and EPA does not have discretion to defer the imposition of permit limits until TMDLs are developed. See Response to Comment B7. Some aspects of nonpoint source nutrient loading are in fact being addressed, such as reduction in phosphates in everyday use (see Comment B6), phosphorus fertilizer bans (see Massachusetts General Court, Chapter 262 of the Acts of 2012) and reduction in atmospheric nitrogen contributions (through Clean Air Act requirements (see, e.g., Chesapeake Bay TMDL, Appendix L. Setting the Chesapeake Bay Atmospheric Nitrogen Deposition Allocations), but there remains a need for TMDLs to address all sources in a coordinated manner.

Changes to permit: none.

Comment B20. Because of the uncertainty on the timing of control of other sources, we request that the EPA adopt one or all of the following approaches:

- Require us to operate our treatment facility to "reduce the discharge of nutrients to the maximum extent possible using all available treatment equipment in place at the facility". We would work with you to define what constitutes an appropriate "maximum extent possible". This strategy, currently used for nitrogen by The Rhode Island Department of Environmental Management (RIDEM) in the Burrillville, RI treatment plant, would provide for some nutrient reductions, but would put off major construction until the coordinated plans are developed, and everyone understands the benefit of the invested dollars. When the plan is developed, the permit can be reissued with the coordinated limits.

- Incorporate a schedule of compliance in the permit, as is allowed by Massachusetts and Rhode Island regulations. Our recommended schedule is contained in the attached comments. This would make the limits effective at some time in the future, so that the permit can be modified, if the plans being developed by the States require limits different than the ones contained in the current permit.

[23] See http://www.dem.ri.gov/pubs/303d/303d12.pdf for the RI plan and http://www.mass.gov/dep/water/resources/12list2.pdf for the Massachusetts list.

- Agree that no permit renewal issued in the next 15 years will modify the nutrient limits contained in this permit, unless a coordinated plan for nutrient reduction has been developed and accepted by the EPA, MassDEP and RIDEM.

Regardless of the approach adopted, we urge the EPA to begin the process of developing these coordinated plans. We need to know what levels of control of all sources will be required in the future, so we can best plan to meet your water quality objectives. We are greatly concerned that failure on the part of the agencies to develop coordinated plans will result in the next round of permits being issued with even lower nutrient limits. We have already seen this happen in the case of several local wastewater agencies: Attleboro MA, the Narragansett Bay Commission and the Upper Blackstone Water Pollution Abatement District. This leads to the situation where one plant upgrade is immediately followed by another. This is very costly and confusing to the public and frustrating to local officials, who spin from one project to the next with no apparent end in sight. Most importantly, in these difficult economic times, with local financial resources scarce, we need to carefully weigh each investment. Getting the permit limits "right the first time" will assure the public that its money is being spent wisely.

Response to Comment B20. The uncertainty on the timing on control of other sources is not a basis for deferring permit limits in a NPDES permit for a point source that has been shown to contribute to water quality violations. With respect to the specific approaches suggested, the differences between the Grafton WWTP and the Burrillville, RI facility are discussed in Response to Comment B10. EPA cannot incorporate a compliance schedule in the permit for limits based on Rhode Island water quality standards, as discussed in Response to Comment B16. With respect to agreements to a 15 year period with no modification of permit limits, EPA's regulations provide for NPDES permit limit terms of five years.

EPA understands the desire for certainty in making the large investments necessary to meet permit limits, but EPA's governing statutes and regulations are clear that uncertainty is not a basis for delay in instituting permit limits. Moreover, a level of scientific uncertainty is inherent in projecting the impacts of such large scale reduction of nutrient inputs on a dynamic, watershed-scale system, even if the most sophisticated and data-rich models are available. EPA recognizes the difficulty of having nutrient limits lowered in successive permitting rounds and has sought to establish nutrient limits that are stringent enough to ensure that Grafton's discharge does not contribute to water quality violations (i.e. getting the permit limits "right the first time"). However given the inherent uncertainty in these complex systems EPA encourages facilities planning upgrades to incorporate flexibility into their designs.

Changes to permit: none.

Comment B21. Lastly, when these coordinated plans are developed, we urge you to consider sustainability in the selection of the most appropriate plan. Most of the technologies available today to meet these limits rely heavily on energy and chemicals, and result in expanded carbon and nitrogen footprints. We need to seriously consider these environmental effects in the development of nutrient control strategies.

Response to Comment B21. EPA agrees with the permittee that sustainability is an important consideration in designing the treatment process, and notes the substantial progress being made in achieving more sustainable nutrient reduction and recovery processes. See Response to Comment B6. We encourage the permittee to select the most sustainable technology that will attain the permit limits. Permit limit decisions, however, are based solely on water quality considerations and not the overall environmental footprint of the treatment process. See Response to Comment B3.

Changes to permit: none.

C. The following comments were received from the Blackstone River Coalition in a letter dated November 26, 2012:

Comment C1. The Blackstone River Coalition strongly supports the recently proposed draft permit limits for the Grafton Sewage Treatment Plant. The new nutrient limits will provide significant water quality improvements for the Blackstone River, its downstream impoundments and ultimately the Narragansett Bay.

Grafton is not alone in facing new limits for nitrogen and phosphorous. Every treatment plant along the river in both Massachusetts and Rhode Island is, or soon will be, forced to upgrade the quality of their discharges. Detailed scientific studies and years of citizen monitoring all report excessive nutrient levels that continue to plague the Blackstone. It is not EPA that tells us there are too many nutrients in the River; it is our noses. It is not arcane scientific models, but our eyes that can see excessive vegetation smothering downstream impoundments, and have witnessed fish kills in the Narragansett Bay.

Unfortunately, much like global warming, scientists can argue interminably as to what sources contribute how much, or how long it will take to achieve critical levels, or even what those levels are; but no one can disagree that there are simply way too many nutrients in the Blackstone River. Yes, regulators need to consider the effects of stormwater runoff and the existence of historic sediments; but at times of critical low flows in the summer, sewage treatment plants are the dominating factor affecting water quality.

Treatment at the end of the pipe is critical and necessary, but in all likelihood even the proposed limits will not be sufficient to achieve a “Fishable/Swimmable Blackstone”. The Blackstone River Coalition is committed to work with homeowners and businesses, cities and towns, federal and state agencies to restore a river we can be proud to call our home.

Response to Comment C1. EPA notes the support of the Blackstone River Coalition for the nutrient limits. EPA appreciates the commitment of the Blackstone River Coalition to work with stakeholders for the restoration of the Blackstone River.

Changes to permit: none.

D. The following comments were received from the RIDEM in a letter dated November 13, 2012:

Comment D1. The draft permit includes summer e-coli limits, to meet the Massachusetts water quality standards, and year round enterococci limits, to meet the Rhode Island water quality standards. The enterococci limits account for die-off when assigning permits limits that will meet the Rhode Island standards at the state line. These permits also include a condition that, after a minimum of 1 year, the permittee may request a reduction to only require enterococci monitoring in the winter if it is determined that "e.coli control is adequate to ensure control of enterococcus". Although RIDEM is willing to accept the reduction to the enterococci monitoring, this reduction should only be made if it is demonstrated that compliance with the e.coli limit will also ensure compliance with the enterococci limit. Therefore, RIDEM is requesting that the following change be made to footnote 8 of the permit:

> *8. The E. coli limits are State certification requirements. The enterococci limits are a requirement of the EPA permit and are not a requirement of the Massachusetts Department of Environmental Protection (MassDEP) permit.*
>
> *The enterococci sample shall be collected concurrently 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 demonstrates that compliance with the E.coli limit is adequate to ensure compliance with the enterococcus limit. 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.*

Response to Comment D1. EPA agrees that the revised language is consistent with the intent of the original language in the Draft Permit and more clearly states the showing that is required for EPA approval of a reduction in monitoring. The Final Permit has been modified accordingly.

Changes to permit: Footnote 8 has been modified as set forth in the comment above.

Comment D2. RIDEM is concerned over the lack of an Aluminum (Al) limit in the Grafton WWTF's permit. The fact sheet for the Uxbridge WWTF, which is downstream of the Grafton WWTF, included a reasonable potential analysis for AL indicating that the upstream water exceeded the Al criteria. Therefore, an Al limit equal to the criteria was assigned to the Uxbridge WWTF. This is consistent with how RIDEM assigns limits in Rhode Island Pollutant Discharge Elimination System (RIPDES) permits and will ensure that the discharge from the Uxbridge WWTF does not further degrade the Blackstone River. However, when evaluating the need for limits for the Grafton WWTF the Environmental Protection Agency (EPA) calculated a downstream Al concentration using the 95th percentile effluent concentration, the average upstream concentration, and the 7Q10 flow dilution factor. This yielded a downstream concentration of 82.5 ug/l. EPA then compared this concentration to the chronic criteria of 87 ug/l and concluded that there was no reasonable potential, since the downstream concentration was less than the criteria. As a result Al limits were not assigned to the Grafton WWTF. RIDEM does not agree with this analysis for the following reasons:

a. The reasonable potential analysis used the average Al upstream concentration of 81 ug/l. However, 4 of the 10 upstream Al samples had concentrations significantly greater than the average, with values ranging from 135 to 160 ug/l. Although average concentrations may be appropriate if the data is relatively consistent, that is not the case for Al and it would seem appropriate to use the maximum concentration as the upstream "critical condition." If this is done, the background concentration would exceed the criteria and the Grafton WWTF would be assigned the same limit as the Uxbridge WWTF (87 ug/l).

b. The analysis uses historical Al effluent data. However, the new permit lowers the phosphorus limit from 1.0 mg/l to 0.2 mg/l. It is likely that, to meet the lower TP limit, the Grafton WWTF will have to increase its use of chemicals, which will result in increased Al concentrations in the discharge. In the absence of a limit, the Grafton WWTF would not have any restrictions on the levels of Al that it could discharge.

c. Finally, the upstream data presented in the permit fact sheets clearly indicate a need for Al controls at the Grafton WWTF. The average and maximum Al concentrations upstream of the Grafton WWTF are 81 ug/l and 160 ug/l, respectively. The corresponding concentrations downstream of the Grafton WWTF, from the background data in the Uxbridge WWTF's fact sheet, are 123 ug/l and 324 ug/l. This indicates that the Grafton WWTF is causing an exceedance of the Al water quality criteria and points to a need to control Al discharges from the Grafton WWTF.

Failure to control Al discharges from the Grafton WWTF will result in an exceedance of the instream Al criteria upstream of the Uxbridge WWTF and a resulting exceedance at the state line. Therefore, RIDEM is requesting that an Al limit of 87 ug/l be assigned to the Grafton WWTF.

> **Response to Comment D2.** EPA does not believe an Al limit is necessary. The Grafton facility uses ferric compounds for phosphorus control, not aluminum. For that reason, Grafton's discharges of aluminum are consistently low, with only two monitoring results in seven years higher than the chronic water quality criterion of 87 ug/l. The 95^{th} percentile effluent concentration results in an increase in receiving water concentration of only 1.5 ug/l under 7Q10 conditions. EPA disagrees that the use of averages is contraindicated in this specific case because the data is insufficiently "consistent" as suggested in the comment; the variability of the receiving water concentrations is not unusually high,[24] particularly for grab samples which will tend to be more variable than either the 24 hour composites use for effluent monitoring or the 4-day average concentration that is the basis for chronic water quality criteria.

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[24] The coefficient of variability of the receiving water data is 0.5, compared to the EPA guidance recommended assumption of 0.6 where variability data is not available. See TSD at 107.

It should also be noted that the monitoring results date from before the implementation of the new permit limit for aluminum at the UBWPAD, which makes up most of the receiving water flow under 7Q10 conditions. There is no reason to believe that receiving water aluminum concentrations at Uxbridge are related to the Grafton discharge, given the available data. High concentrations at Uxbridge are likely related to other sources, including the Northbridge WWTP (located between Grafton and Uxbridge), which has had a maximum effluent concentration of 718 ug/l and is receiving an aluminum limit in its new permit. EPA also notes that the tributary to which Northbridge discharges also has concentrations higher than the chronic criterion with a maximum measured concentration of 610 ug/l.

EPA recognizes that the Grafton facility has a lower phosphorus limit in this new permit and that, should Grafton seek to meet this limit by changing its operations to incorporate aluminum compounds, it would potentially discharge higher concentrations of aluminum and be subject to receiving a permit limit for aluminum. EPA therefore encourages the permittee and its consultants to consider the potential for permit limits on aluminum in connection with an aluminum-based phosphorus removal process and plan accordingly, in order to avoid having to make another process change in the future. EPA expects that the permittee is already well aware of this issue. EPA also notes that the time frame for construction of new facilities to meet the new permit limits is likely to be on the order of several years, so that the impacts of a process change on aluminum discharges can be adequately assessed in the next permit reissuance.

Changes to permit: none.

Other Changes to Final Permit:

In addition to the changes made in response to comments as outline above, the Final Permit contains the following changes:

1. The Final Permit contains a requirement that monitoring results in connection with the WET tests (for hardness, ammonia as N, aluminum, cadmium, copper, nickel, lead and zinc) be reported on the facility's Discharge Monitoring Reports. See Final Permit, page 2. Such monitoring was conducted under the previous permit but was reported with the WET Reports only, and not on the DMR. This is not a new monitoring requirement but merely a change in the format of reporting of these parameters. The permittee shall continue to provide the results of this monitoring with its WET Reports in addition to reporting them on the DMRs.

2. The Final Permit requires reporting of TKN and "nitrite+nitrate as N" in addition to Total Nitrogen. This does not require additional testing as TN is calculated from the sum of TKN, and nitrate plus nitrite (see Footnote 13 of the Draft and Final Permits); this is simply a change in the format of reporting requirements. This change will allow data on specific nitrogen species to be used in future modeling and analysis of water quality requirements.

3. Footnote 9 of the Final Permit has been revised to clarify the use of chronic toxicity testing to calculate the acute LC50.

4. Part 1.A.2.g. of the Final Permit has been revised to reflect the change to an annual average flow limit for purposes of determining whether the permittee is exceeding 80 percent of design flow.