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 Hopedale
Board of Water and Sewer Commission
P.O. Box 7
Hopedale, MA 01747

is authorized to discharge from a facility located at:

Hopedale Wastewater Treatment Facility
Junction Route 16 and Mendon Street
Hopedale, MA 01747

to receiving water named: **Mill River (Blackstone River Basin – USGS Code #01090003)**

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 following 60 days after signature.

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

This permit supersedes the permit signed on September 3, 1999, which was appealed to the Environmental Appeals Board on July 18, 2000, and became effective on May 1, 2001.

This permit consists of 18 pages in Part I including effluent limitations and monitoring requirements, **Attachment A (Discharge Outfall), Attachment B (Freshwater Acute Toxicity Test Procedure and Protocol, February 2011), Attachment C (Freshwater Chronic Toxicity Test Procedure and Protocol, March 2013)**, and **Part II** (25 pages including NPDES Part II Standard Conditions).

Signed this 6th day of August, 2013.

/S/ SIGNATURE ON FILE

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Director
Office of Ecosystem Protection
Environmental Protection Agency
Boston, MA

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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 Mill River. Such discharge shall be limited and monitored by the permittee as specified below.

Effluent Characteristic		**Discharge Limitation**			**Monitoring Requirement** [*3]	
Parameter	**Units**	**Average Monthly**	**Average Weekly**	**Maximum Daily**	**Measurement Frequency**	**Sample Type** [*3]
Flow (Annual Average) [*2]	MGD	0.588 [*2]	—	Report	Continuous	Recorder
Flow [*2]	MGD	Report	—		Continuous	Recorder
BOD_5 [*4] (June 1 – Oct 31)	mg/l	15	15	Report	1/Week	24-Hour Composite* [5]
	lbs/day	74	74	Report	1/Week	24-Hour Composite* [5]
BOD_5 [*4] (Nov 1 – May 31)	mg/l	30	45	Report	1/Week	24-Hour Composite* [5]
	lbs/day	147	221	Report	1/Week	24-Hour Composite* [5]
TSS [*4] (June 1 – Oct 31)	mg/l	15	15	Report	1/Week	24-Hour Composite* [5]
	lbs/day	74	74	Report	1/Week	24-Hour Composite* [5]
TSS [*4] (Nov 1 – May 31)	mg/l	30	45	Report	1/Week	24-Hour Composite* [5]
	lbs/day	147	221	Report	1/Week	24-Hour Composite* [5]
E. Coliform Bacteria [*1, *6] (April 1 - Oct. 31)	cfu/100 ml	126	—	409	1/Week	Grab
Dissolved Oxygen (April 1 – Oct. 31)	mg/l	Not Less Than 6.0 mg/l			1/Week	Grab
pH [*1]	Standard Units	6.5 – 8.3 (See Permit Part I.A.1.b.)			1/Day	Grab

Effluent Characteristic	Units	Discharge Limitation			Monitoring Requirement	
Parameter		**Average Monthly**	**Average Weekly**	**Maximum Daily**	**Measurement Frequency**	**Sample Type[*3]**
Total Ammonia Nitrogen[*7]						
November 1 – April 30	mg/l	11	—	Report	1/Week	24-Hour Composite*[5]
May 1 – May 31	mg/l	5	5	8	1/Week	24-Hour Composite*[5]
June 1 – October 31	mg/l	2	2	3	1/Week	24-Hour Composite*[5]
Total Kjeldahl Nitrogen[*7]	mg/l, lbs/day	Report	—	Report	1/Month	24-Hour Composite*[5]
Total Nitrate Nitrogen[*7]	mg/l, lbs/day	Report	—	Report	1/Month	24-Hour Composite*[5]
Total Nitrite Nitrogen[*7]	mg/l, lbs/day	Report	—	Report	1/Month	24-Hour Composite*[5]
Aluminum, Total [*8,*10]	mg/l	0.11	—	1.2	1/Month	24-Hour Composite*[5]
Copper, Total Recoverable[*9]	ug/l	8.14	—	11.82	1/Month	24-Hour Composite[*5]
Total Phosphorus (April 1 - Oct. 31) [*11]	mg/l	0.160	—	Report	1/Week	24-Hour Composite*[5]
Total Phosphorus (Nov 1 – March 31) [*11]	mg/l	1.0	—	Report	1/Month	24-Hour Composite*[5]
Ortho-phosphorus, dissolved (Nov 1-March 31)	lbs/day	Report	—	—	1/Month	24-Hour Composite*[5]
Ortho-phosphorus, dissolved (Nov 1-March 31)	mg/l	Report	—	—	1/Month	24-Hour Composite*[5]

Effluent Characteristic	Units	Discharge Limitation			Monitoring Requirement	
Parameter		**Average Monthly**	**Average Weekly**	**Maximum Daily**	**Measurement Frequency**	**Sample Type[*3]**
Whole Effluent Toxicity [*1, *12, *13, *14, *15]	%	Acute	LC_{50}	$\geq$ 100%	4/Year	24-Hour Composite*[5]
	%	Chronic	NOEC	$\geq$ 61%	4/Year	24-Hour Composite*[5]
Hardness[*16]	mg/l		Report		4/Year	24-Hour Composite*[5]
Ammonia Nitrogen as N[*16]	mg/l		Report		4/Year	24-Hour Composite*[5]
Total Recoverable Aluminum[*16]	mg/l		Report		4/Year	24-Hour Composite*[5]
Total Recoverable Cadmium[*16]	mg/l		Report		4/Year	24-Hour Composite*[5]
Total Recoverable Copper[*16]	mg/l		Report		4/Year	24-Hour Composite*[5]
Total Recoverable Nickel[*16]	mg/l		Report		4/Year	24-Hour Composite*[5]
Total Recoverable Lead[*16]	mg/l		Report		4/Year	24-Hour Composite*[5]
Total Recoverable Zinc[*16]	mg/l		Report		4/Year	24-Hour Composite*[5]

Footnotes:

1. Required for State Certification

2. Report annual average, monthly average, and the maximum daily flow. The limit is an annual average, which shall be reported as a rolling average. The value will be calculated as the arithmetic mean of the monthly average flow for the reporting month and the monthly average flows of the eleven previous months.

3. Effluent sampling shall be representative of the discharge.

   A routine sampling program shall be developed in which samples are taken at the same location, same time, and same days of every month. Occasional deviations from the routine sampling program described above are allowed, but the reason for the deviation shall be documented in correspondence appended to the applicable discharge monitoring report.

   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 required effluent samples shall be collected at the point specified herein. Any change in sampling location must be reviewed and approved in writing by EPA and MassDEP.

PARAMETER:	SAMPLE LOCATION:
FLOW	Recorder in the Effluent Flume
FECAL COLIFORM and E-COLI	After discharge from the disinfection chamber, prior to discharge into the Mill River
BOD_5, TSS, pH RANGE, TOTAL AMMONIA AS N, TOTAL KJELDAHL NITROGEN, TOTAL NITRITE, TOTAL NITRATE, and WHOLE EFFLUENT TOXICITY	After discharge from the disinfection chamber, prior to discharge into the Mill River WET Dilution Water: Mill River upstream of treated wastewater discharge outfall
BOD and TSS (Influent)	Influent Line prior to primary tanks

4. Sampling is required for influent and effluent.

5. A 24-hour composite sample will consist of at least twenty four (24) grab samples taken during one consecutive 24 hour period, either collected at equal intervals and combined proportional to flow or continuously collected proportionally to flow.

6. *Escherichia coli (E. coli)* bacteria limitations and monitoring requirements are effective from April 1st through October 31st. The monthly average limit is expressed as a geometric mean.

7. Total ammonia nitrogen, total Kjeldahl nitrogen, nitrite nitrogen, and nitrate nitrogen samples shall be collected concurrently.

   The permittee shall operate the treatment facility to reduce the discharge of total nitrogen to the maximum extent possible, using existing treatment equipment at the facility. **Within one (1) year after the effective date** of the permit, the permittee shall submit a report to EPA and the MassDEP that describes the measures it has taken to enhance the removal of nitrogen by its treatment facility and summarizes the effectiveness of these measures.

8. Total aluminum samples shall be collected concurrently with a total phosphorus sample. See also Part I.B. Special Condition 1.

9. The minimum level (ML) for copper is defined as 3 ug/l. This value is the minimum level for copper using the Furnace Atomic Absorption analytical method 220.2. This method or another EPA-approved method with an equivalent or lower ML shall be used for effluent limitations less than 3 ug/l. Compliance/non-compliance will be determined based on the ML. Sampling results of 3 ug/l or less shall be reported as zero on the Discharge Monitoring Report.

10. See Part I.B., Special Condition 1 for a schedule of compliance.

11. The sampling frequency identified is the minimum sampling frequency and, in accordance with footnote #8 above, sampling must be conducted on the same day(s) each week. If any additional phosphorus sampling is conducted, including process control samples, the individual phosphorus results, including the day each sample was taken, the type of sample (i.e., 24-hour composite or grab), and the analytical method, must be reported on an attachment to the discharge monitoring report. Additionally, the chemical dosing rate for all chemicals added for the purpose of phosphorus removal shall be reported for each day of the month. Only 24-hour composite samples analyzed with an EPA-approved method shall be used in determining compliance with the permit limit.

    See Part I.B., Special Condition 2 for schedule of compliance and phosphorus interim limit.

12. The permittee shall conduct acute and chronic toxicity tests four times per year. 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 31th, August 31th, and November 30th, respectively. The tests must be performed in accordance with test procedures and protocols specified in **Attachments B and C** of this permit.

Test Dates during the month of	**Submit Results By:**	**Test Species**	**Acute Limit** LC_{50}	**Chronic Limit** NOEC
January April July October	February 28th May 31th August 31th November 30th	Ceriodaphnia dubia (Daphnid) See **Attachments B and C**	≥ 100%	≥ 61%

After submitting a minimum of four consecutive sets of whole effluent toxicity (WET) test results, all of which demonstrate compliance with the WET permit limits, the permittee may request a reduction in the frequency of required WET testing. The permittee is required to continue testing at the frequency specified in the permit until notice is received by certified mail from the EPA that the WET testing requirement has been changed.

13. The LC_{50} 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.

14. The chronic-no observed effect concentration (C-NOEC) is defined as the highest tested concentration of toxicant in 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, based on a statistically significant difference from dilution control, at a specific time of observation as determined from hypothesis testing. As described in the EPA WET Method Manual EPA 821-R-02-013, section 10.2.6.2, all test results are to be reviewed and reported in accordance with EPA guidance on the evaluation of the concentration-response relationship. The "61% or greater" is defined as a sample which is composed of 61% (or greater) effluent, the remainder being dilution water.

15. If toxicity test(s) using receiving water as diluent show the receiving water to be toxic or unreliable, the permittee shall follow procedures outlined in **Attachments B and C, Section IV., DILUTION WATER** in order to obtain permission to use an alternate dilution water. In lieu of individual approvals for alternate dilution water required in **Attachments B and C**, EPA-New England has developed a Self-Implementing Alternative Dilution Water Guidance document (called "Guidance Document") 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 found on the EPA, Region I web site at http://www.epa.gov/region01/enforcementandassistance/dmr.html.

If this guidance is revoked, the permittee shall revert to obtaining individual approval as outlined in **Attachments B and C**. Any modification or revocation to this guidance shall be transmitted to the permittees as part of the annual DMR instruction package. However, at any time, the permittee may choose to contact EPA-New England directly using the approach outlined in **Attachments B and C**. If the permittee has already received permission to use an alternative

dilution water under the previous permit, the permittee does not need to repeat this approval process. If the permittee uses an alternative dilution water, the ambient water will still need to be tested.

16. 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 **Attachments B and C**. Also the permittee should note that all chemical parameter results must still be reported in the appropriate toxicity report.

Part I.A.1. (Continued)

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 Standard Units (S.U.) at any time.

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

d. The effluent shall not contain a visible oil sheen, foam, or floating solids at any time.

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

f. The results of sampling for any parameter analyzed in accordance with EPA approved methods above its required frequency must also be reported.

g. If the average annual flow in any calendar year exceeds 80 percent of the facility's design flow, the permittee will submit a report to MassDEP by **March 31st** 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 permittee is not authorized to use chlorine as a method of disinfection.

i. **Within 24 months of the effective date of the** permit, the permittee shall submit a plan to EPA and the MassDEP that will verify the instream 7Q10 flow upstream of the treatment plant outfall. Options may include, but are not limited to, measuring the flow release from the upstream Hopedale Dam or gaging the flow in the river.

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

    a. Any new introduction of pollutants into that 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 will 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.

3. Prohibitions Concerning Interference and Pass Through:

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

4. Toxics Control

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

    b. Any toxic components of the effluent will 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.

5. Numerical Effluent Limitations for Toxicants

    a. 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. SPECIAL CONDITIONS

1. Aluminum

a. The permittee shall evaluate the ability of the existing treatment facilities to achieve the monthly average and daily maximum aluminum limitations and shall submit a report on or before **36 months from the effective date of the permit** that summarizes the evaluation and includes a determination whether the existing facility is capable of reliably achieving the effluent limitations.

b. If the permittee concludes that the existing facilities can achieve the monthly average and daily maximum limitations, the limits will become effective **38 months from the effective date of the permit**.

c. If the permittee concludes that the existing facilities cannot achieve the monthly average and daily maximum limitations (and EPA and MassDEP concur), the limits will become effective **59 months from the effective date of the permit**. Until the limits are achieved, the Town shall submit a report to EPA and MassDEP at **12 months, 24 months, 38 months, and 50 months, from the effective date,** describing progress towards attaining the effluent limitations, including a description of planning, design, and construction of any necessary facilities.

d Until the limits become effective, the permittee shall minimize the discharge of aluminum, and conduct sampling as required by the permit (i.e., the compliance schedule does not affect the monitoring requirements).

2. Total Phosphorus

a. The permittee shall evaluate the ability of the existing treatment facilities to achieve the April – October 31 monthly average total phosphorus limitation and shall submit a report on or before **36 months from the effective date of the permit** that summarizes the evaluation and includes a determination whether the existing facility is capable of reliably achieving the effluent limitations.

b. If the permittee concludes that the existing facilities can achieve the April 1 – October 31 monthly average limit, the limits will become effective **38 months from the effective date of the permit**.

c. If the permittee concludes that the existing facilities cannot achieve the April 1 – October 31 monthly average limit (and EPA and MassDEP concur), the limits will become effective **59 months from the effective date of the permit**. Until the limit is achieved, the Town shall submit a report to EPA and MassDEP at **12 months, 24 months, 38 months, and 50 months, from the effective date**, describing progress towards attaining the effluent limitation, including a description of planning, design, and construction of any necessary facilities.

d. Until the April 1 – October 31 limit becomes effective, the permittee shall achieve a monthly average total phosphorus limit of 1.0 mg/l. Sampling for total phosphorus shall be conducted as required by the permit (i.e., the compliance schedule does not affect the monitoring requirements).

e The winter phosphorus limitation is new for this permit. The 1.0 mg/l seasonal (November 1st – March 31st) total phosphorus limit in this permit shall become effective **36 months from the effective date of the permit**. Until the limits become effective, the permittee shall minimize the discharge of phosphorus during the winter season and conduct sampling as required by the permit (i.e., the compliance schedule does not affect the monitoring requirements).

C. UNAUTHORIZED DISCHARGES

The permittee is authorized to discharge only in accordance with the terms and conditions of this permit and only from outfall 001 listed on **Attachment A** and 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 must be reported to EPA and MassDEP in accordance with Part II. Section D.1.e.(1) of the General Requirements of this permit (Twenty-four hour reporting).

Notification of SSOs to MassDEP will be made on its SSO reporting form (which includes MassDEP regional office telephone numbers). The reporting form and instructions for its completion can be found on-line at: http://www.mass.gov/dep/water/approvals/surffms.htm#sso.

D. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

Operation and maintenance of the sewer system will 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 will 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 will be described in the Collection System O & M Plan required pursuant to Section D.5. below.

2. Preventative Maintenance Program

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

4. Collection System Mapping

   Within 30 months of the effective date of this permit, the permittee shall each 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. combined manholes);
   d. All outfalls, including the treatment plant outfall(s), CSOs, combined manholes, and any known or suspected SSOs;
   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 goal, 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 all 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 completed, implemented, and submitted to EPA and MassDEP **within twenty four (24) months from the effective date of the permit**. The Plan shall include:

(1) The required submittal from paragraph 5.a. above, update to reflect current information;

(2) A preventative maintenance and monitoring program for the collection system;

(3) Description of sufficient staffing necessary to properly operate and maintain the sanitary sewer collection system and how the operation and maintenance program is staffed;

(4) Description of funding, the source(s) of funding and provisions for funding sufficient for implementing the plan;

(5) Identification of known and suspected overflows and back-ups, including manholes. A description of the cause of the identified overflows and back-ups, corrective actions taken, and a plan for addressing the overflows and back-ups consistent with the requirements of this permit;

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

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

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

6. Annual Reporting Requirement

The permittee shall submit a summary report of activities related to the implementation of its Collection System O & M Plan during the previous calendar year. The report shall be submitted to EPA and MassDEP **annually by March 31st**. 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 its design flow (0.47 mgd) based on the annual average flow during the reporting year, 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 its portion of the publicly owned treatment works1 it owns and operates.

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

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

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

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

- Monitoring
- Reporting

Which of the 40 CFR §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), 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.

F. 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 all DMRs and reports. Specific requirements regarding submittal of data and reports in hard copy form and for submittal using NetDMR are described below:

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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

a. Submittal of Reports Using NetDMR

NetDMR is accessed from: http://www.epa.gov/netdmr. **Within one year of the effective date of the 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 the 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
5 Post Office Square, Suite 100 (OES04-4)
Boston, MA 02109-3912

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

MassDEP – Central Region
Bureau of Resource Protection (Municipal)
627 Main Street
Worcester, MA 01608

Copies of toxicity tests, nitrogen and phosphorus optimization reports, and aluminum evaluations only to:

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

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

G. 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 will have the independent right to enforce the terms and conditions of this permit. Any modification, suspension or revocation of this permit will be effective only with respect to the Agency taking such action, and will 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 will remain in full force and effect under Federal law as an 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 will remain in full force and effect under State law as a permit issued by the Commonwealth of Massachusetts.

Attachment A
Advanced Secondary Wastewater Treatment Plant Discharge Outfall
NPDES Permit No. MA0102202
Hopedale, MA

Outfall:	Description of Discharge:	Outfall Location/Receiving Water:
001	Advanced Secondary Wastewater Treatment Plant Effluent	Mill River

USEPA REGION 1 FRESHWATER ACUTE TOXICITY TEST PROCEDURE AND PROTOCOL

I. GENERAL REQUIREMENTS

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

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

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

II. METHODS

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

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

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

III. SAMPLE COLLECTION

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

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

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

IV. DILUTION WATER

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

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

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

and

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

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

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

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

V. TEST CONDITIONS

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

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

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

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

Footnotes:

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

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

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

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

Footnotes:

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

VI. CHEMICAL ANALYSIS

At the beginning of a static acute toxicity test, pH, conductivity, total residual chlorine, oxygen, hardness, alkalinity and temperature must be measured in the highest effluent concentration and the dilution water. Dissolved oxygen, pH and temperature are also measured at 24 and 48 hour

intervals in all dilutions. The following chemical analyses shall be performed on the 100 percent effluent sample and the upstream water sample for each sampling event.

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

Notes:

1. Hardness may be determined by:
   - APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
     -Method 2340B (hardness by calculation)
     -Method 2340C (titration)

2. Total Residual Chlorine may be performed using any of the following methods provided the required minimum limit (ML) is met.
   - APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
     -Method 4500-CL E Low Level Amperometric Titration
     -Method 4500-CL G DPD Colorimetric Method

3. Required to be performed on the sample used for WET testing prior to its use for toxicity testing

VII. TOXICITY TEST DATA ANALYSIS

LC50 Median Lethal Concentration (Determined at 48 Hours)

Methods of Estimation:

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

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

No Observed Acute Effect Level (NOAEL)

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

VIII. TOXICITY TEST REPORTING

A report of the results will include the following:

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

FRESHWATER CHRONIC
TOXICITY TEST PROCEDURE AND PROTOCOL
USEPA Region 1

I. GENERAL REQUIREMENTS

The permittee shall be responsible for the conduct of acceptable chronic 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 toxicity data shall be reported as outlined in Section VIII.

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, Region 1
Five Post Office Square, Suite 100
Mail Code OEP06-5
Boston, MA 02109-3912

and

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

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

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

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 IC25 values and ≥ two concentration intervals for NOECs, 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://water.epa.gov/scitech/methods/cwa/ . 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)

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PART II. A. GENERAL REQUIREMENTS

1. Duty to Comply

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

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

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

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

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

2. Permit Actions

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

3. Duty to Provide Information

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

4. Reopener Clause

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

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

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

5. Oil and Hazardous Substance Liability

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

6. Property Rights

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

7. Confidentiality of Information

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

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

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

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

8. Duty to Reapply

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

9. State Authorities

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

10. Other Laws

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

PART II. B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of storm water pollution prevention plans. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of the permit.

2. Need to Halt or Reduce Not a Defense

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

3. Duty to Mitigate

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

4. Bypass

a. Definitions

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

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

b. Bypass not exceeding limitations

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

c. Notice

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

d. Prohibition of bypass

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

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

5. Upset

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

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph B.5.c. of this section are met. No determination made during

administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

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

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

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

PART II. C. MONITORING REQUIREMENTS

1. Monitoring and Records

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

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

c. Records of monitoring information shall include:

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

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

e. The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by

imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

2. Inspection and Entry

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

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

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

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

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

PART II. D. REPORTING REQUIREMENTS

1. Reporting Requirements

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

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

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

c. Transfers. This permit is not transferable to any person except after notice to the Regional Administrator. The Regional Administrator may require modification or revocation and reissuance of the permit to change the name of the permittee and

incorporate such other requirements as may be necessary under the CWA. (See 40 CFR Part 122.61; in some cases, modification or revocation and reissuance is mandatory.)

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

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

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

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

e. Twenty-four hour reporting.

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

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

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

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

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

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

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

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

2. Signatory Requirement

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

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

3. Availability of Reports.

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

PART II. E. DEFINITIONS AND ABBREVIATIONS

1. Definitions for Individual NPDES Permits including Storm Water Requirements

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

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

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

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

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

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

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

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

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

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

Construction Activities - The following definitions apply to construction activities:

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

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

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

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

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

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

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

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

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

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

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

Discharge of a pollutant means:

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

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

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

to a treatment works; and discharges through pipes, sewers, or other conveyances leading into privately owned treatment works.

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

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

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

EPA means the United States "Environmental Protection Agency".

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

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

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

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

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

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

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

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

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

Large and Medium municipal separate storm sewer system means all municipal separate storm sewers that are either: (i) located in an incorporated place (city) with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census (these cities are listed in Appendices F and 40 CFR Part 122); or (ii) located in the counties with unincorporated urbanized

populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships, or towns within such counties (these counties are listed in Appendices H and I of 40 CFR 122); or (iii) owned or operated by a municipality other than those described in Paragraph (i) or (ii) and that are designated by the Regional Administrator as part of the large or medium municipal separate storm sewer system.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

NPDES means "National Pollutant Discharge Elimination System".

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

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

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

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

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

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

(a) Sewage from vessels; or

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Waters of the United States means:

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

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

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

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

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

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

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

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

(f) The territorial sea; and

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Class I sludge management facility is any publicly owned treatment works (POTW), as defined in 40 CFR §501.2, required to have an approved pretreatment program under 40 CFR §403.8 (a) (including any POTW located in a state that has elected to assume local program responsibilities pursuant to 40 CFR §403.10 (e) and any treatment works treating domestic sewage, as defined in 40 CFR § 122.2,

classified as a Class I sludge management facility by the EPA Regional Administrator, or, in the case of approved state programs, the Regional Administrator in conjunction with the State Director, because of the potential for sewage sludge use or disposal practice to affect public health and the environment adversely.

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

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

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

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

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

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

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

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

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

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

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

Feed crops are crops produced primarily for consumption by animals.

Fiber crops are crops such as flax and cotton.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Range land is open land with indigenous vegetation.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3. Commonly Used Abbreviations

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

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

Temp. °C	Temperature in degrees Centigrade
Temp. °F	Temperature in degrees Fahrenheit
TOC	Total organic carbon
Total P	Total phosphorus
TSS or NFR	Total suspended solids or total nonfilterable residue
Turb. or Turbidity	Turbidity measured by the Nephelometric Method (NTU)
ug/l	Microgram(s) per liter
WET	"Whole effluent toxicity" is the total effect of an effluent measured directly with a toxicity test.
C-NOEC	"Chronic (Long-term Exposure Test) – No Observed Effect Concentration". The highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specified time of observation.
A-NOEC	"Acute (Short-term Exposure Test) – No Observed Effect Concentration" (see C-NOEC definition).
LC_{50}	LC_{50} is the concentration of a sample that causes mortality of 50% of the test population at a specific time of observation. The LC_{50} = 100% is defined as a sample of undiluted effluent.
ZID	Zone of Initial Dilution means the region of initial mixing surrounding or adjacent to the end of the outfall pipe or diffuser ports.

Response to Public Comments

On March 2, 2012, the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) released a draft National Pollutant Discharge Elimination System (NPDES) permit for the Hopedale Wastewater Treatment Facility in Hopedale, Massachusetts for public comment notice and comment. The public comment period ended on March 31, 2012.

The draft permit was developed pursuant to an application from the Town of Hopedale for the reissuance of its permit to discharge treated wastewater from outfall 001 to the designated receiving water, the Mill River. The Response to Comments below includes all written comments submitted to EPA and the MassDEP during the public comment period, and in accordance with the provisions of 40 C.F.R. §124.17, presents the agencies' responses to all of the significant comments. The response to public comments explains and supports the EPA's determinations that form the basis of the final permit.

After a review of the comments received, EPA has made a final decision to issue the permit authorizing this discharge. EPA's decision-making process has benefited from the comments and additional information submitted. There are only two substantial changes to the permit that are summarized as follows: (1) a change from requiring one chronic and modified acute whole effluent toxicity test protocol to requiring separate acute and chronic toxicity tests, and (2) a change in the total phosphorus limit from a mass limit of 0.49 lbs/day to a concentration limit of 0.160 mg/l. The explanation for the change in the whole effluent toxicity testing protocols are discussed in the last section of this response to comments document, and the analyses underlying the total phosphorus limit changes are explained in the responses to individual comments that follow. Both of these changes are reflected in the final permit.

Copies of the final permit may be obtained by writing or calling Janet Deshais, EPA Municipal Permits Section (OEP 06-4), Office of Ecosystem Protection, 5 Post Office Square, Suite 100, Boston, MA 02109-3912; Telephone: (617) 918-1667.

A. Comments received from the Town of Hopedale dated March 30, 2012.

Comment A.1.

Meeting the effluent limitations presents an unreasonable financial burden. The ratepayers of Hopedale have shouldered millions of dollars in regulatory burden over the past decade. In 2009, the Town completed construction on upgrades to the WWTF at a total cost of approximately $2.05 million, and in 2011, completed construction on a new Water Treatment Facility at a total cost of $4.89 million. For fiscal year 2013, Hopedale's *existing* wastewater and water debt is over $8 million, with a combined annual principal and interest payment of $772,473. As a result of this debt, in fiscal year 2013, Hopedale's wastewater and water ratepayers will shoulder the burden of base assessments totaling over $367 per user before even turning on the tap. This debt, and associated annual

assessments and rate increases, is *in addition to* the Town's annual operating budget and accumulated debt related to all other municipal responsibilities.

This *is existing* debt. In order to meet the increasingly stringent effluent limits that EPA is proposing in the 2012 Draft Permit, Hopedale is likely to require another costly upgrade to its WWTF. With the amount of existing debt, only slightly over 2,000 sewer system users, and a total population of less than 6,000 people, Hopedale does not have the financial capability to shoulder the debt for another upgrade, especially in these tough economic times. In their November 14, 2007 White Paper titled *The Case for Environmental Regulatory Reform - Clean Water Act NPDES Permitting* (copy attached), the Massachusetts Coalition for Water Resources Stewardship (MCWRS) further emphasizes this regulatory burden placed upon the Town of Hopedale:

> *Failure to Consider Cost Impacts*
> *While regulators insist that costs to utilities and their ratepayers are considered in their permitting decisions, cost impacts are in fact given only cursory attention. Most troubling is that regulatory compliance costs are evaluated independently for each regulatory decision. Utilities and communities obtain their revenue from the same source: their ratepayers. In most cases the ratepayers shouldering the burden of wastewater treatment compliance are the same as those funding wastewater conveyance, stormwater management and drinking water systems. It is totally inadequate to assess the cost impact for a wastewater treatment initiative and proclaim it to be reasonable without first looking at the current and future total regulatory load. Such an analysis is lacking at this time.*

With this 2012 Draft Permit, the EPA looks to ask the ratepayers of Hopedale to shoulder the costly dollar burden of evaluation, design, and construction of two major WWTF upgrades and a new Water Treatment Facility, as well as meeting the requirements of a variety of other Federal and State mandates, such as stormwater permitting, all in the span of less than 15 years. This is clearly and justifiably an unreasonable financial burden on such a small Town.

The Town of Hopedale shares the EPA's desire for the protection of water resources and is committed to continual improvement of its WWTF to address emerging contaminants. However, the Town of Hopedale also has a responsibility to its ratepayers, taxpayers, residents, business owners, and children to provide fiscally sound capital and operating budgets that maintain a minimum level of public services. As per 314 CMR 4.03(1), the Town of Hopedale requests that the EPA revise the 2012 Draft Permit as requested herein in such a manner to consider the "technological and economical impacts".

Response A.1.

EPA and the MassDEP appreciate that achieving the more stringent limits in the permit may cause additional financial burden to the Town. Although the agencies are cognizant of the cost associated with protecting water quality, the law and regulations do not allow financial burden to be a component of the decision making process in establishing necessary water quality-based limits. Specifically, the Environmental Appeals Board has ruled that "In requiring compliance with applicable water quality standards, the Clean Water Act simply does not make any exceptions for cost or technological feasibility." [1] In the draft permit, EPA provided a schedule that it believed was reasonable, providing time for the Town to assess the performance of the existing facility after completing the new drinking water plant, before having to initiate planning design and construction of upgraded facilities. We believed that this would allow the Town to maximize the performance of existing facilities in order to minimize the need for additional treatment facilities.

Comment A.2.

The EPA created an undue financial burden on the Permittee by failing to make available more stringent standards in a timely fashion. In September 2005, the EPA issued an Administrative Consent Order to the Town of Hopedale in response to the inability of the Town's WWTF to meet effluent limits set forth in its NPDES permit. In 2009, the Town completed construction of WWTF upgrades needed to comply with the consent order and permit limits. Through this 2012 Draft Permit, the EPA will impose even more stringent effluent limits that will likely require Hopedale to undertake an entirely new, and substantial, WWTF upgrade just three years after completing its last upgrade.

By failing to anticipate and communicate effluent limit expectations in a timely fashion, the EPA failed to provide Hopedale with information that might have allowed the Town to address these limits during design and construction of their recent WWTF upgrades.

Consequently, the Town will now have to undertake an entirely new design and construction process to upgrade the WWTF again to meet the proposed 2012 effluent limits. By requiring repeated upgrades under separate five-year permit cycles, the EPA likely caused cost inefficiencies, misdirected treatment technology/design selections, and created an undue financial burden on the Town. The EPA has a responsibility to advise permittees such as Hopedale of likely changes to NPDES permits well in advance of instituting them in NPDES permits, thereby giving reasonable notice to allow design and construction of upgrades to properly and cost-effectively address anticipated future requirements.

1 See EAB decision *In re New England Plating Co*, NPDES Appeal No. 00-7, Decided March 29, 2001. "In requiring compliance with applicable water quality standards, the CWA simply does not make any exceptions for cost or technological feasibility. *Mass. Corr. Inst.-Bridgewater*, slip op.at 10-11; *In re City of Fayetteville*, 2 E.A.D. 594, 600-01 (CJO 1988).".

Response A.2.

The new or more stringent limits in the draft permit are for total phosphorus (more stringent limit) and aluminum (new limit).

Regarding phosphorus, the previous permit included a 1.0 mg/l limit. This permit was signed on September 3, 1999, appealed to the Environmental Appeals Board on July 18, 2000, became effective on May 1, 2001, and remained in effect until this final permit decision. The 1999 permit maintained the 1.0 mg/l total phosphorus limit that had been included in the 1992 permit. Therefore, the 1.0 mg/l limit had been in place for at least twenty years, sufficient time to determine that it was inadequate to attain downstream water quality standards.

Regarding aluminum, the fact sheet clearly shows that the discharge of this pollutant has the reasonable potential to cause or contribute to exceedances of water quality standards and also describes the basis for the limits in the draft permit.

The terms of NPDES permits are limited to five years by regulation under 33 USC §§ 1342(b)(1)(B) and 40 C.F.R. § 122.46(a), and EPA is required to re-visit the entire permit during reissuance, so we are unable to provide assurances for permit limitations and conditions beyond the five year term of the permit. EPA does not make permit decisions lightly, and as described above we believe we have provided appropriate justification for the limits.

We regret that the Town believes that EPA has allowed the Town to misdirect its funds by not advising it of likely changes to future permits when the Town undertook the most recent upgrade. It is not clear what changes the Town would have made to its upgrade (which was primarily to achieve ammonia limits) had it been made aware that more stringent phosphorus and aluminum limits might be required in a future permit, or that the Town would have undertaken efforts to remove these pollutants if the limit were not in a final permit.

As described in the response to the previous comment, the compliance schedule in the permit allows time for the effects of the new drinking water plant on wastewater treatment plant effluent quality to be realized, and for the upgraded wastewater treatment plant to be optimized before the planning, design, and construction of any new facilities are required. In this way, EPA has sought to minimize the cost of any necessary upgrades.

Comment A.3.

The EPA has not provided adequate scientific basis for the more stringent effluent limitations. Although the EPA offers ambient water quality as the basis for effluent limits in the 2012 Draft Permit, the EPA has failed to provide adequate scientific evidence of any direct measurable benefits to be achieved through the more stringent effluent limits proposed. The EPA has the burden of proof in this matter and must justify through

scientific data that the WWTF discharge contributes to a violation of water quality standards in the receiving water, and if so, that each modification to the effluent limits proposed in the 2012 Draft Permit will result in a direct measureable reduction of that contribution.

In their White Paper titled *The Case for Environmental Regulatory Reform - Clean Water Act NPDES Permitting*, the MCWRS states:

> *Lack of Meaningful Benefits*
> *The single most troubling aspect of the current approach to implementation of the Clean Water Act is the lack of meaningful, measurable benefits that will be derived through compliance with mandated rules. Many of the numerical discharge limits are based on generalities, not site specific scientific principles. Terms like "cultural eutrophication" are tossed about as if they were accurate measures of aquatic systems when they are nothing more than concepts. The benefits of permit conditions are typically vague and generalized. As such they are difficult to quantify and even more difficult to assign a monetary benefit value. Therefore, any thoughts of performing a true cost/benefit analysis are hopeless. The costs can be clearly derived but the benefits are subjective and nebulous. The regulatory philosophy generally follows the rules that "less is better", "try it and see what happens" and "do it because you can".*

The EPA has failed to provide any scientific basis to demonstrate a direct correlation between the proposed modifications to the effluent limits in the 2012 Draft Permit and the reduction of the WWTF's contribution to violations of water quality in the receiving water, if any.

Response A.3 .

Water quality standards define the water quality goals of a water body by designating a use or uses of the water and setting criteria necessary to protect the uses (See 40 CFR 131.2). Permit limits must be included for pollutants that have the reasonable potential to cause or contribute to excursions above a narrative or numeric criteria within a State water quality standard (See 40 CFR 122.44(d)). The narrative criteria for nutrients in the Massachusetts Surface Water Quality Standards include a specific provision regarding cultural eutrophication (see 314 CMR 4.05(5) (c)). It is specifically defined as "including the excessive growth of aquatic plants or algae."

In the fact sheet, EPA documented several reports prepared by MassDEP that identify waters downstream of the Hopedale discharge as impacted by excessive growth of plants or algae. As required by regulations at 40 CFR 122.44(d), EPA interpreted the state's narrative criteria using EPA water quality criteria guidance documents and showed that the discharge of phosphorus has the reasonable potential to cause or contribute to exceedances of these criteria. Accordingly, EPA established the phosphorus limits in the draft permit, which are more stringent than the limitations in the previous permit. The

expected benefits of the reduction of the discharge of phosphorus are reductions in downstream plant growth and attainment of water quality standards.

It is unclear what the commenter believes would constitute an "adequate scientific basis." The impacts of excessive nutrients in receiving waters are well known and there is nothing particular to the Mill River that would lead us to believe that the water quality guidance used to interpret the state's narrative criteria are incorrect.

Regarding the comments relative to cost/benefit, cost/benefit is not a principal for establishing water quality-based limits in NPDES permits. Cost may be a factor in establishing water quality standards, if the cost of achieving a designated use is shown to cause widespread economic and social impact (see 40 CFR Part 131.10 (g)(6)). However, no such analysis has been done on the Mill River, so the permit must be written to attain the existing water quality standards.

Therefore, the final permit includes a more stringent phosphorus limit than in the previous permit to ensure attainment of water quality standards. The limit has been changed from a mass limit to a concentration limit (See Response A.7.).

Comment A.4.

Part 1.A.1: Increased cost of "report" parameters. The 2012 Draft Permit contains a variety of parameters requiring monitoring and reporting, but which have no effluent limits. These include, but are not limited to Total Kjeldahl Nitrogen, Total Nitrate Nitrogen, Total Nitrite Nitrogen, and Dissolved Ortho-Phosphorus. Since there are no effluent limits, monitoring of these parameters is being requested for the sole purpose of gathering scientific data for future use by the EPA (and other parties). In fact, the EPA states this in the 2012 Draft Permit Fact Sheet; that the intent of including monitoring and reporting requirements for nitrogen-based parameters is to "establish a database of nitrogen loadings, which can be used to quantitatively assess the impact of loading and transport of nitrogen to Narragansett Bay," and for Ortho-Phosphorus is to "further understand the dynamics of phosphorus during the non-growing season."

Monitoring and reporting of these parameters requires notable expenditures in staff time and laboratory costs, adding to the already high burden of operation and maintenance of the WWTF. The Town of Hopedale is not required, nor willing, to expend its limited resources to support the EPA in this effort to gather scientific data for future use.

Response A.4.

EPA agrees that it should have good reason to establish monitoring requirements for pollutants that are not limited by the permit. We believe that the reasons cited in the fact sheet do support the inclusion of monitoring requirements for nitrogen compounds and for orthophosphate.

Regarding nitrogen, the impacts of nitrogen on downstream waters in Rhode Island are well documented, and several larger Massachusetts facilities in the Blackstone and Seekonk River watersheds have total nitrogen limits in draft or final permits, in order to attain water quality standards in Rhode Island. Based on current information, EPA does not believe that the Hopedale treatment plant has the reasonable potential to cause or contribute to the water quality exceedances in Rhode Island, but monitoring will help inform future water quality studies and permit decisions.

Regarding orthophosphorus, the winter limit of 1.0 mg/l for total phosphorus is based on the understanding that this limit will minimize the discharge of particulate phosphorus, the component most likely to be retained in downstream sediments and available to support plant growth in the spring. Measurement of orthophosphorus, the dissolved component of phosphorus, will confirm this assumption.

Comment A.5.

Part 1.A.1: Available Dilution and 7Q10 Flow. The 2012 Draft Permit proposes significant and costly nutrient and metals effluent limit modifications based on a calculated dilution factor and the seven-day, ten-year low flow (7Q10) of the Mill River. The Town takes exception to the overly conservative method EPA used to calculate the 7Q10 Flow. The use of the overly conservative 7Q10 flow results in excessively stringent effluent limits for nutrients and metals.

Response A.5.

The Massachusetts Water Quality Standards establish the 7Q10 as the hydrologic condition at which water quality criteria must be applied (See 314 CMR 4.03(3)). The 7Q10 is a relatively rare (once in 10 years) flow condition. It is not clear what aspect of the 7Q10 calculation the Town considers “overly conservative”. The 7Q10 used to calculate water quality-based limits for this permit is less than that used in the 1999 permit due to an error in the 1999 calculation that was described in detail in the fact sheet.

Comment A.6.

Part 1.A.1: Modification of effluent limits for nutrients. The 2012 Draft Permit proposes significant, and costly, effluent nutrient limits modifications. The EPA supports statewide numeric nutrient criteria for nitrogen and phosphorus, in lieu of developing “attainment of designated use” values for receiving waters. This means that specific effluent constituent concentrations would be permitted without determining if each of the constituents actually has a deleterious effect on the water quality downstream of the WWTF outfall. In the case of the Mill River, to which the Hopedale WWTF discharges, the MassDEP has listed this river as impaired for “metals and priority organics”, but not “nutrients”. The EPA Fact Sheet for the 2012 Draft Permit states that:

> *"The impacts associated with excessive phosphorus inputs are well documented in the Spindleville Pond, a 2.4 acre pond located approximately one mile downstream of the Hopedale WWTF discharge."*

While the Hopedale WWTF does indeed discharge upstream of this pond, which is fed by the Mill River, the EPA has not clearly demonstrated that the observed eutrophication of this pond is a direct result of the discharge from the WWTF. There are many other point and non-point nutrient sources contributing to the pond's eutrophication. In addition, the EPA offers no discussion about the fact that neither Spindleville Pond nor the Mill River above or below this pond are listed as impaired for "nutrients" in the current MassDEP 303d List. The absence of a nutrient impairment suggests a lack of scientific data to support a listing for this impairment. Furthermore, the lack of similar impairments in the Mill River above or below Spindleville Pond suggest that the problem may be specific to that pond and possibly attributable to localized stormwater runoff, land use practices, and/or subsurface disposal systems local to the pond. The EPA even states in the 2012 Draft Permit Fact Sheet that a study completed by the State of Rhode Island found that the Nitrogen input from the Hopedale WWTF to the main stem of the Blackstone River (and eventually to the Upper Narragansett Bay) was relatively small.

In October 2011, a White Paper titled *Evaluation of Massachusetts Water Quality Criteria for Nutrients, Bacteria, and Metals* (see copy attached) was prepared by Hall & Associates for the MCWRS. This White Paper discusses the legal, regulatory, and scientific basis behind the development of effluent permit limits and makes recommendations for their future development to avoid the imposition of inappropriate permit requirements and excessive costs to address water quality issues which may not really exist. All of the arguments presented in this White Paper are, by their reference here, to be included as part of this comment letter.

While the intent of proposed nutrient effluent limit modifications in the 2012 Draft Permit are to benefit the environment by protecting water quality, these changes will result in significant financial impacts on the Town of Hopedale and the amount of measurable benefit to the environment has not been sufficiently justified by the EPA. Based on the available data and arguments presented, the EPA lacks justification to incorporate additional or more stringent nutrient requirements into Hopedale's permit re-issuance.

Response A.6.

The impairment description of the receiving water in the fact sheet was from the 2008 Integrated List rather than the 2010 Integrated List, as cited. The 2010 list does not separately list the impoundments on the Mill River, but rather includes the impoundments in segment MA51-10. In the 2010 list, the entire segment is listed as impaired for aquatic plants (macrophytes), PCB in fish tissue, non-native aquatic plants and "other".

The fact sheet cites to several state reports that document evidence of cultural eutrophication, and includes characterizations of receiving water sampling data downstream of the discharge that show that total phosphorus concentrations are well in excess of values recommended in EPA guidance. The actual measured phosphorus concentrations upstream and downstream of the discharge, and at the outlet from Spindleville Pond are shown below, along with dissolved oxygen concentration measurements.

Table 1 – Orthophosphate as Phosphorus* Instream Data

Date:	Upstream, at Thwing Street (mg/l)	Downstream, 15 feet from the Discharge (mg/l)	Downstream, at Mill Street (Spindleville Pond Outlet) (mg/l)	Dissolved Oxygen, at Mill Street** (mg/l)
5/15/08	---	---	0.189	---
6/22/08	---	0.557	0.124	---
7/30/08	---	0.401	0.083	---
8/9/08	0.01	---	---	---
8/21/08	0.007	0.176	0.044	---
9/13/08	0.01	---	---	---
9/23/08	0.033	0.059	0.065	---
10/11/08	0.065	---	---	---
4/10/10	---	---	0.059	11
5/8/10	---	---	0.065	9
6/12/10	---	---	0.033	8
7/10/10	---	---	0.052	4
8/14/10	---	---	0.062	4
9/11/10	---	---	0.062	6
10/9/10	---	---	0.055	7
11/13/10	---	---	0.062	11

* Orthophosphate is a component of total phosphorus, therefore total phosphorus concentrations will be higher. The difference between total phosphorus and orthophosphate cannot be accurately estimated in this case, but EPA notes that orthophosphate is typically the major component of total phosphorus in wastewater treatment plant effluent.

** Dissolved oxygen sample results were collected between 7:15 am. and 10:00 am.

The data above clearly shows that instream orthophosphate (as phosphorus) concentrations measured just downstream of the treatment plant typically exceed Gold Book-recommended total phosphorus criteria of 0.1 mg/l for rivers and streams. The data also shows that the orthophosphate (as phosphorus) concentrations in the Spindleville Pond outlet also exceed the Gold Book recommended criteria of 0.025 mg/l for lakes, ponds, and reservoirs. EPA also notes that there are 21 lakes, ponds and reservoirs in the Blackstone River basin with site-specific total phosphorus criteria (See 314 CMR 4.06, Table 28, Blackstone River Basin) and that these criteria range from 0.010 to 0.0455 mg/l; 13 have the criteria of 0.025 mg/l, 5 are less than 0.025 mg/l (0.010 mg/l - 0.02

mg/l) and 3 are greater than 0.025 mg/l (0.027 mg/l - 0.0455 mg/l). All of the measured orthophosphate concentrations in the Spindleville Pond outlet exceed the total phosphorus Gold Book criteria and all but two of the measured values exceed all of the site-specific total phosphorus criteria in the other Blackstone River Basin lakes, ponds and reservoirs.

The data also shows violations of the dissolved oxygen criteria (5 mg/l) in the outlet from Spindleville Pond.

In addition, *The Blackstone River Watershed 2003 – 2007 Water Quality Assessment Report* also describes the Spindleville Pond as having dense emergent vegetation, including smartweed, duckweed, water meal, purple loosestrife, cattails, grasses, arrow arum, arrowhead, pondweed, and rush, which was observed from the shore by MassDEP Central Regional Office (CERO) staff in 2004. The MassDEP CERO staff also conducted an in-lake investigation on 23 September 2005 and observed that the area of Spindleville Pond near Mill Street was covered with dense aquatic macrophytes, including milfoil, duckweed, water meal, arrowhead, arrow arum, cattails, pickerelweed, yellow water lily and "thick bubbling algae" (Beaudoin 2005a). These observations clearly document cultural eutrophication.

In any event, an impaired listing by the MassDEP is not a prerequisite for setting a NPDES permit limit. EPA is required to establish water quality-based limits on any pollutant "which will cause, have the reasonable potential to cause, or to contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." (See 40 CFR 122.44(d)(1)(i)).

EPA believes that the available data demonstrates the need for a more stringent limit to ensure attainment of water quality standards.

With respect to the comment, "All of the arguments presented in this White Paper are, by their reference here, to be included as part of this comment letter:" EPA and MassDEP reviewed the November 14, 2007 White Paper titled *The Case for Environmental Regulatory Reform – Clean Water Act NPDES Permitting* by the Massachusetts Coalition for Water Resources Stewardship (MCWRS) that was attached to the Town's comments on the draft permit. Although we did not find anything that was specific to the Town of Hopedale's NPDES Permit that warranted a response, there were general themes within the White Paper that the Town's comments captured, which we responded to within this Response to Comments document.

Comment A.7.

Part 1.A.1: effluent limit for total phosphorus. The 2012 Draft Permit recommends a change from concentration-based limit to a loading-based limit for effluent phosphorus. While this would normally be advantageous to a WWTF, this new proposed total load limit is much more stringent than the current total permitted phosphorus loading due to the methods used by the EPA to calculate the new limit. Such a drastic reduction in the

effluent phosphorus limit will result in excessive costs to Hopedale (which just completed a costly upgrade to their WWTF to address copper and ammonia in 2009), and will most likely not result in any significant improvement to conditions at Spindleville Pond even though it is used by the EPA to justify the more stringent limit.

In the 2012 Draft Permit Fact Sheet, the EPA presents its calculation of the effluent limit for phosphorus based on conventional attainment of the Gold Book criterion of 100 micrograms per liter (µg/l) under 7Q10 conditions. Based on the current design flow for the Hopedale WWTF, this resulted in a calculated total phosphorus mass limitation of 0.78 pounds per day (lbs/day) and an equivalent concentration limit of 0.158 milligrams per liter (mg/l). However, the EPA then proceeded to discard this conventional calculation, and used a non-standard method to achieve a more stringent limit. The EPA proposes use of a loading limit for phosphorus, but then selects an arbitrary flow rate for use in calculating the loading. Rather than using the WWTF design flow, the EPA uses the lowest monthly flow for the prior five years, which results in a loading limit of 0.49 lbs/day, resulting in an equivalent concentration of only 0.1 mg/l. This limit is excessively stringent. It is half of the MassDEP's established standard for "highest and best practical treatment", which for phosphorus, is currently 0.2 mg/l.

In addition, the EPA takes an overly conservative approach to calculate phosphorus limits. As discussed in the MCWRS White Paper *Evaluation of Massachusetts Water Quality Criteria for Nutrients, Bacteria, and Metals,* the use of the Gold Book criterion (100 µg/l) is not based on site-specific data, studies, or models showing a 100 µg/l total phosphorus in-stream standard is necessary to ensure designated uses will be attained. Furthermore, setting the discharge limit based on 7Q10 flow is questionable, as the impacts of phosphorus do not develop over such a short time.

While the intent of this proposed phosphorus limit is to benefit the environment by protecting water quality, these changes will result in significant financial impacts to the Town of Hopedale with no scientific evidence that there will be an improvement to the conditions at Spindleville Pond. Based on the arguments above, the EPA lacks justification for any additional phosphorus requirements, let alone the excessively stringent limits proposed. At a minimum, the Town requests recalculation of the total phosphorus loading using the WWTF design flow, or return to a concentration-based calculation that results in a slightly more reasonable effluent limit.

Response A.7.

The commenter characterizes EPA's use of a mass limit as a means for establishing a more stringent limit than would have been established using a concentration limit. In fact, the use of a mass-based approach was an effort by the Region to provide some relief to the Town by allowing higher effluent concentrations at lower discharge flows. (For example, at a discharge flow of 0.3 MGD, the allowable concentration that would achieve the proposed mass limit is 0.2 mg/l.) This approach was predicated on an assumption that monthly average discharge flows from the treatment plant during the growing season

months (April through October, when the more stringent phosphorus limits are in effect) were significantly less than the design flow of 0.588 MGD.

EPA has reviewed the monthly average flow data for the treatment plant for the past five years (June 2007 through May 2012) and has determined that our assumptions regarding treatment plant flows were incorrect. While the long-term average flow for the months of April through October was 0.4 MGD, less than the facility design flow, with many of the monthly average flows in the 0.3 to 0.4 MGD range, there were also several months with monthly average flows exceeding 0.588 MGD.

Accordingly, EPA has recalculated the effluent limits at full design flow, resulting in a concentration limit of 158 ug/l.

These calculations, which were shown in the fact sheet, are reproduced below.

$$Cd = \frac{QrCr - QsCs}{Qd}$$

Where:

Qr = Flow of the Mill River downstream of the discharge = Qd + Qs = 1.493 cfs (0.96 MGD)
Qd = Design flow of the Hopedale WWTF = 0.9096 cfs (0.588 MGD)
Qs = 7Q10 flow upstream of the discharge = 0.5838 cfs (0.38 MGD)
Cs = In-stream water quality concentration upstream of the discharge = 10 ug/l
Cr = Resulting in-stream phosphorus concentration downstream of the discharge = 100 ug/l
Cd = Phosphorus concentration in the Hopedale discharge = discharge limit

$$Cd = \frac{(1.493 * 100) - (0.5838 * 10)}{0.9096}$$

Cd = 157.7 ug/l = 0.158 mg/l

The monthly average limit in the final permit has been rounded to 160 ug/l (0.160 mg/l).

Regarding the basis for using the Gold Book criteria, this effects-based criterion was selected following consideration of other phosphorus criteria that have been developed to address cultural eutrophication. This was discussed extensively in the fact sheet. The criteria were applied using site specific factors, including the discharge flow, available dilution, and the presence of downstream impoundments which are inherently sensitive to phosphorus enrichment and have well documented phosphorus related impairments. The Gold Book criteria are considered not-to exceed criteria, so application under 7Q10 conditions are appropriate. Had EPA applied criteria based on more average conditions, such as the Ecoregion criteria, it may have applied these under more average summer conditions. It should be noted, however, that the applicable Ecoregion criteria of 0.024 ug/l are one quarter of the Gold Book criteria, meaning that the effect of increased dilution would be more than balanced by the more stringent criteria, especially when considering background concentration.

Comment A.8.

Part 1.A.1, Footnote 7: Requirements related to reduction of Total Nitrogen. The 2012 Draft Permit includes a requirement to reduce the discharge of total nitrogen to the maximum extent possible using existing treatment equipment, and submit a report to the EPA describing measures taken. This requirement should be removed in its entirety. As stated above, there is no scientific evidence to justify the addition of further nitrogen-based requirements proposed in the 2012 Draft Permit. In addition, the existing WWTF has no equipment or processes designed for the reduction of Total Nitrogen; therefore, there are no measures that can be undertaken in compliance with Footnote 7. Furthermore, trying to comply with this item would require a notable expenditure of staff time, as well as budget to engage an engineering consultant, which is not justified given the lack of scientific basis or potential to identify measures that would achieve Total Nitrogen reduction.

Response A.8.

The requirements of Part I.A.1, Footnote 7 of the draft permit are being included in all NPDES discharge permits issued to Massachusetts POTWs discharging to receiving waters tributary to Narragansett Bay that do not include effluent limitations for total nitrogen. The intent of these requirements is to ensure that loadings of total nitrogen from point sources discharging to the Providence River, Seekonk River and Upper Narragansett Bay are minimized. The requirements of Part I.A.1, Footnote 7 of the draft permit have remained unchanged in the final permit.

Comment A.9.

Part 1.A.1, Footnote 12: Frequency of Whole Effluent Toxicity Testing. The 2012 Draft Permit requires Whole Effluent Toxicity (WET) testing four times per year, but includes a provision to reduce this frequency if the Permittee can demonstrate compliance with the WET limits after four consecutive WET test results. The Hopedale WWTF has consistently demonstrated compliance with WET limits. Since the cost of WET testing is quite significant, Hopedale requests that the EPA grant approval for a reduced frequency as part of the 2012 permit re-issuance, similar to what the EPA has done for Dilution Water under Part 1.A.1, Footnote 15.

Response A.9.

The final permit has not changed with regard to this issue, based on past results for the chronic-no observed effect concentration (C-NOEC) (i.e., defined as the highest tested concentration of toxicant in 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). Since C-NOEC test results, as recently as February 2010, May 2010, and July 2010, would have failed if the new limit of $\geq$ 61% had been in place, the Region has determined to retain the monitoring frequency in the draft permit until it is clear that the discharge consistently complies with both the chronic and acute toxicity limits in the

reissued permit. If the discharge demonstrates consistent compliance with the limits in the reissued permit, the permittee may request a reduction in the toxicity testing frequency pursuant to Part I.A.1. Footnote 12 of the permit.

Comment A.10.

Part 1.A.1: Modification of effluent limits for metals. The 2012 Draft Permit proposes significant, and costly, modifications to effluent limits for Total Aluminum and Total Recoverable Copper without adequate scientific basis. While the intent of these effluent limit modifications is to benefit the environment by protecting water quality, these changes will result in significant financial impacts to the Town of Hopedale and the amount of measurable benefit to the environment has not been sufficiently justified by the EPA.

The MassDEP has current regulations for effluent metals concentrations that impose more restrictive requirements than are necessary to protect designated uses. This situation creates problems for effluent copper (a common wastewater constituent resulting primarily from potable water system piping) and aluminum (a wastewater constituent commonly resulting from the chemical phosphorus removal process at WWTFs).

The MassDEP water quality standards for copper and aluminum are based on the assumption that these metals are primarily present in the toxic form, and capable of causing aquatic life use impairments. This assumption has resulted in the development of water quality-based effluent limits that impose more restrictive limits than what is actually required to protect aquatic life. The following excerpt from the MCWRS *Evaluation of Massachusetts Water Quality Criteria for Nutrients, Bacteria, and Metals* details the manner in which the MassDEP and/or EPA currently set effluent metals limits, and shows how the current approach is errant:

> *The Massachusetts Surface Water Quality Standards (314 CMR 4.05 (5)(e)) establish in-stream requirements for toxic pollutants (e.g., certain metals) for the various classes of Inland and Coastal and Marine waters, as follows: "314 CMR 4.05 (5)(e) Toxic Pollutants. All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife. For pollutants not otherwise listed in 314 CMR 4.00, the* National Recommended Water Quality Criteria: 2002, EPA 822R-02-047, November 2002 *published by EPA pursuant to Section 304(a) of the Federal Water Pollution Control Act, are the allowable receiving water concentrations for the affected waters, unless the Department either establishes a site specific criterion or determines that naturally occurring background concentrations are higher. Where the Department determines that naturally occurring background concentrations are higher, those concentrations shall be the allowable receiving water concentrations. The Department shall use the water quality criteria for the protection of aquatic life expressed in terms of the dissolved fraction of metals when EPA's 304(a) recommended criteria provide for use of the dissolved fraction. The EPA recommended criteria based on total recoverable metals shall be converted to dissolved metals using EPA's*

> *published conversion factors. Permit limits will be written in terms of total recoverable metals. Translation from dissolved metals criteria to total recoverable metals permit limits will be based on EPA's conversion factors or other methods approved by the Department. The Department may establish site specific criteria for toxic pollutants based on site specific considerations."*

As noted in the regulations, the criteria for metals are generally considered to apply to the dissolved form of the metal, as is the case for copper, because the dissolved form is generally regarded as the bio-available (i.e., toxic) fraction of the total metal concentration. However, since effluent limitations are written in terms of the total recoverable fraction, a permit limit that protects aquatic life uses (expressed as the dissolved form of the metal) must be converted into an equivalent total recoverable fraction. As noted in the regulations, MassDEP uses EPA's conversion factors "or other methods approved by the Department" as the basis for this conversion.

In the case of copper in municipal wastewater, the dissolved form of this metal forms strong complexes with dissolved organic carbon that are significantly less toxic than the form of metal used to establish the water quality criterion. In the case of aluminum, the total recoverable form of this metal is the toxic form and a dissolved translator is not required. However, the criterion for aluminum was established for a form of the metal (aluminum hydroxide) under conditions (low pH of 6.5 SU and very low hardness) that may not be characteristic of natural waters. As a consequence, both the copper and aluminum criteria should be adjusted to account for the real toxic fraction of these metals so that water quality-based effluent limits for these parameters are appropriately protective, without being significantly overprotective.

As per the MCWRS White Paper arguments and other available information, the EPA should take into account solids partitioning when determining the dissolved fraction in accordance with EPA's metal translator guidance for metals with water quality criteria based on the dissolved fraction of the metal.

Effluent metals limitations in Hopedale's 2012 permit re-issuance need to reflect the total actual toxic fraction. This will allow downstream water quality to be adequately protected without placing an unnecessary burden on the community.

Response A.10.

In accordance with Massachusetts Water Quality Standards (MA WQS), the copper and aluminum limits were established using the current EPA-recommended criteria established pursuant to Section 304(a) of the Clean Water Act [see MA WQS at 314 CMR 4.05 (5)(e)]. As explained in the Fact Sheet on page 21, the EPA- recommended approach to set and measure compliance with water quality standards is to use dissolved metals, because dissolved metals more closely approximates the bioavailable fraction of metals in the water column than does the total recoverable metal. Most toxicity to aquatic organisms is by adsorption of uptake across the gills which require the metals to be in dissolved form. When toxicity tests were originally conducted to develop EPA's

Section 304(a) metals criteria, the concentrations were expressed as total metals. Subsequent testing determined the percent of the total metals that is dissolved in the water column. The calculations in the Fact Sheet that support the draft and final permit used the freshwater conversion factors in EPA National Recommended Water Quality Criteria: 2002 to calculate the dissolved acute and chronic water quality criteria for metals (Appendix A of the Fact Sheet). The federal regulations under 40 CFR 122.45(c) require that the permit limits be based on total recoverable metals.

The chemical differences between the effluent and the receiving water may cause changes in the partitioning between dissolved and particulate forms of metals. As the effluent mixes with the receiving water, absorbed metals from the discharge may dissolve in the water column. In this case, measuring dissolved metals would underestimate the impact on the receiving water, and an additional calculation, using a site-specific translator would determine total metal criteria. Based on EPA's Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion (EPA-823-B-96-007), the conversion factor is equivalent to the translator if site-specific studies for partitioning have not been conducted. In subsequent calculations, conversion from dissolved metals to total recoverable metals have been done using the conversion factor for the particular metals found in Appendix A of National Recommended Water Quality Criteria: 2002, in lieu of a translator.

The MA water quality standards regulation does permit MassDEP to make a determination that a higher concentration than the adopted criterion is "naturally occurring" in a particular receiving water, and identify an alternate naturally occurring concentration. However, no such determination has been made by MassDEP for the Mill River, and no evidence has been provided that would indicate that the copper or aluminum concentrations currently found in the Mill River at Hopedale are naturally occurring.

Alternative criteria cannot be used for establishing effluent limitations, unless the state adopts, and EPA approves, alternative criteria. MassDEP has not adopted alternative criteria for copper or aluminum for the Mill River. However, the permittee may undertake a study and submit those results to MassDEP as part of a request for site-specific limits. If adopted by MassDEP and approved by EPA, they may be used as the basis for a permit modification or during subsequent reissuance of the permit.

Comment A.11.

Part 1.A.1: Modification of effluent limits for metals – ambient water quality. The 2012 Draft Permit disregards data on the existing concentration of metals in the Mill River upstream of the Hopedale WWTF. In-stream monitoring performed by the Hopedale WWTF staff as part of past Whole Effluent Toxicity (WET) testing clearly documents elevated Aluminum concentrations in the Mill River upstream of the WWTF outfall. From the WET data, the average in-stream Aluminum concentration upstream of the WWTF is 0.162 mg/l, with a maximum of 0.93 mg/l. The occurrence of elevated Aluminum is not unprecedented. The 2011 MCWRS White Paper *Evaluation of*

Massachusetts Water Quality Criteria for Nutrients, Bacteria, and Metals presents a discussion regarding the presence of naturally-occurring metals, such as Aluminum, in surface waters in New England.

The 2012 Draft Permit proposes an effluent limit of 0.11 mg/l for Aluminum. This is more stringent than the in-stream average. As indicated in the 2012 Draft Permit Fact Sheet, where naturally occurring background concentrations are higher than water quality criterion, these background concentrations shall be the allowable receiving water concentrations. Therefore, the allowable limit for Aluminum for discharges to the Mill River should be not less than the documented average concentration in the river, or 0.162 mg/l.

Perhaps more important is that the WET testing results also document that the current effluent characteristics, including those for Aluminum and Copper, are not toxic. As summarized in Table 1, below, the Hopedale WWTF consistently shows no acute or chronic toxicity.

TABLE 1
Comparison of Whole Effluent Toxicity to Current Aluminum and Copper Concentrations

	Metals Results		Toxicity Test Result (%)				Hardness as CaCO3		Effluent
Date	Copper (µg/l)	Aluminum (mg/l)	LC-50	A-NOEC	C-NOEC	LOEC	Effluent (mg/l)	Mill River (mg/l)	TDS (mg/l)
Oct-10	15	0.33							
Nov-10	16	0.44							
Nov-10	11	0.67	>100	100	100	>100			
Dec-10	13	1.40							
Jan-11	24	0.47							
Feb-11	10	0.20							
Mar-11	13	0.17							
Mar-11	7	0.35	>100	100	100	>100	69	33	620
Apr-11	16	0.30							
May-11	15	0.44							
May-11	13	0.68	>100	100	100	>100	53	33	610
Jun-11	15	0.49							
Jul-11	15	0.33							
Aug-11	13	0.24							
Aug-11	12	0.30	>100	100	100	>100	61	45	490
Sep-11	10	0.39							
Oct-11	6	0.16	Town water treatment facility on line						
Oct-11	N.A.	0.14							
Oct-11	N.A.	0.22							
Oct-11	N.A.	0.25							
Oct-11	7	0.13							
Nov-11	9	0.28							
Nov-11	4	0.54	>100	100	100	>100	54	29	430

Dec-11	7	0.25							
Jan-12	14	0.28							
Feb-12	6	0.29							
Feb-12	4	0.29	>100	100	100	>100	48	26	444

The data presented in this table clearly demonstrates that the amounts of aluminum and copper currently being discharged by the Hopedale WWTF, up to 0.67 mg/l of Aluminum and 13 µg/l Copper as indicated above, are not toxic to aquatic life. Based on this data, it can be concluded that effluent limits can be set at, or potentially above these values without reasonable potential to be toxic to aquatic life in the Mill River. Therefore, the EPA has no justification for the more stringent limits being proposed in the 2012 Draft Permit.
In addition, the EPA's National Secondary Drinking Water Contaminant Standard for Aluminum has a range of 0.05 mg/l to 0.2 mg/l. This drinking water guideline is based on aesthetics, and EPA states that levels as high as 0.5 mg/l are not harmful, but may give the drinking water a cloudy look. This allowable drinking water concentration for Aluminum is almost five times the wastewater effluent limit of 0.11 mg/l proposed for the Hopedale WWTF. The EPA's National Secondary Drinking Water Contaminant Standard for Copper is 1.0 mg/l. This allowable drinking water concentration for Copper is significantly higher than the 0.00814 mg/l proposed wastewater effluent limit for the Hopedale WWTF. With these proposed effluent limits, Hopedale could not even discharge drinking water from their new ***water*** treatment facility to the Mill River. To expect the WWTF to meet this limit for wastewater is excessive and treatment to this limit would present an unreasonable financial burden on the Town.

Response A.11.

Even though recent toxicity test results have demonstrated compliance with whole effluent toxicity effluent limits, EPA is still required to ensure that the discharge meets the state-adopted water quality standards for surface water. The copper and aluminum criteria are set at their respective concentration levels in order to ensure that state numeric criteria for aluminum and copper are attained. These criteria were adopted by the state to ensure the protection of various aquatic species that live in and depend on the receiving water. For many pollutants, aquatic life criteria are more stringent than drinking water standards, since the species living in waters of the US are more sensitive to certain chemicals than humans.

To ensure protection of aquatic habitats and provide more comprehensive assessments, EPA recommends that States fully integrate chemical-specific, whole effluent, and bioassessment approaches into their water quality-based toxics control programs. It is EPA's position that the concept of "independent application" be applied to water quality-based situations. Since each method has unique as well as overlapping attributes, sensitivities, and program applications, no single approach for detecting impact should be considered uniformly superior to any other approach. For example, the inability to detect receiving water impacts using a biosurvey alone is insufficient evidence to waive or relax a permit limit established using either of the other methods. The most protective results from each assessment conducted should be used in the effluent characterization process.

The results of one assessment technique should not be used to contradict or overrule the results of the other(s). (*See*: Technical Support Document for Water Quality-Based Toxics Control, 1991, page 22.)

EPA disagrees with the assertion that the MA water quality standards regulation "does not allow the limit to be more stringent than the receiving stream concentration." This is an incorrect reading of the regulation. Similar to Response A.10. above, the regulation does permit MassDEP to make a "determination" that a higher concentration than the adopted criterion is "naturally occurring" in a particular receiving water, and identify an alternate naturally occurring concentration. No such determination has been made by MassDEP for the Mill River, and no evidence has been provided that would indicate that the copper or aluminum concentrations currently found in the Mill River at Hopedale are naturally occurring. Moreover, a determination that "naturally occurring background concentrations are higher" pursuant to 314 CMR 4.05(4)(e) must be done in the context of an adjustment to state water quality standards rather than through an NPDES permit action.

In developing NPDES permit limits, EPA is required to ensure that discharges do not cause or contribute to an exceedance of water quality standards. Water quality standards are promulgated by the state, subject to EPA approval. The EPA ambient water quality criterion for chronic exposure to aluminum (87 ug/l) is used as the basis for effluent limits in this permit because the Commonwealth of Massachusetts has adopted that criterion in its water quality standards. When issuing permits, EPA does not have the authority to reexamine duly issued and approved state water quality standards based on additional research, a balancing of toxic impacts against other water pollution problems, or otherwise. The appropriate course for considering such issues is through either: (1) a change in the state water quality standards to adopt either a site-specific criterion or a different statewide criterion, or (2) a variance or change in use designation for the receiving water.

MassDEP has informed EPA that it is developing site-specific criteria for aluminum that reflect specific factors affecting aluminum toxicity, as suggested by the Town. The development of site-specific criteria must meet the procedural requirements for changes to water quality standards, as well as receive EPA approval. As this is a lengthy process, and formal proceedings to change the standard have not commenced, EPA has decided to issue this Final Permit based on the existing criterion. This decision is consistent with the CWA and EPA's regulations, which provide for the reissuance of permits on a regular basis so that permit terms are revisited and reviewed rather than left unexamined and unchanged for long periods of time. *See* 33 USC §§ 1342(a)(3) and (b)(1)(B), and 40 C.F.R. § 122.46(a). EPA notes that the aluminum limit in the Final Permit is subject to a compliance schedule, so that the effluent limit goes into effect 59 months (4.9 years) from the permit effective date. If a site-specific criterion is adopted and approved during this permit term, the permittee may request modification of the permit pursuant to 40 CFR § 122.62(a)(3)(i)(B).

EPA agrees that drinking water standards are higher than the 87 ug/l chronic aluminum ambient water quality criterion based on protection of aquatic life. In general, ambient water quality standards for surface waters incorporate two types of criteria: those based on protection of human health (which include both drinking water and fish consumption exposure), and those based on protection of aquatic life. See, e.g., EPA, "Water Quality Criteria" at http://water.epa.gov/scitech/swguidance/standards/criteria/index.cfm; EPA, *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health* (2000). Aquatic life criteria for surface waters may be lower or higher than drinking water standards, depending on the relative sensitivity of aquatic life to specific pollutants. See EPA, *National Recommended Water Quality Criteria: 2002*. Lower aquatic life criteria are not unusual: a common example is chlorine, for which the drinking water standard is 4 mg/l, over 300 times the aquatic life chronic criterion. See EPA, *National Primary Drinking Water Regulations*, http://water.epa.gov/drink/contaminants/upload/mcl-2.pdf. As NPDES permits must be written in consideration of both types of criteria, the application of the 87 ug/l chronic criterion for aluminum is appropriate.

In summary, EPA is required to issue permits that meet the state-adopted water quality criterion and incorporate permit limits based on the potential to cause or contribute to an exceedance of the water quality standards. Therefore, since the available data demonstrates the potential to exceed the Water Quality Standard for copper and aluminum, the final permit has not been changed in this regard. Please also see the permit fact sheet for an explanation of the basis for these limitations.

Comment A.12.

Part 1.A.1.g (and Part 1.A.1, Footnote 2): Modification to reporting of flow. The 2012 Draft Permit proposes to modify the reporting of elevations in effluent flow from "a period of 90 consecutive days" to the "average annual flow in any calendar year", as calculated as the "arithmetic mean of the monthly average flow for the reporting month and the monthly average flows of the eleven previous months." These modifications inaccurately represent average daily flows due to variations of effluent flow due to seasonal and other factors. The Town of Hopedale takes exception to these proposed modifications and requests that the 90-day calculation be re-instituted.

Response A.12.

Part 1.A.1, Footnote 2 concerns the flow limitation and the reporting of effluent flow for the facility. It establishes that the flow limitation of 0.588 MGD is an annual average, calculated monthly using the monthly average flow of the reporting month and the monthly average flows from the preceding 11 months. It also requires that the facility report the monthly average flow for the reporting month and the maximum daily flow for the reporting month. This is a change from the 1999 permit, which established the flow limit of 0.588 MGD as a monthly average, and did not require reporting of annual average or maximum daily discharge on the federal discharge monitoring report. The change in the flow limitation averaging period is consistent with other POTW permits in

Massachusetts. The major reason for this change was to allow seasonal variability in monthly average flows, while staying within the design flow of the treatment plant on an annual average flow basis.

Part 1.A.1.g in the draft permit requires the permittee to submit a report to MassDEP if the annual average flow of the discharge in a calendar year exceeds 80 percent of its design flow. The purpose of this requirement is to ensure that the facility begins planning for managing future flows in a timely manner. The corresponding requirement in the 1999 permit is found in Part 1.A.1.f., and requires the submittal of the report if the effluent flow exceeds 80 percent of the design flow for 90 consecutive days. This changed requirement is also consistent with other POTW permits issued in Massachusetts, and EPA and MassDEP believe it is appropriate because it more directly relates the conditions under which the report is required, to the actual design flow of the facility (i.e., the facility design flow is an annual average and not a 90 day average). While we have not rigorously examined the relative probability of a report being required under the 1999 threshold (90 consecutive days exceeding 80 percent of 0.588 MGD) versus the draft permit threshold (annual average exceeding 80 percent of 0.588 MGD) we believe that the requirements are similar, and note that the requirement simply triggers the submittal of a report to MassDEP.

Finally, it is unclear why the permittee believes that the new averaging period (annual average) "inaccurately represent average daily flows due to variations of effluent flow due to seasonal and other factors". An annual average calculation encompasses all seasons, and results in high wet weather flows being averaged with lower dry weather flows. Therefore, for all of the above reasons, the final permit has not been changed in this regard.

Comment A.13.
Part 1.A.1.i: 7Q10 Verification. This section of the 2012 Draft Permit requires that the Town of Hopedale submit a plan to EPA and the MassDEP to verify the in-stream 7Q10 flow upstream of the WWTF outfall. Monitoring and documenting stream flow for the purpose of calculating 7Q10 may be the responsibility of the EPA, MassDEP, the U.S. Geologic Survey (USGS), or even the owner of the dam upstream of the WWTF under the Water Management Act; however, it is clearly ***not*** the responsibility of the Town of Hopedale. This requirement should be removed in its entirety. Although Hopedale recognizes the value of gathering scientific data to calculate an accurate value for the 7Q10 in the Mill River, there is substantial cost associated with development and implementation of such a monitoring plan. The Town of Hopedale does not have the available staff, the expertise, or the financial resources available to conduct such a study. The Town takes exception to this requirement being included in the 2012 Draft Permit and is unable to pay for such an effort to provide data to federal and state agencies tasked with this responsibility.

Response A.13.

In developing NPDES permit limits, EPA is required to ensure that discharges achieve water quality standards (See 40 CFR 122.44(d)(1)). Massachusetts Surface Water Quality Standards specify that for rivers and streams, 7Q10 is the hydrologic condition at which water quality criteria must be applied (See 314 CMR 4.04(3)(a)).

As described in the fact sheet, the 7Q10 was calculated using the first available downstream gage, which is located far downstream of the discharge, under the assumption that flow uniformly enters the watershed along the stream length. While this is a reasonable assumption for many streams, it is less reasonable for streams with major tributaries and impoundments. As described in the fact sheet, the Hopedale WWTP is located about a mile downstream of a dam impounding Hopedale Pond, and EPA was unable to obtain any records of dam flow releases, and so was unable to confirm the 7Q10 estimates.

Under the Clean Water Act, Section 308(a)(1)(2)(3)(A)(v), EPA has the authority to request information that will assist in the development of effluent limitations and assist in determining whether a discharge is in violation of any effluent limitation. Requiring verification of the 7Q10 flow of the Mill River upstream of the discharge is necessary to confirm that the estimated 7Q10 used to establish numeric water quality-based limitations is accurate. If the 7Q10 estimate used in the permit is too high, the limitations are not sufficiently stringent; if it is too low, the limitations are more stringent than necessary. If the stream flow is less than the 7Q10 used in the permit, the resolution could be as simple as working with the owner of the dam to ensure a minimum flow release that is equal to or greater than the estimated 7Q10. A written agreement between the owner of the dam and the Town may satisfy this requirement.

If it is shown that the actual 7Q10 is less than used for the draft permit, and an agreement for minimum releases equal to or greater than the estimated 7Q10 cannot be achieved, or if the Town does not provide verification data, EPA may be obligated to reopen and modify the Town's NPDES permit with limits that reflect a lower (or no) flow from the dam.

Comment A.14.

Part 1.B: Compliance schedules for Aluminum and Phosphorus. Under Special Considerations, the 2012 Draft Permit contains compliance schedules for Aluminum and Phosphorus. Although the Town of Hopedale appreciates the EPA's inclusion of compliance schedules within the 2012 Draft Permit, the timelines set forth in these schedules do not consider municipal budget cycles and financing options. In accordance with the Code of Massachusetts Regulations (CMR), 314 CMR, Section 4.03(1), compliance schedules set forth in permits must "be based on a consideration of technological and economic impacts". The compliance schedule set forth in the 2012 Draft Permit does not consider these impacts.

The municipal budget cycle requires a minimum of one year to request and secure funding before permission to retain an engineering consultant is granted. Time is also required to select and enter into a contract with a qualified and responsible consultant to perform the work. In order to allow sufficient time to secure funding, retain an engineering consultant, and complete the requested evaluation of the ability of the existing WWTF to meet proposed Aluminum and Phosphorus effluent limits, a minimum of 48 months is needed.
In addition, the EPA has failed to consider the level of effort required for data collection, research and evaluation of treatment technologies, bench-scale and pilot testing, cost-benefit analyses, alternatives selection, design, public bidding, and construction of the WWTF upgrades necessary to meet the very stringent effluent limits proposed in the 2012 Draft Permit. Less than two years is provided from determination that the WWTF cannot meet the proposed limits to completion of construction, startup, and optimization of the required upgrades. It will likely take up to two years just to complete construction of the upgrades, let alone all of the effort required to design them. A minimum of 60 months is required from EPA's approval of Hopedale's determination that the existing WWTF cannot meet the new effluent limits with existing facilities.

Response A.14.

We believe the draft permit provided a reasonable compliance schedule of five years to meet the new limits. The regulations at 40 CFR 122.47 require that permit schedule of compliance require compliance "as soon as possible." In the proposed schedule EPA has provided a lengthy planning period, in part to allow the effects of the new water treatment plant to be realized (hopefully through reduced influent pollutant concentrations) and for the existing wastewater treatment plant to be optimized. At the start of this planning period there will not be a need for significant additional funding, which will allow time for the community to secure funding for the more detailed planning, design and construction, if necessary. We also believe that the design and construction period in the draft permit are reasonable, since we expect that there will not be a need to replace any of the major components of the existing facility, and that if additional facilities are needed to attain the new limits, it will be in the form of added treatment units, such as an effluent filter.

In addition, whereas MassDEP regulations at 314 CMR 4.03(1)(b) discusses the use of compliance schedules within permits "where the permittee either cannot comply with such permit requirements or limitations, or there is insufficient information available to determine whether the permittee can comply with such permit requirements or limitations." However, the compliance schedule portion of the regulations does not discuss the potential economic impacts. MassDEP concurs that the draft permit provided a reasonable compliance schedule to meet the new limits.

Comment A.15.

Part 1.D: Operation and Maintenance of the Sewer System: Although the Town of

Hopedale is in agreement with the EPA on the need for proper Operation and Maintenance (O&M) of the sewer system, the EPA has no jurisdiction to require it under the 2012 Draft Permit. NPDES permits are given jurisdiction by receiving water quality and, since O&M does not directly relate to effluent or receiving water quality, EPA has no jurisdiction over it. In addition, the EPA cannot dictate the "means and methods" utilized by the permittee for O&M any more than they can dictate the means and methods utilized by the permittee for treating its wastewater. The EPA neither has the jurisdiction or desire to dictate to a permittee how to run its activated sludge process. Why then, does the EPA expect to dictate to a permittee how it should inspect or clean its sewers? This requirement should be returned to its original form that simply states that the permittee shall properly operate and maintain its sewer system, but does not dictate means and methods.

Response A.15.

As previously mentioned in the Fact Sheet, the standard permit conditions for “Proper Operation and Maintenance”, set forth at 40 C.F.R. §122.41(e), require the proper operation and maintenance of permitted wastewater systems and associated facilities to achieve permit conditions. The requirements at 40 C.F.R. §122.41(d) impose a “duty to mitigate” upon the permittee, which requires that “all reasonable steps be taken to minimize or prevent any discharge violation of the permit which has a reasonable likelihood of adversely affecting human health or the environment.” EPA and the MassDEP maintain that an inflow/infiltration (I/I) removal program is an integral component to ensuring compliance with the requirements of the permit under the provisions at 40 C.F.R. §122.41(d) and (e).
There are several requirements in the permit that were not included in the previous 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 have been included to minimize the occurrence of permit violations that have a reasonable likelihood of adversely affecting human health or the environment. A specific example is the requirement to address illegal sump pumps and roof down spouts, which is a logical extension of the requirements of the O&M Plan to adequately operate and maintain the collection system. These requirements are intended to highlight specific problems that are common to most communities, but difficult to control. A specific level of removal is not mandated. For example, should the permittee determine that I/I quantities in its collection system are sufficiently low and there are no overflows from the collection system or effluent violations at the wastewater treatment plant, efforts to remove sumps and down spouts may be minimal. Therefore, the final permit has not been changed in this regard.

Comment A.16.

Part 1.E.6 and 8: Sludge monitoring and reporting requirements. Sludge from the Hopedale WWTF is trucked to the Woonsocket WWTF in Rhode Island for incineration. Required monitoring for the sludge is dictated, through Hopedale's

contract for sludge disposal, by the City of Woonsocket. Based on the Section 503 sludge disposal standards, the Hopedale WWTF is not required to perform the sludge pollutant concentration monitoring stated in Part 1.E.6. In addition, in accordance with the Section 503 standards, the Hopedale WWTF is not required to submit an annual report since, as per Section 503.48, it does not have a design flow of equal to or greater than one million gallons per day, or serve a population of 10,000 or more people. Therefore, the monitoring and reporting requirements should be removed from the 2012 Draft Permit.

Response A.16.

The annual reporting requirement in Part I. E. 8. of the permit has been removed, since this facility does not exceed the 40 CFR §503.48 thresholds requiring an annual report, and is not expected to exceed these thresholds during the term of the permit.
Part I.E.6. of the permit specifies monitoring requirements for sludge disposal methods regulated by 40 CFR Section 503. EPA agrees with the Town's comment that its current method of sludge disposal (trucking to another facility for disposal) is not regulated by Section 503 and does not require monitoring pursuant to Part I.E.6. of the permit. However, Part I.E.6. has been retained in the final permit because the standard sludge permit conditions included in all Massachusetts POTW permits (including Part I.E.6) are intended to be sufficiently broad to include conditions for the full range of sludge disposal methods, thus allowing the permittee flexibility to change its sludge disposal method during the term of the permit without needing to first seek a modification of the permit.

B. Other Changes to the Final Permit.

1. The final permit has been changed to require reporting of the results from effluent metals sampling done in conjunction with WET tests on the monthly discharge monitoring report (DMR). This change does not require any additional monitoring. This change is only requiring the permittee to report their WET testing data, which is already available, on the DMR.

2. The final permit has been changed to require separate acute and chronic whole effluent toxicity tests. The corresponding protocols have been updated and are specified by date on page 1 of the final permit.

3. The final permit does not include an attachment with DMR instructions. However, this information can still be found on EPA's website and is referenced in the final permit.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND
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 NO.: **MA0102202**

PUBLIC NOTICE START AND END DATES: March 2, 2012 – March 31, 2012

NAME AND ADDRESS OF APPLICANT:

Town of Hopedale
Board of Water and Sewer Commission
P.O. Box 7
Hopedale, MA 01747

NAME AND ADDRESS OF FACILITY WHERE THE DISCHARGE OCCURS:

Hopedale Wastewater Treatment Facility
Junction Route 16 and Mendon Street
Hopedale, MA 01747

TO RECEIVING WATER: **Mill River (Blackstone River Basin – USGS Code #01090003)**

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

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

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Figure 1: Location of Hopedale WWTF

Figure 2: Hopedale WWTF's Flow Schematic

Attachment A: Effluent Monitoring Data

Attachment B: Blackstone River Initiative Volunteer Monitoring Program

Attachment C: Mill River Sampling Stations

I. PROPOSED ACTION

The above named applicant has applied to the U.S. Environmental Protection Agency (EPA) for reissuance of its National Pollutant Discharge Elimination System (NPDES) permit to discharge into the designated receiving waters. The existing permit expired on May 1, 2006 and is still in effect. The draft permit proposes an expiration date five (5) years from the effective date of the final permit.

II. TYPE OF FACILITY AND DISCHARGE LOCATION

The facility is an advanced wastewater treatment plant and is engaged in the collection and treatment of municipal wastewater. Currently, the facility serves approximately 5,000 people in the Town of Hopedale and 500 people in the Town of Milford. The facility does not serve any significant industrial users (SIUs). The treatment plant discharges into the Mill River. The facility's location is shown in **Figure 1**.

Information regarding the facility's treated discharge outfall is listed below:

Outfall:	Description of Discharge:	Outfall Location:
001	Advanced Secondary Wastewater Treatment Plant Effluent	42^{O} 17' 59" / -71^{O} 54' 0"

III. DESCRIPTION OF THE DISCHARGE

A quantitative description of the wastewater treatment plant discharge in terms of significant effluent parameters based on recent monitoring data is shown on **Attachment A** of this fact sheet. This facility's flow schematic is shown in **Figure 2**.

IV. LIMITATIONS AND CONDITIONS

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

V. PERMIT BASIS AND EXPLANATION OF EFFLUENT LIMITATION DERIVATION

A. BACKGROUND

a. Treatment Process Description

The wastewater treatment facility (WWTF) treatment processes include: a headworks, in which grit and screening are removed, primary sedimentation, an Integrated Fixed-Film Activated Sludge (IFAS) biological treatment system, secondary clarification, cloth disk filtration, and disinfection using ultraviolet disinfection units. Waste sludge is trucked off-site to Synagro in Woonsocket, Rhode Island for incineration. The Hopedale WWTF generates approximately 1320 dry metric tons of sludge each year. The Town completed a construction upgrade on October 7, 2009 that added a grit washing system, added chemical feed systems, replaced the aeration system, added the IFAS system, and added a tertiary cloth disk filter.

b. Collection System Description

The Hopedale WWTF is a separate sewer system. A separate sanitary sewer conveys domestic, industrial and commercial sewage, but not storm water. It is part of a "two pipe system" consisting of separate sanitary sewers and storm sewers. The two systems have no interconnections; the sanitary sewer leads to a wastewater treatment plant and the storm sewer discharges to a local water body.

c. Enforcement Status

The permittee was issued an administrative compliance order on September 29, 2005 by EPA to address copper and ammonia-nitrogen permit limitation exceedances.

The Order included a requirement to prepare and submit an engineering report that would: (1) include an inventory of the copper sources that discharge to the WWTF, (2) include an evaluation of various treatment technologies and source reduction measures to reduce the level of copper discharged to, and from, the WWTF, and (3) recommend the treatment technologies and measures that would minimize the level of copper discharged from the WWTF. The Order also included a requirement to develop a schedule to implement the chosen technologies or source reduction measures.

The Order also required the Town to prepare a detailed evaluation and explanation of the specific causes of the violations of the ammonia-nitrogen limitations in the NPDES permit. The Town was required to develop an Ammonia-Nitrogen Report that was required to include interim and long-term corrective measures to eliminate the ammonia-nitrogen violations and an implementation schedule for achieving and maintaining compliance with their NPDES permit.

All of the Order's required reports, submissions, and construction schedules have been met by the Town. The Town's final construction and process upgrades were completed on October 7, 2009.

d. Permit Compliance Schedule

Given the Town's recent WWTF upgrades, and its plans for constructing a new water treatment facility, the draft permit proposes an extended three year compliance schedule for achieving new water quality-based limitations required by the permit. This schedule will allow time to complete the new water treatment plant (which should reduce concentrations of metals in the wastewater treatment plant influent) and to optimize the operations at the WWTF after the water treatment facility is fully functioning.

e. Overview of Federal and State Regulations

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 specific permitting sections of the CWA, one of which is Section 402. See CWA §§ 303(a), 402(a). Section 402(a) establishes one of the CWA's principal permitting programs, the National Pollutant Discharge Elimination System (NPDES). Under this section, EPA may "issue a permit for the discharge of any pollutant, or combination of pollutants" in accordance with certain conditions. See CWA § 402(a). NPDES permits generally contain discharge limitations and establish related monitoring and reporting requirements. See CWA § 402(a)(1)-(2).

Section 301 of the CWA provides for two types of effluent limitations to be included in NPDES permits: "technology-based" limitations and "water quality-based" limitations. See CWA §§ 301, 304(b); 40 C.F.R. 122, 125, 131. Technology-based limitations, generally developed on an industry-by-industry basis, reflect a specified level of pollutant reducing technology available and economically achievable for the type of facility being permitted. See CWA § 301(b). As a class, publicly owed treatment works (POTWs) must meet performance-based requirements based on available wastewater treatment technology. See CWA § 301(b)(1)(B). The performance level for POTWs is referred to as "secondary treatment". Secondary treatment is comprised of technology-based requirements expressed in terms of BOD_5, TSS, and pH. See 40 C.F.R. §133.
Water quality-based effluent limits are designed to ensure that State water quality standards are met regardless of the decision made with respect to technology and economics in establishing technology-based limitations. In particular, Section 301(b)(1)(C) requires achievement of, "any more stringent limitation, including those necessary to meet water quality standards…established pursuant to any State law or regulation…" See 40 C.F.R. §§ 122.4(d)(1) (providing that a permit must contain effluent limits as necessary to protect State water quality standards, "including State narrative criteria for water quality") (emphasis added) and 122.44(d)(5) (providing in part that a permit incorporate any more stringent limits required by Section 301(b)(1)(C) of the CWA).
The CWA requires that States develop water quality standards for all water bodies within the State. See CWA § 303. These standards have three parts: (1) one or more "designated uses" for each water body or water body segment in the state; (2) water quality "criteria", consisting of numeric concentration levels and/or narrative statements specifying the amounts of various pollutants that may be present in each water body without impairing the designated uses of that water body; and (3) an anti-degradation provision, focused on protecting existing uses. See CWA § 303(c)(2)(A) and 40 C.F.R. § 131.12. The limits and conditions of the permit reflect the goal of the CWA and EPA to achieve and then to maintain water quality standards.

Receiving stream requirements are established according to numeric and narrative standards adopted under State law for each stream classification. When using chemical-specific numeric criteria from the State's water quality standards to develop permit limits, both the acute and chronic aquatic life criteria are used and expressed in terms of maximum allowable in-stream pollutant concentrations. Acute aquatic life criteria are generally implemented through average monthly limits.

Where a State has not established a numeric water quality criterion for a specific chemical pollutant that is present in the effluent in a concentration that causes or has a reasonable potential to cause a violation of narrative water quality standards, the permitting authority must establish effluent limits in one of three ways: based on a "calculated numeric criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and fully protect the designated use," on a "case-by-case basis" using CWA Section 304(a) recommended water quality criteria, supplemented as necessary by other relevant information; or, in certain circumstances, based on an indicator parameter. See 40 C.F.R. § 122.44(d)(1)(vi)(A-C).

All statutory deadlines for meeting various treatment technology-based effluent limitations established pursuant to the CWA have expired. When technology-based effluent limits are included in a permit, compliance with those limitations is from the date the issued permit becomes effective. See 40 C.F.R. § 125.3(a)(1). Compliance schedules and deadlines not in accordance with the statutory provisions of the CWA cannot be authorized by an NPDES permit. The regulations governing EPA's NPDES permit program are generally found in 40 C.F.R. §122, §124, §125, and §136.

The permit must limit any pollutant parameter (conventional, non-conventional, toxic, and whole effluent toxicity) that is or may be discharged at a level that causes or has "reasonable potential" to cause or contribute to an excursion above any water-quality criterion. See 40 C.F.R. §122.44(d)(1)(i). An excursion occurs if the projected or actual in-stream concentration exceeds the applicable criterion.

Reasonable Potential

In determining reasonable potential, EPA considers: 1) existing controls on point and non-point sources of pollution; 2) pollutant concentration and variability in the effluent and receiving water as determined from the permit's reissuance application, DMRs, and State and Federal Water Quality Reports; 3) sensitivity of the species to toxicity testing; 4) the statistical approach outlined in *Technical Support Document for Water Quality-Based Toxics Control*, March 1991, EPA/505/2-90-001 in Section 3; and, where appropriate, 5) dilution of the effluent in the receiving water.

Anti-Backsliding

Section 402(o) of the CWA generally provides that the effluent limitations of a renewed, reissued, or modified permit must be at least as stringent as the comparable effluent limitations in the previous permit. EPA has also promulgated anti-backsliding regulations, which are found at 40 C.F.R. §122.44(l). Unless applicable anti-backsliding requirements are met, the limits and conditions in the reissued permit must be at least as stringent as those in the previous permit.

State Certification

Section 401(a)(1) of the CWA requires all NPDES permit applicants to obtain a certification from the appropriate state agency stating that the permit will comply with all applicable federal effluent limitations and State water quality standards. See CWA § 401(a)(1). The regulatory provisions pertaining to State certification provide that EPA may not issue a permit until a certification is granted or waived by the state in which the discharge originates. See 40 C.F.R. § 124.53(a). The regulations further provide that, "when certification is required…no final permit shall be issued…unless the final permit incorporates the requirements specified in the certification under §124.53(e)." See 40 C.F.R. §124.55(a)(2). Section 124.53(e) in turn provides that the State certification shall include "any conditions more stringent than those in the draft permit which the State finds necessary" to assure compliance with, among other things, State water quality standards. See 40 C.F.R. §124.53(e)(2), and shall also include "[a] statement of the extent to which each conditions of the draft permit can be made less stringent without violating the requirements of State law, including water quality standards". See 40 C.F.R. §124.53(e)(3).

However, when EPA reasonably believes that a State water quality standard requires a more stringent permit limitation than that reflected in a state certification, it has an independent duty under CWA §301(b)(1)(C) to include more stringent permit limitations. See 40 C.F.R. §122.44(d)(1) and (5). It should be noted that under CWA § 401, EPA's duty to defer to consideration of state law is intended to prevent EPA from relaxing any requirements, limitations, or conditions imposed by State law. Therefore, "[a] State may not condition or deny a certification on the grounds that State law allows a less stringent permit condition." See 40 C.F.R. §12455(c). In such an instance, the regulation provides that, "The Regional Administrator shall disregard any such certification conditions or denials as waivers of certification." EPA regulations pertaining to permit limits based upon water quality standards and state requirements are contained in 40 C.F.R. §122.4(d) and 40 C.F.R. §122.44(d).

In accordance with the regulations found at 40 C.F.R. Section 131.12, the Massachusetts Department of Environmental Protection (MassDEP) has developed and adopted a statewide anti-degradation policy to maintain and protect existing in-stream water quality. The Massachusetts Anti-Degradation Policy is found at Title 314 CWR 4.04. No lowering of water quality is allowed, except in accordance with the anti-degradation policy. All existing uses of the Mill River must be protected. This draft permit is being reissued with allowable discharge limits as, or more, stringent than those in the current permit and with the same parameter coverage. There is no change in outfall location. The public is invited to participate in the anti-degradation finding through the permit public notice process.

f**. <u>Water Quality Standards; Designated Use; Outfall 001</u>**

The Hopedale WWTF discharges into the Mill River within Segment MA51-10. This river is 16.1 miles in length, and begins at the outlet of North Pond in Milford, Massachusetts. The Mill River flows in a southern direction through Milford, Upton, Hopedale, Mendon, and Blackstone, Massachusetts to the confluence with the Blackstone River in Woonsocket, Rhode Island. The Blackstone River then joins the Seekonk River in Pawtucket, Rhode Island. The Mill River is a part of the Blackstone River Basin and the Narragansett Bay Basin. The Hopedale treatment plant discharge is located approximately 6 river miles downstream of North Pond and approximately 1.25 river miles downstream of the dam at Hopedale Pond.

Mill River has been designated as a Class B warm water fishery by the Massachusetts Surface Water Quality Standards(SWQS), 314 Code of Massachusetts Regulations ("CMR") 4.05(4)(a). The SWQS (314 CMR 4.02) defines warm water fisheries as waters in which the maximum mean monthly temperature generally exceeds 68 ^{o} Fahrenheit (20^{o} Celsius) during the summer months and are not capable of supporting a year-round population of cold water stenothermal aquatic life. The SWQS at 314 CMR 4.05(3)(b) state that Class B waters are designated as habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. They shall be a source of public water supply (i.e., where designated and with appropriate treatment). They shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. They shall also have consistently good aesthetic value.

The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. To meet this goal, the CWA requires states to develop information on the quality of their water resources and report this information to EPA, the U.S. Congress, and the public. To this end, the EPA released guidance on November 19, 2001, for the preparation of an integrated "List of Waters" that could combine reporting elements of both §305(b) and 303(d) of the CWA. The integrated list format allows the states to provide the status of all their assessed waters in one list. States choosing this option must list each water body or segment in one of the following five categories:

1) Unimpaired and not threatened for all designated uses; 2) Unimpaired waters for some uses and not assessed for others; 3) Insufficient information to make assessments for any uses; 4) Impaired or threatened for one or more uses but not requiring the calculation of a Total Maximum Daily Load (TMDL); and 5) Impaired or threatened for one or more uses and requiring a TMDL.

A comprehensive assessment program of the Blackstone River Watershed began in 1991, under a cooperative agreement with the EPA, MassDEP, Rhode Island Department of Environmental Management (RIDEM), and the University of Rhode Island. This assessment program was part of the Blackstone River Initiative (BRI). The BRI included an extensive water quality survey of the Blackstone River and its tributaries, and was conducted during 1991 – 1994 by the MassDEP. The

survey included both dry and wet weather sampling, as well as sediment quality, biological and habitat assessment (Wright et al.). Twenty-three water quality stations were selected for analysis, including stations located along the mainstem of the river, six major tributaries, and near the discharge locations of the two largest point sources (Upper Blackstone Water Pollution Abatement District and Woonsocket WWTF) within the watershed.

In MassDEP's 2001 Blackstone River Watershed Water Quality Assessment Report, the 0.3-mile reach of the Mill River downstream from the Hopedale WWTF discharge was determined to be in partial attainment for aquatic life criteria. This was reported to be caused by organic enrichment and nutrient loadings from the Hopedale WWTF, compounded by the low-base flow conditions in the Mill River. The Aesthetics Use was also assessed as partial support for the 0.3-mile reach of the Mill River downstream from the Hopedale WWTF because of effluent odor and the presence of green filamentous algae.

The MassDEP's 2010 Water Quality final report 303(d) list includes the Mill River as impaired and in need of a total maximum daily load (TMDL) assessment due to priority pollutants and metals. Spindleville Pond, a 2.4 acre impoundment located approximately one mile downstream from the Hopedale WWTF discharge, is listed as impaired due to priority pollutants and noxious aquatic plants. This assessment is based on the results of the 1998 Blackstone River Survey conducted by the MassDEP.

g**. Available Dilution**

7 Day, 10 Year Low Flow

Water quality-based effluent limitations are established with the use of a calculated dilution factor, based on the available dilution of the effluent. Massachusetts water quality regulations require that the available effluent dilution be based upon the 7 day, 10 year low flow (7Q10 flow) of the receiving water (314 CMR § 4.03(3)(a)). The 7Q10 low flow is the mean low flow over seven consecutive days, recurring every ten years.

The facility design flow is 0.588 million gallons per day (mgd) or 0.9096 cubic feet per second (cfs). The dilution factor used to calculate the water quality-based limits in the current permit was 1.8, based on a calculated 7Q10 receiving water flow of 0.7 cfs. It appears that this value was calculated using the 7Q10 flow at United States Geological Survey gage number 01112250, located on the Mill River downstream of the treatment plant, adjusted for runoff area. The watershed area at the treatment plant discharge is about 11 square miles, and the watershed area at the dam is 25.3 square miles. Using this information, with current 7Q10 data from the USGS gage, a 7Q10 at the Hopedale outfall can be calculated as follows:

$$Q_s = Q_{001} = \frac{(A_{001})}{(A_{gage})} * (Q_{gage}) = \frac{(11 \text{ miles}^2)}{(25.3 \text{ miles}^2)} * (1.73 \text{ cfs}) = 0.75 \text{ cfs}$$

The dilution factor can then be calculated as follows:

$$\text{Dilution Factor (DF)} = \frac{(Q_s) + (Q_d)}{(Q_d)} = \frac{(0.75 \text{ cfs}) + (0.9096 \text{ cfs})}{(0.9096 \text{ cfs})} = 1.8$$

This dilution factor is the same as the one used to calculate the limits in the current permit.

In reviewing this methodology, EPA realized that the 7Q10 flow at the treatment plant outfall, assumed to be the flow upstream of the treatment plant was too high, given that the measured 7Q10 flow at the downstream gage included the discharge flow. A more appropriate calculation of the 7Q10 would include subtracting the treatment plant flow from the downstream 7Q10 flow, and then apportioning that flow according to the watershed area. Recalculating the 7Q10 just upstream of the treatment plant, using a treatment plant flow of 0.3867 cfs (the lowest monthly average flow over the past five years) resulted in a 7Q10 of 0.5838 and a dilution factor of 1.64. The calculations are as follows:

$$Q_s = Q_{001} = \frac{(A_{001})}{(A_{gage})} * (Q_{gage} - Q_d) = \frac{(11 \text{ miles}^2)}{(25.3 \text{ miles}^2)} * (1.73 \text{ cfs} - 0.3867 \text{ cfs}) = 0.5838 \text{ cfs}$$

Where:

Q_{gage} = Estimated 7Q10 flow for the Mill River near the Blackstone, MA gage station in the Blackstone River Basin (gage station # 01112250, downstream from the WWTF discharge) = 1.73 cfs

A_{gage} = Drainage area at the gage station = 25.3 miles^2

A_{001} = Mill River drainage area at Outfall 001 = 11 miles^2

Q_d = Treatment plant dry weather flow = (0.25 mgd x 1.547) = 0.3867 cfs

1.547 = converts million gallons per day (mgd) to cubic feet per second (cfs) units

Based on the most recent instream low flow data available, the resulting dilution factor at the Hopedale WWTF Outfall 001 is re-calculated to be 1.64 using the following equation and data:

$$\text{Dilution Factor (DF)} = \frac{(Q_s) + (Q_d)}{(Q_d)} = \frac{(0.5838 \text{ cfs}) + (0.9096 \text{ cfs})}{(0.9096 \text{ cfs})} = \mathbf{1.64}$$

Where:

Q_s = 7Q10 flow upstream of the treatment plant outfall = 0.5838 cfs

Q_d = Treatment plant design flow = (0.588 mgd * 1.547) = 0.9096 cfs

This dilution factor is slightly less than the value used to calculate water quality based limits for the current permit.

The following statistical tools and stream flow gage data was used to prepare the preceding calculations.

USGS – *StreamStats is a web-based tool that allows users to obtain stream flow statistics, drainage-basin characteristics, and other information for user-selected sites on streams (i.e.,* http://water.usgs.gov/osw/streamstats/massachusetts.html). Streamstats was used to calculate the drainage area at the POTW.

USGS – gage flow data derived from the National Water Information System, Web Interface, http://ma.water.usgs.gov/water/default.htm.

As described previously, the treatment plant is located approximately 1.25 river miles downstream of the privately owned dam on Hopedale Pond. There is no information currently available to verify that water released from the pond is equal to or greater than the estimated 7Q10 at all times. The draft permit therefore includes a requirement that a plan be submitted to EPA and MassDEP that will verify the instream 7Q10 flow at the treatment plant outfall. Options may include, but are not limited to, measuring the flow release from the upstream Hopedale Pond Dam, or gaging the flow in the river.

30 Day, 10 Year Low Flow

Additionally, the 30-day, ten-year low flow (30Q10 flow) of the receiving water is used in the calculation of water quality-based limitations for parameters such as ammonia (EPA 1999 Update of Ambient Water Quality Criteria for Ammonia).

Because there is no stream flow gage on the Mill River with 30Q10 flow values, flow data from the Branch River gage number 01112250 in Forestdale Rhode Island was used. Reliable estimations can be obtained, given that the two watersheds have similar characteristics. The Branch River gage data was also used in the current permit's 30Q10 calculations. At this gage, the 7Q10 is 11.8 cfs and the winter season 30Q10 is 47.1 cfs. These values were derived with flow data up through 2011. The ratio of 30Q10 to 7Q10 for this gage is 3.9. Applying this ratio to the 7Q10 from the Mill River of 0.5838 cfs, we obtained an estimated winter period 30Q10 flow of 2.28 cfs.

Background Information:

Flow Gaging Information for the Branch River gage for the period 1941 – 2011 annual values for the year ending March 31:

In the February 28, 2002 Fact Sheet	Updated in this Fact Sheet
7Q10 = 13.5 cfs	7Q10 = 11.8 cfs
30Q10 = 18.4 cfs	30Q10 = 15.9 cfs

Seasonal values for period November 1 – May 31:

In the February 28, 2002 Fact Sheet	Updated in this Fact Sheet
7Q10 = 29.5 cfs	7Q10 = 29.5 cfs
30Q10 = 48.8 cfs	30Q10 = 47.1 cfs

Calculations:

Therefore, the updated ratio of 30Q10 to 7Q10 for the Branch River gage is 3.9.

30Q10 to 7Q10 for the Branch River gage = (Winter 30Q10)/(7Q10)
= (47.1 cfs)/(11.8 cfs)
= 3.9

Mill River 30Q10 estimate

Applying this ratio to the 7Q10 from the Mill River of 0.5838 cfs, we obtained an estimated winter period of 30Q10 flow of 2.28 cfs.

Winter 30Q10 flow = (Mill River 7Q10) * (Winter 30Q10)/(7Q10 of the B.R. gage)
= (0.5838 cfs * 3.9 cfs)
= 2.28 cfs

Therefore, the 30Q10 dilution factor is 3.51.

30Q10 dilution factor = (WWTF design flow + Winter 30Q10 flow)/(WWTF design flow)
= (0.9096 cfs + 2.28 cfs)/(0.9096 cfs)
= 3.51

B. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Outfall 001)

In addition to the State and Federal regulations described above, data submitted by the permittee in its permit application as well as in monthly discharge monitoring reports (DMRs) and in whole effluent toxicity (WET) test reports from 2005 to 2011 was used to evaluate the discharge during the effluent limitations development process (see **Attachment A**).

a. Flow

The 12 month rolling average flow limitation of 0.588 MGD in the current permit has been maintained in the draft permit. This is the design flow of the facility found in Form 2A, Part A, Section a.6. of the permit application. The draft permit requires continuous flow measurement, and also requires reporting of the average monthly and maximum daily flows.

b. Conventional Pollutants

1. Biochemical Oxygen Demand (BOD)

The draft permit includes technology-based effluent limitations for the months of November through May and more stringent water quality-based limits for the months of June through October.

The November through May limits include average monthly and average weekly concentration limits and average monthly percent removal limitations based on the requirements of 40 CFR § 133.102(a)(1), (2), (3), and average monthly and average weekly mass limits based on the concentration limits and the treatment plant design flow, pursuant to 40 CFR § 122.45(f) and 40 CFR 122.45(b)(1). The draft permit also requires that the maximum daily concentration and mass be reported.

The more restrictive June through October concentration limits are necessary to meet water quality standards. These limits have been carried over from the permittee's 1991 and 1999 permits, consistent with anti-backsliding regulations. The corresponding mass limits were calculated using the concentration limits and the treatment plant design flow. The percent removal limit during this period is based on secondary treatment requirements in 40 CFR §133.102. The draft permit also requires that the maximum daily concentration and mass be reported.

Calculations are presented following the TSS Section.

2. Total Suspended Solids (nonfilterable) (TSS)

The draft permit includes technology-based limitations for the months of November through May and more stringent water quality-based limits for the months of June through October.

The November through May limits include average monthly and average weekly concentration limits and average monthly percent removal limits based on the requirements of 40 CFR § 133.102(a)(1), (2), (3), and average monthly and average weekly mass limitations based on the concentration limits and the treatment plant design flow, pursuant to 40 CFR § 122.45(f) and 40 CFR 122.45(b)(1). The draft permit also requires that the maximum daily concentration and mass be reported.

The more restrictive June through October concentration limits are necessary to meet water quality standards. These limits have been carried over from the permittee's 1991 and 1999 permits, consistent with anti-backsliding regulations. The corresponding mass limits were calculated using the concentration limits and the treatment plant design flow. The percent removal limit during this period is based on secondary treatment requirements in 40 CFR 133.102. The draft permit also requires that the maximum daily concentration and mass be reported.

Calculations for BOD and TSS Limitations

The average monthly and average weekly mass limitations for BOD and TSS were calculated as follows:

Mass Limitation (lbs/day) = C * DF * 8.34

Where:
C = Concentration limit
DF = Design flow of the facility, in million gallons per day (MGD)
8.34 = Factor to convert effluent concentration in mg/l and design flow in MGD to lbs/day. The units of this 8.34 conversion factor are (lbs)(l)/(mg)(gal).

June 1 – October 31 Limitations

Average Monthly Mass Limit = 15 mg/l * 0.588 MGD * 8.34 = 73.5 lbs/day = 74 lbs/day
Average Weekly Mass Limit = 15 mg/l * 0.588 MGD * 8.34 = 73.5 lbs/day = 74 lbs/day

The mass limitations in the draft permit are the same as those in the current permit and are consistent with anti-backsliding requirements.

November 1 – May 31 Limitations

Average Monthly Mass Limit = 30 mg/l * 0.588 MGD * 8.34 = 147.1 lbs/day = 147 lbs/day
Average Weekly Mass Limit = 45 mg/l * 0.588 MGD * 8.34 = 220.6 lbs/day = 221 lbs/day

The mass limitations in the draft permit are the same as those in the current permit and are consistent with anti-backsliding requirements.

3. pH

The draft permit includes pH limitations which are required by state water quality standards, and are protective of pH standards set forth at Title 314 CMR 4.05(b)(3), for Class B waters. The pH requirements are more stringent than those required under 40 CFR § 133.102(c). The pH limits are carried forward from the current permit, and so are consistent with antibacksliding requirements of 40 CFR § 122.44(1). The monitoring frequency for pH is set at once per day in the draft permit.

4. *Escherichia Coli Bacteria (E. coli)*

The *Escherichia Coli (E. coli)* limits for outfall 001 are based on state water quality standards for Class B waters (314 CMR 4.05(b)(4)). The State of Massachusetts promulgated new bacteria criteria in the Surface Water Quality Standards (314 CMR § 4.00) on December 29, 2006, which were approved by EPA on September 19, 2007. The *E. coli* bacteria limits proposed in the draft permit for Outfall 001 are 126 cfu per 100 ml geometric mean and 409 cfu per 100 ml maximum daily value (this is the 90% distribution of the geometric mean of 126 cfu per 100 ml). The current permit requires bacteria limitations and monitoring year round. Since seasonal limits will provide adequate water quality protection, the draft permit proposes seasonal bacteria limits and monitoring, from April 1st – October 31st, to ensure the protection of the receiving water during the recreational period. The proposed bacteria monitoring frequency in the draft permit is once per week.

c. Non-Conventional Pollutants

Nutrients: Ammonia-Nitrogen, Nitrogen, and Phosphorus

Nutrients are compounds containing nitrogen and phosphorus. Although nitrogen and phosphorus are essential for plant growth, high concentrations of these nutrients can cause eutrophication, a condition in which aquatic plant and algal growth is excessive. Plant and algae respiration and decomposition reduces dissolved oxygen concentrations in the water, creating poor habitat for fish and other aquatic animals. In addition, nitrogen in the form of ammonia can be toxic to aquatic life. The toxicity level of ammonia depends on the temperature and pH of the receiving water (USEPA 1999).

1. Ammonia-Nitrogen (NH_3-N)

The current permit includes ammonia-nitrogen limits of 11 mg/l average monthly and a maximum daily monitoring requirement during November through April; 5 mg/l average monthly, 5 mg/l average weekly, and 8 mg/l maximum daily limits in May; and, 2 mg/l average weekly, 2 mg/l average monthly, and 3 mg/l maximum daily during June through October. All of the reporting requirements for ammonia-nitrogen in the current permit are once per week.

EPA published new ammonia criteria in December 1999, which were included in the 2002 State of Massachusetts Water Quality Standards, and are required to be used unless there is a site specific criteria. Based on these criteria, revised warm weather and cold weather ammonia limits have been reviewed for potential draft permit limits to protect the sensitive life stages of fish species which are expected to be present in the Mill River. The following values are based on the most recent ammonia criteria published by EPA in December 1999, which were unavailable when the current permit became effective on October 3, 1999.

Ammonia-Nitrogen Warm Weather Limit Calculation:

Critical instream temperature = 24 C (75 F) (summer instream temperature)
Critical instream pH = 7.0 (summer instream pH)
Chronic ammonia criteria (chronic criterion for Early Life Stages Present) = 3.21 mg/l

Therefore, the ammonia-nitrogen monthly average summer limit:
(7Q10 dilution factor x summer instream ammonia criterion)
(1.64 * 3.21 mg/l) = 5.26 mg/l

Ammonia-Nitrogen Cold Weather Limit:

Critical instream temperature = 10 C (winter instream temperature)
Critical instream pH = 7.0 (winter instream pH)
Chronic ammonia criteria (chronic criterion for Early Life Stages Present) = 5.91 mg/l
Therefore, the ammonia-nitrogen monthly average winter limit:
(30Q10 winter dilution factor x winter instream ammonia criterion)
(3.51 * 5.91 mg/l) = 20.74 mg/l

These calculated limits are less stringent than the limits in the current permit.

Proposed Ammonia-Nitrogen Limitations - Section 402(o) of the Clean Water Act generally provides that the effluent limitations of a renewed, reissued, or modified permit must be at least as stringent as the comparable effluent limitations in the previous permit. EPA has also promulgated anti-backsliding regulations that are found at 40 CFR § 122.44(l). For water-quality limits, anti-backsliding is satisfied if the relaxed limits achieve water quality standards, including anti-degradation. Typically, where it is shown that less stringent limits will attain water quality standards, the Region will only relax the limits to values reflecting the demonstrated performance of the facility, if those values are more stringent than the new water quality-based limits, in order to satisfy anti-degradation requirements.

EPA reviewed the effluent data submitted by the facility for the period from October 7, 2009 to April 2010, which reflect the performance of the upgraded facilities, and noted that the reported summer period average monthly values ranged from 0 mg/l to 0.2 mg/l, and the maximum daily values ranged from 0.2 mg/l to 0.4 mg/l. The winter period monthly average values ranged from 3 mg/l to 4 mg/l, and the maximum daily values ranged from 6 mg/l to 8 mg/l. Also, the reported effluent average monthly and maximum daily values for the month of May in 2010 were 4 mg/l and 6 mg/l, respectively. Since these values are lower than both the current ammonia-nitrogen permit limits and the calculated water quality-based limits (i.e., winter limit of 20.74 mg/l average monthly, and summer limit of 5.26 mg/l average monthly), the current ammonia-nitrogen permit limits are proposed for the draft permit.

Potential Future Ammonia Criteria – Additionally, EPA has recently noticed its intention to re-evaluate the current aquatic life ambient water quality criteria for ammonia to determine whether it should be revised based on new toxicity data for aquatic organisms (USEPA 2004). If future ammonia criteria demonstrates that more stringent ammonia limits are needed to meet water quality standards, this permit may be re-opened and modified.

2. Total Nitrogen

As described earlier, 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 could start a chain of events detrimental to the health of the aquatic ecosystem. The algae prevent sunlight from penetrating through the water column. As the algae decay, they depress the DO levels in the water. Fish are in turn deprived of oxygen. Excessive algae may also cause foul smells and decrease aesthetic value, which could affect swimming and recreational uses.

It has been documented that the Providence and Seekonk Rivers (in Rhode Island) are impacted by low DO levels and high phytoplankton concentrations that stem from excessive nitrogen loadings. Significant areas of these rivers suffer from hypoxic (low DO) and anoxic (no DO) conditions and violate water quality Federal and State (Rhode Island) water quality standards.

In its Section 305(b) report, the State of Rhode Island assessed the health of its receiving waters. Significant nutrient impairments to shellfish harvesting and swimming, due to nitrogen, were noted in the Providence River, Seekonk River and Upper Narragansett Bay. These waters were given the highest priority consistent with the State of RI's goal of restoring such waters.

The State of Rhode Island conducted water quality modeling to estimate the nitrogen loading that was being contributed to Upper Narragansett Bay from Massachusetts sources. It was found that WWTFs contributed over 90% of the nitrogen loading to the MA/RI state line. Since it has demonstrated that a significant portion of the overall nitrogen loading discharged to Narragansett Bay originates from WWTF effluents in Massachusetts, we believe that limits on nitrogen must be considered at the Massachusetts WWTFs to protect the downstream uses in Rhode Island.

In particular, based on an annual estimate of nitrogen flux into the Upper Narragansett Bay from rivers, the Blackstone River was estimated to be the largest contributor of nitrogen. Thus, EPA believes there is a need to determine the loadings of nitrogen from sources in Massachusetts which are tributary to the Blackstone River. An understanding of nitrogen loadings from Massachusetts sources will help to determine whether these loadings are impacting the water quality in Narragansett Bay. Ultimately, as mentioned above, an understanding of nitrogen loadings from Massachusetts will help determine if nitrogen limits are necessary for discharges in Massachusetts.

According to 40 CFR §122.44(d)(4), EPA should include any requirements in permits to "conform to applicable water quality requirements under Section 401(a)(2) of the CWA when the discharge affects a State other than the certifying State. Based on monitoring conducted in the Blackstone River in support of the State of Rhode Island's assessment efforts, it was found that the nitrogen input from the Hopedale WWTF to the main stem of the Blackstone River (and eventually to Upper Narragansett Bay) was relatively small in comparison to other larger wastewater treatment facilities, and that controls on these larger facilities should be sufficient to ensure that water quality standards are attained. See *Evaluation fof Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers*, RIDEM December 2004. Therefore, EPA has not included nitrogen limits at this time.

However, EPA has included monitoring requirements for total nitrogen in the draft permit (total Kjeldahl nitrogen, nitrite, and nitrate). The data submitted by the permittee will help to establish a database of nitrogen loadings, which can be used to quantitatively assess the impact of loading and transport of nitrogen to Narragansett Bay. The monitoring data will provide a more sound decision-making basis in the future decisions relating to nitrogen loadings to Narragansett Bay.

Specifically, average monthly and maximum daily reporting requirements for total Kjeldahl nitrogen (TKN), total nitrite nitrogen (NO_2), and total nitrate nitrogen (NO_3) at a frequency of once per month have been proposed in the draft permit in order to assess the annual average total nitrogen loading from this facility. A nitrogen optimization removal requirement is also proposed in the draft permit, with a requirement to submit a report to the permitting agencies within one year, summarizing the measures taken to enhance the removal of nitrogen by its treatment facility and the effectiveness of these measures. The proposed nitrogen requirements in the draft permit are consistent with the requirements for other small WWTFs that ultimately discharge to Narragansett Bay.

3. Phosphorus

While phosphorus is an essential nutrient for the growth of aquatic plants, it can stimulate rapid plant growth in freshwater ecosystems when it is present in high quantities. The excessive growth of aquatic plants and algae within freshwater systems negatively impacts water quality and can interfere with the attainment of designated uses by: (1) increasing the oxygen demand within the water body (to support an increase in both plant respiration and the biological breakdown of dead organic (plant) matter); (2) causing an unpleasant appearance and odor; (3) interfering with navigation and recreation; (4) reducing water clarity; and (5) reducing the quality and availability of suitable habitat for aquatic life. Cultural (or accelerated) eutrophication is the term used to describe dense and excessive plant growth in a water body that results from nutrients entering the system as a result of human activities. Discharges from municipal and industrial wastewater treatment plants, agriculture runoff, and stormwater are examples of human-derived (i.e., anthropogenic) sources of nutrients in surface waters.

Elevated concentrations of chlorophyll a, excessive algal and macrophyte growth, and either elevated (i.e., near saturation or super saturated) or low levels of dissolved oxygen are all effects of nutrient enrichment. The relationship between these factors and high instream total phosphorus concentrations is well documented in scientific literature, including guidance developed by EPA to address nutrient overenrichment (Nutrient Criteria Technical Guidance Manual – Rivers and Streams. EPA July 2000 [EPA-822-B-00-002]).

EPA has produced several guidance documents which contain recommended total phosphorus criteria for receiving waters. EPA has published national guidance documents which contain recommended total phosphorus criteria and other indicators of eutrophication. EPA's 1986 *Quality Criteria for Water* (the "Gold Book") recommends that instream phosphorus concentrations not exceed 0.05 mg/l in any stream entering a lake or reservoir, 0.1 mg/l (100 ug/l) for any stream not discharging directly into lakes or impoundments, and 0.025 mg/l (25 ug/l) within a lake or reservoir.

More recently, EPA has released recommended Ecoregional Nutrient Criteria, established as part of an effort to reduce problems associated with excess nutrients in water bodies in specific areas of the country. The published criteria represent conditions in waters within ecoregions that are minimally impacted by human activities, and thus free from the effects of cultural eutrophication. Charlton is located within Ecoregion XIV, Eastern Coastal Plains. The recommended total phosphorus criterion for this ecoregion, found in Ambient Water Quality Criteria Recommendations: Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion XIV (EPA December 2000) is 0.024 mg/l (24 ug/l).

Currently, the Massachusetts Water Quality Standards do not contain numerical criteria for phosphorus. The narrative criterion for nutrients, found at 314 CMR § 4.05(5)(c), states that nutrients " Unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses ." The Massachusetts Water Quality Standards also require that "any 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…" "…, including, where necessary, highest and best practical treatment (HBPT) for POTWs…" (314 CMR § 4.05(5)(c)). The MassDEP has established that a monthly average total phosphorus limit of 0.2 mg/l (200 ug/l) represents the highest and best practical treatment for POTWs.

The existing (1999) permit includes a seasonal monthly average total phosphorus limit of 1 mg/l. This limit was continued from the previous permit, and was determined necessary to achieve water quality standards. In this reissuance, EPA has evaluated whether this limit is sufficient to meet water quality standards.

In this evaluation, EPA has decided to apply the Gold Book criterion because it was developed from an effects- based approach versus the reference conditions-based approach used in the derivation of the ecoregion criteria. The effects-based approach is preferred in this case because it is more directly associated with an impairment of designated use (e.g., fishing). The effects-based approach provides a threshold value above which water quality impairments are likely to occur. It applies empirical observations of a causal variable (i.e., phosphorus) and a response variable (i.e., algal growth) associated with impairment of designated uses. Reference-based values are statistically derived from a comparison within a population of rivers in the same ecoregional class. They are a quantitative set of river characteristics (physical, chemical, and biological) that represent minimally impacted conditions.

The impacts associated with excessive phosphorus inputs are well documented in the Spindleville Pond, a 2.4 acre pond located approximately one mile downstream of the Hopedale WWTF discharge. See Blackstone River Watershed 1998 and 2003 Water Quality Assessment Reports (MassDEP 1998 and 2003). The Pond is on the Massachusetts 2010 Integrated List of Waters (the 303(d) list) as impaired and needing a TMDL for priority organics and noxious aquatic plants.

The MassDEP's Blackstone River Watershed 1998 and 2003 Water Quality Assessment Reports indicated a need for additional studies in order to understand the eutrophication impacts within the Mill River segment MA51-10, since the impacts were observed without the support of sampling data. The Blackstone River Basin Volunteer Monitoring Program, which MassDEP convened and oversees as part of the Blackstone River Initiative, has been conducting water quality sampling for the Mill River for several years at sampling stations that are located upstream and downstream of the Hopedale WWTF discharge location. Monitoring is conducted monthly from April through November, on the second Saturday of the month. The samples are analyzed by trained volunteers using HACH colorimeters, and participants follow an approved Quality Assurance Project Plan (QAPP) signed by EPA, MassDEP, and RIDEM. Phosphorus sampling results and sampling station locations are attached to this Fact Sheet. (see **Attachments B and C,** respectively.)

The samples taken immediately downstream of the treatment plant outfall show concentrations far in excess of the Gold Book criteria of 100 ug/l for free flowing waters and, and samples at the outlet of Spindleville Pond show concentrations in excess of the Gold Book criteria of 25 ug/l for lakes and reservoirs.

The table below shows phosphorus concentrations in the receiving water upstream of the discharge. The table also includes the receiving water flow for the sampling dates measured at the Branch River gaging station. The total phosphorus concentrations, and the estimated instream flow occurring on the sampling dates, are listed below:

Table 1. Sampling Station at Thwing Street Upstream of the Hopedale WWTF

Date of Sample	Phosphorus, Total (ug/l)	Branch River gage (cfs)
8/9/08	10	97
8/21/08	7	58
9/13/08	10	71
9/23/08	33	37
10/11/08	65	85
Average	25	
Median	10	

The sampling station at Thwing Street is located just upstream of the Hopedale WWTF's discharge. Since the phosphorus concentration values do not seem to correlate to the flow at the Branch River gage station during the low flow season, the median value of 10 ug/l, which represents the upstream phosphorus concentrations was used to calculate the sufficiency of the existing monthly average limit of 1 mg/l. The following calculations show that the existing limits are not sufficiently stringent to ensure that the discharge does not cause or contribute to an exceedance of water quality standards.

Using an upstream concentration of 10 ug/l, an effluent concentration of 1000 ug/l (1 mg/l), the treatment plant design flow of 0.9096 cfs and an upstream receiving water 7Q10 of 0.5838 cfs, the conccentration in the receiving water downstream of the discharge can be calculated as follows:

$$Cr = \frac{QsCs + QdCd}{Qr}$$

Where:
Qr = Flow of the Mill River downstream of the discharge = Qd + Qs = 1.4934 cfs
Qd = Design flow of the Hopedale WWTF = 0.9096 cfs
Qs = 7Q10 flow upstream of the discharge = 0.5838 cfs
Cs = In-stream water quality concentration upstream of the discharge = 10 ug/l
Cr = Resulting in-stream phosphorus concentration downstream of the discharge
Cd = Phosphorus concentration in the Hopedale discharge = 1000 ug/l (1 mg/l)

$$Cr = \frac{[(0.5838 * 10) + (0.9096 * 1000)]}{1.4934}$$

Cr = 612.98 ug/l = 0.613 mg/l

As can be seen, the current effluent limit is insufficiently stringent to achieve the Gold Book criterion of 100 ug/l downstream of the discharge. Accordingly, a more stringent limit has been calculated that will ensure attainment of the Gold Book criteria.

Phosphorus Permit Limits:

The proposed phosphorus limitation was calculated using the same mass balance equation that was used to calculate reasonable potential, but was instead solved to calculate an effluent limitation (Cd) that would result in attainment of the Gold Book criterion of 100 ug/l under 7Q10 conditions. The calculations are as follows:

$$Cd = \frac{QrCr - QsCs}{Qd}$$

Where:
Qr = Flow of the Mill River downstream of the discharge = Qd + Qs = 1.493 cfs
Qd = Design flow of the Hopedale WWTF = 0.9096 cfs
Qs = 7Q10 flow upstream of the discharge = 0.5838 cfs
Cs = In-stream water quality concentration upstream of the discharge = 10 ug/l
Cr = Resulting in-stream phosphorus concentration downstream of the discharge = 100 ug/l
Cd = Phosphorus concentration in the Hopedale discharge = discharge limit

$$Cd = \frac{(1.493 * 100) - (0.5838 * 10)}{0.9096}$$

Cd = 157.7 ug/l = 0.158 mg/l

EPA notes that this calculated limitation also meets the level of treatment to achieve the "highest and best practical treatment" for point sources contributing to eutrophication, since this level of treatment has been defined as achieving a monthly average total phosphorus concentration of 0.2 mg/l or less.

In discussions with the permittee regarding the proposed limit, the permittee requested that the limit be expressed in terms of mass, rather than concentration. The advantage of this approach to the permittee is that at discharge flows less than full design flow, an effluent concentration greater than the calculated limit would be protective of water quality standards. EPA believes that a mass discharge limit is protective provided that the mass limit would result in a downstream concentration equal to, or less than, 100 ug/l under all discharge flow conditions.

Under design flow conditions of 0.59 MGD (0.9096 cfs) a mass limit of 0.78 lbs per day would be protective, based on a discharge concentration of 0.158 mg/l:

Mass limitation (lbs/day) = discharge concentration (mg/L) * flow (MGD) * 8.34
= 0.158 * 0.59 * 8.34
= 0.78 lbs per day

However, this mass limit would not be protective at lower discharge flows because of the effect of the lower discharge flow on the available dilution (i.e., as the discharge flow is decreased, there becomes less total flow in the river). Therefore, EPA selected the minimum monthly average discharge flow recorded over the previous five years (0.25 MGD, or 0.39 cfs) to calculate an effluent concentration limit, which was then converted to a mass limit.

$$Cd = \frac{QrCr - QsCs}{Qd}$$

Where:
Qr = Flow of the Mill River downstream of the discharge = Qd + Qs = 0.39 + 0.5838 = 0.97 cfs
Qd = Summer low flow of the Hopedale WWTF = 0.39 cfs
Qs = 7Q10 flow upstream of the discharge = 0.5838 cfs
Cs = In-stream water quality concentration upstream of the discharge = 10 ug/l
Cr = Resulting in-stream phosphorus concentration downstream of the discharge = 100 ug/l
Cd = Phosphorus concentration in the Hopedale discharge = discharge limit

$$Cd = \frac{(0.97 * 100) - (0.5838 * 10)}{0.39}$$

Cd = 233 ug/l = 0.233 mg/l

Mass limitation (lbs/day) = discharge concentration (mg/L) * flow (MGD) * 8.34
= 0.233 * 0.25 * 8.34
= 0.49 lbs per day

April 1 – October 31 Limitation

A monthly average limit of 0.49 lbs per day is proposed in the draft permit, in order to control cultural eutrophication. If new information becomes available that demonstrates the need to change the phosphorus permit limit, the permit may be re-opened and modified as necessary to include a different phosphorus permit limit. The existing monitoring frequency of once per week is also maintained.

The proposed cold weather limit (November 1 – March 31) is 1.0 mg/l. The cold weather limitation on phosphorus is necessary to ensure that the higher levels of phosphorus discharged during the winter period do not result in the accumulation of phosphorus in the sediments, and subsequent release during the warm weather growing season. The limitation assumes that the vast majority of the phosphorus discharged will be in the dissolved fraction and that dissolved phosphorus will pass through the system and not accumulate in the sediments. A dissolved orthophosphorus monitoring requirement has been included to verify the dissolved fraction.

A seasonal (November 1st – March 31st) once per month monitoring requirement for dissolved ortho-phosphorus is also proposed in the draft permit. Monitoring for ortho-phosphorus is necessary to identify whether the particulate fraction remains low and to further understand the dynamics of phosphorus during the non-growing season.

The draft permit allows a reasonable period of time for the facility to begin meeting the new, more restrictive total phosphorus (TP) limit. During the first three years of the permit, the permittee is required to continue meeting the 1 mg/l monthly average total phosphorus limit from the 2006 permit, while it works towards meeting the new limit. If the new limit can be achieved in three years with the current treatment facility upgrades (coupled with expected improvements resulting from the new water treatment facility), the new TP limit will become effective three years and two months from the effective date of the permit. If the new TP limit is not achievable during the first three years of the permit, the permittee is required make necessary upgrades to the facility in order to meet the new limit before the permit expires.

NPDES permits may include compliance schedules for achieving new or revised water quality based permit limits. Schedules in permits are only granted (see In Re Star-kist Caribe, Inc., NPDES Appeal No. 88-5 (EAB, May 25, 1992)), when the state's water quality standards or their implementing regulations allow such schedules. Massachusetts regulations permit schedules under Title 314 CMR, §4.03(1). Schedules must be consistent with the CWA, be as short as possible, and be based on a consideration of technological and economic impacts. Note, additionally, that consistent with Section B.1. of Part II (General Conditions) of the draft permit, the permittee shall properly operate and maintain the existing phosphorus removal facilities at the treatment plant to obtain the lowest effluent phosphorus concentration that can be reasonably achieved.

d. Metals (Aluminum, Cadmium, Copper, Lead, Nickel, and Zinc)

Relatively low concentrations of metals in receiving waters can be toxic to resident aquatic life species. EPA is required to limit any pollutant that is, or may be discharged at a level that caused, or has reasonable potential to cause, or contributes to an excursion above any water quality criterion. See 40 CFR 122.44(d)(l)(vi). Effluent metals data submitted with the permit application, toxicity tests results and discharge monitoring reports were reviewed to determine if metals in the discharge have the potential to exceed aquatic life criteria in the Mill River.

As required by Massachusetts Water Quality Standards (314 CMR 4.05(5)(e)), the EPA National Recommended Water Quality Criteria: 2002 were used to calculate reasonable potential, and where necessary, effluent limits. The EPA- recommended approach to set and measure compliance with water quality standards is to use dissolved metals, because dissolved metals more closely approximates the bioavailable fraction of metals in the water column than does the total recoverable metal. Most toxicity to aquatic organisms is by adsorption of uptake across the gills which require the metals to be in dissolved form. When toxicity tests were originally conducted to develop EPA's Section 304(a) metals criteria, the concentrations were expressed as total metals. Subsequent testing determined the percent of the total metals that is dissolved in the water column. The calculations that follow use the freshwater conversion factors in EPA National Recommended Water Quality Criteria: 2002 to calculate the dissolved acute and chronic water quality criteria for metals (Appendix A).

Regulations in 40 CFR 122.45(c) require that the permit limits be based on total recoverable metals. The chemical differences between the effluent and the receiving water may cause changes in the partitioning between dissolved and particulate forms of metals. As the effluent mixes with the receiving water, absorbed metals from the discharge may dissolve in the water column.

In this case, measuring dissolved metals would underestimate the impact on the receiving water, and an additional calculation, using a site-specific translator would determine total metal criteria. Based on EPA's Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion (EPA-823-B-96-007), the conversion factor is equivalent to the translator if site-specific studies for partitioning have not been conducted. In subsequent calculations, conversion from dissolved metals to total recoverable metals have been done using the conversion factor for the particular metals found in Appendix A of National Recommended Water Quality Criteria: 2002, in lieu of a translator.

Hardness-dependent Metals (Cadmium, Copper, Lead, Nickel, and Zinc)

Certain metals, including cadmium, lead, nickel, and zinc, are more toxic at lower hardness, and this is factored into calculations of the water quality criteria. EPA's Office of Water – Office of Science and Technology stated in a letter dated July 7, 2000 that: *The hardness of the water containing the discharged toxic metals should be used for determining the applicable criterion. Thus, the downstream hardness should be used.*

The theoretical hardness of the Mill River downstream of the treatment plant during critical low flow periods and design discharge flow was calculated based on average ambient and effluent hardness data as shown in Table 2, Mill River Hardness Upstream of the Hopedale WWTP, below as reported in the facility's whole effluent toxicity tests conducted in the summer months of August 2006, 2007, 2008 and 2009.

The hardness of Mill River downstream of the treatment plant during critical low flow periods was calculated based on average ambient and effluent hardness data collected for the whole effluent toxicity tests conducted in the summer months of August 2006 – 2009.

Table 2. Mill River Hardness Upstream of the Hopedale WWTF

WET Test Date	Effluent Hardness, mg/l (as $CaCO_3$)	Ambient Hardness, mg/l (data collected upstream)
8/13/07	56	---
8/15/07	58	---
8/17/07	58	---
8/11/08	68	39
8/13/08	75	45
8/15/08	68	42
8/17/09	52	36
8/19/09	55	38
8/21/09	54	38
Average	60.4	39.6

Calculation of hardness in the receiving water:

$$Cr = \frac{QdCd + QsCs}{Qr} = \frac{(0.9096 \text{ cfs})(60.4 \text{ mg/l}) + (0.5838 \text{ cfs})(39.6 \text{ mg/l})}{(0.5838 \text{ cfs} + 0.9096 \text{ cfs})} = 52.3 \text{ mg/l}$$

Where:

Qs = 7Q10 river stream flow upstream of plant = 0.5838 cfs
Qd = Design discharge flow from plant = 0.588 MGD = 0.9096 cfs
Qr = Combined stream flow (7Q10 + plant flow) = (0.5838 + 0.9096) = 1.4934 cfs
Cs = Upstream hardness concentration = 39.6 mg/l as $CaCo_3$
Cd = Plant discharge hardness concentration = 60.4 mg/l as $CaCo_3$
Cr = Receiving water hardness concentration

Therefore, a hardness of 52.3 mg/l as $CaCo_3$ was used to calculate the water quality criteria for certain metals. The water quality criteria formulas are found in Appendix B of EPA's National Recommended Water Quality Criteria – 2006:

1. Acute Criteria $_{(Dissolved)} = \exp\{m_a[\ln(h)]+b_a\}(CF)$[1]

[1] EPA Metal Translator Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criteria (EPA-823-B96-007) was used as the basis for the use of the criteria conversion factor (CF). National Guidance requires that permit limits for metals are to be expressed in terms of total recoverable metal and not dissolved metal. As such, conversion factors are used to develop total recoverable limits from dissolved criteria. The conversion factor reflects how the discharge of a particular metal partitions between the particulate and dissolved form after mixing with the receiving water. In the absence of site-specific data describing how a particular discharge partitions in the receiving water, a default assumption equivalent to the criteria conversion factor is used in accordance with the Metal Translator Guidance.

Where:

m_a = Pollutant-specific coefficient
b_a = Pollutant-specific coefficient
ln = Natural logarithm
h = Hardness of the receiving water, expressed in terms of mg/l $CaCo_3$
CF = Pollutant-specific conversion factor used to convert total recoverable metals to dissolved metal

2. Chronic Criteria $_{(Dissolved)} = \exp\{m_c[\ln(h)]+b_c\}(CF)$

Where:

m_c = Pollutant-specific coefficient
b_c = Pollutant-specific coefficient
ln = Natural logarithm
h = Hardness of the receiving water, expressed in terms of mg/l $CaCo_3$
CF = Pollutant-specific conversion factor used to convert total recoverable metals to dissolved metal

Table 3. Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness Dependent

					Freshwater Conversion Factors (CF)	
Chemical	m_A	b_A	m_c	b_c	CMC	CCC
Cadmium	1.0166	-3.924	0.7409	-4.719	1.136672-[(ln hardness)(0.041838)]	1.101672-[(ln hardness)(0.041838)]
Copper	0.9422	-1.700	0.8545	-1.702	0.960	0.960
Lead	1.273	-1.460	1.273	-4.705	1.46203-[(ln hardness)(0.145712)]	1.46203-[(ln hardness)(0.145712)]
Nickel	0.8460	2.255	0.8460	0.0584	0.998	0.997
Zinc	0.8473	0.884	0.8473	0.884	0.978	0.986

The dissolved acute and chronic criteria and total recoverable maximum daily and average limits are listed on the summary table below.

Metals Criteria and Limits

In order to determine the reasonable potential to cause or contribute to exceedances of the metals criteria in the Mill River, metals data submitted with the toxicity test reports from October 2009 through May 2011 and DMRs from October 2009 through April 2010 were evaluated against potential water quality based effluent limits based on the respective water quality criteria for each metal. The table below summarizes the criteria, potential water quality based limits, and discharge quality for six trace metals (aluminum, copper, cadmium, lead, nickel, and zinc) that are commonly present in the effluent of POTWs.

Table 4. Summary of Reasonable Potential Analysis for Selected Trace Metals

Metal	Acute Criterion, Dissolved (ug/l)	Chronic Criterion, Dissolved (ug/l)	Maximum Daily Limit, Total (ug/l)	Average Monthly Limit, Total (ug/l)	Effluent	
					Range (ug/l)	Number of Exceedances
Aluminum	750	87	1199	111	56 – 1000	13
Copper	7.3	5.15	11.82	8.14	7 – 53	21
Cadmium	1.08	0.16	1.81	0.28	< 0.5 (bdl)	0
Lead	32.13	1.4	58	1.85	< bdl – 0.7	0
Nickel	270.6	30.1	444.7	49.5	< bdl - 2	0
Zinc	67.7	68.2	109.45	109.41	19 - 31	0

Copper

The current permit includes monthly average and daily maximum copper limits of 5.0 ug/l and 7.0 ug/l, respectively. These limits were calculated using the 1998 National Recommended Water Quality Criteria for copper using a hardness of 25 mg/l as $CaCO_3$ and a dilution factor of 1.8. However, a letter from EPA's Office of Water – Office of Science and Water Technology dated July 7, 2000 stated that: "The hardness of water containing the discharged toxic metal should be used for determining the applicable criterion." Therefore, since the downstream hardness should be used, the hardness of the Mill River downstream of the treatment plant was calculated based on ambient and effluent hardness data collected from the August 2006, 2007, 2008, and 2009 whole effluent toxicity tests.

The Massachusetts Surface Water Quality Standards were revised in December 2006 to include site-specific criteria that were developed for receiving waters where national criteria are invalid due to site-specific physical, chemical, or biological considerations, and do not exceed the safe exposure levels determined by toxicity testing (314 CMR 4.06(7) Table 28). EPA approved these criteria on March 26, 2007. The MassDEP has adopted an acute dissolved copper criterion of 25.7 ug/l and a chronic dissolved criterion of 18.1 ug/l for several rivers, and river segments, in Massachusetts. The MassDEP has not adopted site-specific copper criteria for the Mill River. If the MassDEP adopts new criteria for the effluent's receiving water, and if EPA approves, the permit may be re-opened and modified in order to reflect this change.

Calculations for Copper Limits:

The available instream data was evaluated to determine the background concentration of copper in the Mill River upstream of the treatment plant discharge. This data, from the WET test dilution water samples, is shown below:

Table 5. Mill River upstream of the Hopedale WWTF Copper Concentrations

Date	Upstream Copper Concentration, mg/l
8/11/08	0.002
11/3/08	bdl
11/1/10	bdl
8/8/11	bdl
11/14/11	bdl
Average	0.0012
Median	0.001

Note: "bdl" means below detection level. When calculating the average values within this document, half the quantifiable limit was used for "bdl" values.

Acute and Chronic Dissolved Criteria Calculations:

CMC = Acute copper criteria (dissolved) = exp{0.9422 [ln 52.3)] - 1.7}(0.96) = 7.30 ug/l
CCC = Chronic copper criteria (dissolved) = exp{0.85452 [ln 52.3)] - 1.702}(0.96) = 5.15 ug/l

Calculation With Background Copper:

$\{(Qs + Qd) * C_{WQ} – (Qs * Cs)\} / Qd = Cd$

Where:
Qs = 7Q10 flow of Mill River at the point of discharge = 0.5838 cfs
Qd = Design flow of the Hopedale WWTF = 0.9096 cfs
C_{WQ} = In-stream water quality criteria = 7.3 ug/l (acute dissolved criteria)
C_{WQ} = In-stream water quality criteria = 5.15 ug/l (chronic dissolved criteria)
C_S = In-stream copper concentration located upstream of the discharge = 1 ug/l
Cd = Copper concentration limit for the Hopedale WWTF

Acute:
{(0.5838 + 0.9096) * 7.30 – (0.5838 * 1)} / 0.9096 = 11.34 ug/l (dissolved)
(10.7 / 0.96 converts Cu acute dissolved to total recoverable) = 11.15 ug/l total recoverable limit

Chronic:
{(0.5838 + 0.9096) * 5.15 – (0.5838 * 1)} / 0.9096 = 7.17 ug/l (dissolved)
(7.17 / 0.96 converts Cu chronic dissolved to t. recoverable) = 7.47 ug/l total recoverable limit

These limitations are less stringent than the limits in the current permit. A review of monthly discharge monitoring reports (DMRs) submitted by the permittee from October 2009 to April 2010 found concentrations of copper in the effluent ranging from a minimum of 10 ug/l to a maximum of 22 ug/l, and a review WET test reports submitted by the permittee from October 2009 to May 2011 found concentrations of copper in the effluent ranging from a minimum of 7 ug/l to a maximum of 53 ug/l (see **Attachment A**). Since the facility's discharge data indicates that the facility has a reasonable potential to cause or contribute to a violation of the calculated allowable acute and chronic concentration values, effluent limitations for copper are proposed in the draft permit. The proposed copper limitations, based on the calculations above, are less stringent than the existing limits, but are in accordance with the state's antidegradation policy, because the receiving water will meet water quality standards and will not cause any adverse impact to the existing uses.

Lead

The current permit does not include lead limits.

Calculations for Lead Limits:

The available instream data was evaluated to determine the background concentration of lead in the Mill River upstream of the treatment plant discharge. This data, from the WET test dilution water samples, is shown below:

Table 6. Mill River upstream of the Hopedale WWTF Lead Concentrations

Date	Upstream Lead Concentration, mg/l
8/11/08	0.003
11/3/08	---
11/1/10	0.001
8/8/11	0.001
11/14/11	0.0007
Average	0.001
Median	---

Acute and Chronic Dissolved Criteria Calculations:

CMC = Acute lead criteria (dissolved) = exp{1.273 [ln (52.3)] - 1.460}(0.898) = 32.13 ug/l
CCC = Chronic lead criteria (dissolved) = exp{1.273 [ln (52.3)] - 4.702}(0.898) = 1.4 ug/l

Calculation With Background Lead:

$\{(Qs + Qd) * C_{WQ} – (Qs * Cs)\} / Qd = Cd$

Where:
Qs = 7Q10 flow of Mill River at the point of discharge = 0.5838 cfs
Qd = Design flow of the Hopedale WWTF = 0.9096 cfs
C_{WQ} = In-stream water quality criteria = 32.13 ug/l (acute dissolved criteria)
C_{WQ} = In-stream water quality criteria = 1.4 ug/l (chronic dissolved criteria)
Cs = In-stream lead concentration located upstream of the discharge = 1 ug/l
Cd = Lead concentration limit for the Hopedale WWTF

Acute:
{(0.5838 + 0.9096) * 32.13 – (0.5838 * 1)} / 0.9096 = 52.11 ug/l (dissolved)
(52.11/ 0.898 converts Pb acute dissolved to total recoverable) = 58 ug/l total recoverable limit

Chronic:
{(0.5838 + 0.9096) * 1.4 – (0.5838 * 1)} / 0.9096 = 1.66 ug/l (dissolved)
(1.66 / 0.898 converts Pb chronic dissolved to t. recoverable) = 1.85 ug/l total recoverable limit

A review of WET test reports submitted by the permittee from October 2009 to May 2011 showed concentrations of lead in the effluent ranging from not being detected to a maximum of 0.7 ug/l (see **Attachment A**). Since the facility's discharge data indicates that the facility does not have a reasonable potential to cause or contribute to a violation of the calculated allowable acute or chronic concentration values, limitations and monitoring requirements are not proposed in the draft permit. The permittee will continue to monitor lead as part of their whole effluent toxicity (WET) testing.

Nickel

The current permit does not include nickel limits.

Calculations for Nickel Limits:

The available instream data was evaluated to determine the background concentration of nickel in the Mill River upstream of the treatment plant discharge. This data, from the WET test dilution water samples, is shown below:

Table 7. Mill River upstream of the Hopedale WWTF Nickel Concentrations

Date	Upstream Nickel Concentration, mg/l
8/11/08	<0.002
11/3/08	<0.002
11/1/10	<0.002
8/8/11	<0.002
11/14/11	<0.002
Average	Below detection level
Median	Below detection level

Acute and Chronic Dissolved Criteria Calculations:

CMC = Acute nickel criteria (dissolved) = exp{0.8460 [ln(52.3)] + 2.255}(0.998) = 270.6 ug/l
CCC = Chronic nickel criteria (dissolved) = exp{0.8460 [ln(52.3)] + 0.0584}(0.997) = 30.1 ug/l

Calculation Without Background Nickel (since the background level was below detection):

Maximum Daily Effluent Limitation:
(CMC)(dilution factor) = (270.6)(1.64) = 443.78 ug/l (dissolved)
Total recoverable limit = 443.78 / (0.998) = 444.67 ug/l

Monthly Average Effluent limitation:
(CCC)(dilution factor) = (30.1)(1.64) = 49.36 ug/l (dissolved)
Total recoverable limit = 49.36 / (0.997) = 49.5 ug/l

A review of WET test reports submitted by the permittee from October 2009 to May 2011 showed concentrations of nickel in the effluent ranging from not being detected to a maximum of 2 ug/l (see **Attachment A**). Since the facility's discharge data indicates that the facility does not have a reasonable potential to cause or contribute to a violation of the calculated allowable acute or chronic concentration values, limitations and monitoring requirements are not proposed in the draft permit. The permittee will continue to monitor nickel as part of their whole effluent toxicity (WET) testing.

Cadmium

The current permit does not include cadmium limits.

Calculations for Cadmium Limits:

The available instream data collected during the low flow season was evaluated to determine the background concentration of cadmium in the Mill River upstream of the treatment plant discharge. This data, from the WET test dilution water samples, is shown below:

Table 8. Mill River upstream of the Hopedale WWTF Cadmium Concentrations

Date	Upstream Cadmium Concentration, mg/l
8/11/08	-0.0005
11/3/08	-0.0005
11/1/10	-0.0005
8/8/11	-0.0005
11/14/11	-0.0005
Average	Below detection level
Median	Below detection level

Acute and Chronic Dissolved Criteria Calculations:

CMC = Acute cadmium criteria (dissolved) = exp{1.0166 [ln(52.3)] - 3.924}(0.976) = 1.08 ug/l
CCC = Chronic cadmium criteria (dissolved) = exp{0.7409 [ln(52.3)] - 4.72}(0.941) = 0.16 ug/l

Calculation Without Background Cadmium (since the background level was below detection):

Maximum Daily Effluent limitations:
(CMC)(dilution factor) = (1.08)(1.64) = 1.77 ug/l (dissolved)
Total recoverable limit = 1.77 / (0.976) = 1.81 ug/l

Monthly Average Effluent limitations:
(CCC)(dilution factor) = (0.16)(1.64) = 0.26 ug/l (dissolved)
Total recoverable limit = 0.26 / (0.941) = 0.28 ug/l

A review of WET test reports submitted by the permittee from October 2009 to May 2011 showed concentrations of cadmium in the effluent not being detected (see **Attachment A**). Since the facility's discharge data indicates that the facility does not have a reasonable potential to cause or contribute to a violation of the calculated allowable acute or chronic concentration values, limitations and monitoring requirements are not proposed in the draft permit. The permittee will continue to monitor cadmium as part of their whole effluent toxicity (WET) testing.

Zinc

The current permit does not include zinc limits.
Calculations for Zinc Limits:

The available instream data collected during the low flow season was evaluated to determine the background concentration of zinc in the Mill River upstream of the treatment plant discharge. This data, from the WET test dilution water samples, is shown below:

Table 9. Mill River upstream of the Hopedale WWTF Zinc Concentrations

Date	Upstream Zinc Concentration, mg/l
8/17/09	0.011
11/09/09	0.004
11/1/10	0.012
8/8/11	0.003
11/14/11	0.002
Average	0.0064
Median	---

Acute and Chronic Dissolved Criteria Calculations:

CMC = Acute zinc criteria (dissolved) = exp{0.8473 [ln(52.3)] + 0.8847}(0.978) = 67.7 ug/l
CCC = Chronic zinc criteria (dissolved) = exp{0.8473 [ln(52.3)] + 0.884}(0.986) = 68.21 ug/l

Calculation With Background Zinc:

$\{(Qs + Qd) * C_{WQ} – (Qs * Cs)\} / Qd = Cd$

Where:
Qs = 7Q10 flow of Mill River at the point of discharge = 0.5838 cfs
Qd = Design flow of the Hopedale WWTF = 0.9096 cfs
C_{WQ} = In-stream water quality criteria = 67.7 ug/l (acute dissolved criteria)
C_{WQ} = In-stream water quality criteria = 68.21 ug/l (chronic dissolved criteria)
Cs = In-stream zinc concentration located upstream of the discharge = 6.4 ug/l
Cd = Zinc concentration limit for the Hopedale WWTF

Acute:
{(0.5838 + 0.9096) * 67.7 – (0.5838 * 6.4)} / 0.9096 = 107.04 ug/l (dissolved)
(107.04 /0.978 converts Zn acute dissolved to total recoverable) = 109.4 ug/l total recoverable limit

Chronic:
{(0.5838 + 0.9096) * 68.21 – (0.5838 * 6.4)} / 0.9096 = 107.88 ug/l (dissolved)
(107.88 / 0.986 converts Zn chronic dissolved to t. recoverable) = 109.4 ug/l total recoverable limit

A review of WET test reports submitted by the permittee from October 2009 to May 2011 showed concentrations of zinc in the effluent ranging from 19 ug/l to a maximum of 31 ug/l (see **Attachment A**). Since the facility's discharge data indicates that the facility does not have a reasonable potential to cause or contribute to a violation of the calculated allowable acute or chronic concentration values, limitations and monitoring requirements are not proposed in the draft permit. The permittee will continue to monitor zinc as part of their whole effluent toxicity (WET) testing.

Aluminum

The current permit includes a once per month reporting requirement, without numerical limits.

Sample Calculations for Aluminum Limits:

The available instream data collected during the low flow season was evaluated to determine the background concentration of cadmium in the Mill River upstream of the treatment plant discharge. This data, from the WET test dilution water samples, is shown below:

Table 10. Mill River upstream of the Hopedale WWTF Aluminum Concentrations

Date	Upstream Aluminum Concentration, mg/l
8/11/08	0.09
11/3/08	0.03
11/1/10	0.045
8/8/11	0.031
Average	0.05
Median	---

Acute and Chronic Dissolved Criteria Calculations:

The aluminum criteria is expressed in terms of total recoverable metal in the water column but is not hardness-dependent. The following criteria from the EPA 2002 National Recommended Water Quality Criteria were used in the calculation of permissible effluent concentrations of aluminum:

CMC = Acute aluminum criteria = 750 ug/l
CCC = Chronic aluminum criteria= 87 ug/l

Calculation With Background Aluminum:

$\{(Qs + Qd) * C_{WQ} - (Qs * Cs)\} / Qd = Cd$

Where:
Qs = 7Q10 flow of Mill River at the point of discharge = 0.5838 cfs
Qd = Design flow of the Hopedale WWTF = 0.9096 cfs
C_{WQ} = In-stream water quality criteria = 750 ug/l (acute)
C_{WQ} = In-stream water quality criteria = 87 ug/l (chronic)
Cs = In-stream aluminum concentration located upstream of the discharge = 50 ug/l
Cd = Aluminum concentration limit for the Hopedale WWTF

Maximum Daily Effluent limitation:
Total recoverable acute limit ={(0.5838 + 0.9096) * 750 – (0.5838 * 50)} / 0.9096 = 1199 ug/l

Monthly Average Effluent limitations:
Total recoverable chronic limit ={(0.5838 + 0.9096) * 87 – (0.5838 * 50)} / 0.9096 = 111 ug/l

A review of monthly discharge monitoring reports (DMRs) submitted by the permittee from October 2009 to April 2010 showed monthly average effluent concentrations of aluminum ranging from not being detected to a maximum of 1.0 mg/l. A review of WET test reports submitted by the permittee from October 2009 to May 2011 showed concentrations of aluminum in the effluent ranging from 56 ug/l to a maximum of 680 ug/l (see **Attachment A**). Since the facility's discharge data indicates that the facility exceeded the proposed chronic limitation and has a reasonable potential to cause or contribute to a violation of the calculated allowable acute concentration value, limitations and monitoring requirements are proposed in the draft permit. The permittee will also continue to monitor aluminum as part of their whole effluent toxicity (WET) testing.

The draft permit allows a reasonable period of time for the facility to begin meeting the new aluminum limits. During the first three years of the permit, the permittee is required to monitor the effluent and work towards attaining the limits. If the limits can be achieved in three years with the current treatment facility upgrades (with expected improvements from the new water treatment facility) the aluminum limits will become effective three years and two months from the effective date of the permit. If the new limits have not been achieved after three years, any necessary improvements to the treatment facility must be made and the new limits achieved before the permit expires (five years from the effective date).

e. Whole Effluent Toxicity

Under Section 301(b)(1)(C) of the CWA, discharges are subject to effluent limitations based on water quality standards. The Massachusetts State Surface Water Quality Standards, found at 314 CMR § 4.05(5)(e), include the following narrative statements and require that EPA criteria established pursuant to Section 304(a)(1) of the CWA be used as guidance for interpretation of the following narrative criteria:

All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife. For pollutants not otherwise listed in 314 CMR 4.00,the National recommended water quality criteria: 2002, EPA 822-r-02-047, November 2002 published by EPA pursuant to Section 304(a) of the Federal Water Pollution Control Act, are the allowable receiving water concentrations for the affeccted waters, unless the State either establishes a site specific criterion or determines that natually occurring background concentrations are higher. Where the State determines that naturally occurring background concentrations are higher, those concentrations shall be the allowable receiving water concentrations The State may establish site specific criteria for toxic pollutants based on site specific considerations. Site-specific limits, human health risk levels and permit limits will be established in accordance with 314 CMR 4.05(5)(e)(1)(2)(3)(4).

National studies conducted by the EPA have demonstrated that domestic sources, as well as industrial sources, contribute toxic constituents to POTWs. These constituents include metals, chlorinated solvents, aromatic hydrocarbons and others. Based on the potential for toxicity from domestic and industrial contributions, the state narrative water quality criterion, the level of dilution at the discharge location, and in accordance with EPA national and regional policy and 40 CFR § 122.44(d), the draft permit includes a whole effluent acute toxicity (lethal concentration to 50% of the test organisms, or LC_{50}) limitation and a chronic toxicity (no observed effluent concentration, or C-NOEC) monitoring requirement. (See also: *Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants*, 49 Fed. Reg. 9016, March 9, 1984, and EPA's *Technical Support Document for Water Quality-Based Toxics Control*, September, 1991.)

The MassDEP's Division of Watershed Management has a current toxics policy which requires toxicity testing for all major dischargers such as the Hopedale WWTF (*Implementation Policy for the Control of Toxic Pollutants in Surface Waters*, MassDEP 1990). In addition, EPA feels that toxicity testing is required to assure that the synergistic effect of the pollutants in the discharge does not cause toxicity, even though the pollutants may be at low concentrations in the effluent. The inclusion of whole effluent toxicity limitations in the draft permit will assure that the Hopedale WWTF does not discharge combinations of toxic compounds into the Mill River in amounts which would affect aquatic or human life.

Pursuant to EPA Region I Policy, and MassDEP's *Implementation Policy for the Control of Toxic Pollutants in Surface Waters* (February 1990), dischargers having a dilution factor less than 10 are required to conduct acute and chronic toxicity testing four times per year unless there are passing results over an extended period of time. In accordance with the above guidance, the draft permit includes an acute toxicity limit (LC_{50} of $\geq$ 100%) and a chronic toxicity limit (C-NOEC of $\geq$ 61 %). The permittee shall conduct the modified acute and chronic toxicity tests using the daphnid, *Ceriodaphnia dubia* (*C. dubia*), as the test species. Toxicity testing must be performed in accordance with the EPA Region I test procedures and protocols specified in **Attachment B** of the draft permit (Freshwater Chronic Toxicity Procedure and Protocol), and the tests will be conducted four times a year. EPA and the MassDEP may use the results of the toxicity tests and chemical analyses conducted by the permittee, required by the permit, as well as national water quality criteria, state water quality criteria, and any other appropriate information or data, to develop numerical effluent limitations for any pollutants.

The C-NOEC calculations are as follows: (1/dilution factor * 100) = (1/1.64 * 100) = 61 percent

VI. SLUDGE CONDITIONS

Section 405(d) of the Clean Water Act requires that EPA develop technical standards regarding the use and disposal of sewage sludge. On February 19, 1993, EPA promulgated technical standards. These standards are required to be implemented through permits. The conditions in the permit satisfy this requirement.

VII. INFILTRATION/INFLOW (I/I)

Infiltration is groundwater that enters the collection system through physical defects such as cracked pipes or deteriorated joints. Inflow is extraneous flow that enters the collection system through point sources such as roof leaders, yard and area drains, sump pumps, manhole covers, tide gates, and cross connections from storm water systems. Significant I/I in a collection system may displace sanitary flow, reducing the capacity and the efficiency of the treatment works and may cause bypasses of secondary treatment. It greatly increases the potential for sanitary sewer overflows (SSO) in separate systems, and combined sewer overflows (CSO) in combined systems.

The draft permit includes a requirement for the permittee to control infiltration and inflow (I/I) within the sewer collection system it owns and operates. The permittee shall develop an I/I removal program commensurate with the severity of I/I in the collection system. This program may be scaled down in sections of the collection system that have minimal I/I.

VIII. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

The standard permit conditions for "Proper Operation and Maintenance", set forth at 40 C.F.R. §122.41(e), require the proper operation and maintenance of permitted wastewater systems and associated facilities to achieve permit conditions. The requirements at 40 C.F.R. §122.41(d) impose a "duty to mitigate" upon the permittee, which requires that "all reasonable steps be taken to minimize or prevent any discharge violation of the permit which has a reasonable likelihood of adversely affecting human health or the environment". EPA and the MassDEP maintain that an I/I removal program is an integral component to ensuring compliance with the requirements of the permit under the provisions at 40 C.F.R. §122.41(d) and (e).

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

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 essential fish habitat," (16 U.S.C. § 1855(b)).

The Amendments broadly define "essential fish habitat" (EFH) as: "waters and substrate necessary to fish for spawning, breeding, or growth to maturity," (16 U.S.C. § 1802(10)). "Adverse impact" means any impact which reduces the quality and/or quantity of EFH (50 CFR § 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 of 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. The Mill River is not covered by the EFH designation for riverine systems and thus EPA and the MassDEP have determined that a formal consultation with NMFS is not required.

X. ENDANGERED SPECIES ACT (ESA)

Section 7(a) of the Endangered Species Act (ESA) of 1973, as amended (the "Act"), grants authority to and imposes requirements upon Federal agencies regarding threatened or endangered species of fish, wildlife, or plants ("listed species") and habitat of such species that have been designated as critical ("critical habitat").

Section 7(a)(2) of the CWA requires every Federal agency in consultation with and with the assistance of the Secretary of the 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 NMFS administers Section 7 consultations for freshwater species. EPA has reviewed the federal endangered or threatened species of fish and wildlife to determine if any listed species might potentially be impacted by the re-issuance of this NPDES permit. The review revealed that there are no known federally listed threatened or endangered species or their critical habitat within the vicinity of the Hopedale discharge and, therefore, a formal ESA consultation will not be required for this discharge.

The permittee should contact the State regarding a Massachusetts Natural Heritage and Endangered Species Program (NHESP) review. According to the NHESP website, there are no threatened or endangered species listed for the Town of Hopedale, MA. However, the American Brook Lamprey (*Lampetra appendix*) and the Blanding's Turtle (*Emydoidea blandingii*) were listed as threatened endangered species within the Town of Mendon, MA, located downstream of the Hopedale WWTF.

XI. MONITORING AND REPORTING

The permittee is obligated to monitor and report sampling results to EPA and the MassDEP within the time specified within the permit. Timely reporting is essential for the regulatory agencies to expeditiously assess compliance with permit conditions.

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.

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" requests 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 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.

XII. STATE PERMIT CONDITIONS

The NPDES Permit is issued jointly by the U. S. Environmental Protection Agency and the Massachusetts Department of Environmental Protection under federal and state law, respectively. As such, all the terms and conditions of the permit are, therefore, incorporated into and constitute a discharge permit issued by the Director of the Division of Watershed Management pursuant to M.G.L. Chap. 21, §43.

XIII. GENERAL CONDITIONS

The general conditions of the permit are based on 40 C.F.R. §122, Subparts A and D and 40 C.F.R. §124, Subparts A, D, E, and F and are consistent with management requirements common to other permits.

XIV. STATE CERTIFICATION REQUIREMENTS

The staff of the MassDEP has reviewed the draft permit. EPA has requested permit certification by the State pursuant to CWA §401(a)(1) and 40 C.F.R. §124.53 and expects that the draft permit will be certified.

XV. PUBLIC COMMENT PERMIT, PUBLIC HEARING, AND PROCEDURES FOR FINAL DECISION

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full before the close of the public comment period, to the U.S.EPA, Office of Ecosystem Protection, Municipal Permits Unit (OEP06-1), 5 Post Office Square, Suite 100, Boston, MA 02109-3912. Any person, prior to such date, may submit a request in writing to EPA and the state agency for a public hearing to consider the draft permit. Such requests shall state the nature of the issues proposed to be raised in the hearing. In reaching a final decision on the draft permit, the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston office.

Following the close of the comment period, and after a public hearing, if such a hearing is held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice. Permits may be appealed to the Environmental Appeals Board in the manner described at 40 CFR § 124.19.

XVI. EPA AND MassDEP CONTACTS

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

Janet Deshais
Chemical/Environmental Engineer
U.S. Environmental Protection Agency
Office of Ecosystem Protection (OEP06-1)

5 Post Office Square, Suite 100
Boston, MA 02109 - 3912

Telephone: (617) 918-1667
E-mail: deshais.janet@epa.gov

Claire Golden
Environmental Engineer
Bureau of Resource Protection
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205B Lowell Street
Wilmington, MA 01887
Telephone: (978) 694-3244
E-mail: claire.golden@state.ma.us

Date: _____

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

*Please address all comments to Janet Deshais and Claire Golden at the addresses above.

ATTACHMENT A
EFFLUENT MONITORING DATA
NPDES Permit No. MA0102202
HOPEDALE, MA

DESCRIPTION OF DISCHARGE: Advanced Secondary Wastewater Treatment Plant Effluent

DISCHARGE: Outfall 001 (The receiving water is the Mill River.)

The discharge monthly reports for monthly average and daily maximum values listed below, were reported from February 2007 to April 2010 unless otherwise indicated.

EFFLUENT CHARACTERISTICS AT THE POINT OF DISCHARGE:

Parameter	Monthly Average (range)	Weekly Average (range)	Daily Maximum
Flow, MGD (annual average)	0.25 - 1.08	-----	-----
BOD, mg/l (June 1 – Oct 31)	2.0 – 32	3.0 - 15	3.0 - 55
BOD, mg/l (Nov 1 – May 31)	2.0 - 102	7.0 - 32	7.0 - 32
BOD, lb/day (June 1 – Oct 31)	9.5 - 99	13.9 - 470	13.9 - 470
BOD, lb/day (Nov 1 – May 31)	18.0 - 107	22 - 169	22- 238
TSS, mg/l (June 1 – Oct 31)	6.0 - 34	8.0 - 53	8.0 - 53
TSS, mg/l (Nov 1 – May 31)	4.0 - 27	6.0 - 55	6.0 - 159.38
TSS, lb/day (Nov 1 – May 31)	19 - 104	23 - 159.38	13.6 - 818
TSS, lb/day (June 1 – Oct 31)	13.5 - 200	18 - 818	16.7 - 159.38
pH, standard units	6.54 – 8.2 (range)		
Dissolved Oxygen, mg/l	6.4 – 8.8 (range)		
Total Fecal Coliform, cfu/100 ml	1.0 – 153 (monthly geometric mean, range)		3.0 - 194
Total Phosphorus, mg/l (Apr 1–Oct 31)	0.32 – 1.0	0.5 – 1.0	0.5 – 1.4
Total Nitrogen, Ammonia (as N), mg/l			
February 2007 – October 7, 2009 (prior to construction upgrades):			
November 1 – April 30	0.3 – 20	-----	0.7 – 24
May	3.0 – 20	8.0 – 24	8.0 – 24
June 1 – October 31	0.2 – 5	0.4 – 8	0.4 – 8
October 8, 2009 – October 31, 2010 (after construction upgrades were fully functioning):			
November 1 – April 30	0 – 5	-----	0 – 8
May	4.0	6.0	6.0
June 1 – October 31	0 – 0.2	0 – 0.4	0 – 0.4
Aluminum, mg/l	0 – 1	-----	0 – 1
Copper, ug/l	8 – 69	-----	8 – 69

Whole Effluent Toxicity (WET) Tests submitted by the permittee (March 2006 – November 2011):
LC_{50} (Ceriodaphnia dubia) $\geq$ 100% (24 tests)
NOEL (Ceriodaphnia dubia) $\geq$ 100% (11 tests), $\geq$ 57% (1 test), $\geq$ 50% (3 tests), $\geq$ 12.5% (3 tests), $\geq$ 6.25% (2 tests)

ATTACHMENT A, Continued;

Metals Chemistry Effluent Data
August 2006 – November 2008 (monthly average range, prior to construction upgrades):

Aluminum, ug/l	0 – 58
Copper, ug/l	13 – 51
Lead, ug/l	0 – 7
Zinc, ug/l	29 – 62
Nickel, ug/l	0 – 9
Cadmium, ug/l	bdl

Metals Chemistry Effluent Data
October 8, 2009 – May 16, 2011 (monthly average range, after construction upgrades were fully functioning):

Aluminum, ug/l	56 – 680
Copper, ug/l	7 – 19
Lead, ug/l	bdl – 0.7
Zinc, ug/l	19 – 31
Nickel, ug/l	bdl – 2
Cadmium, ug/l	bdl

Effluent Chemistry WET Data, mg/l:

Parameter	8/07/06	11/13/06	2/26/07	5/07/07	8/13/07	11/5/07	2/25/08	3/17/08	6/09/08
Aluminum	bdl	0.021	bdl	bdl	bdl	bdl	0.03	0.058	bdl
Copper	0.036	0.043	0.036	0.027	0.02	0.013	0.031	0.036	0.023
Lead	bdl	bdl	bdl	bdl	bdl	bdl	0.0007	bdl	bdl
Zinc	0.036	0.047	0.056	0.048	0.029	0.032	0.049	0.054	0.056
Nickel	0.009	0.006	bdl	bdl	bdl	bdl	---	bdl	bdl
Cadmium	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl

Parameter	8/11/08	11/03/08	2/02/09	5/04/09	8/17/09	11/09/09	5/03/10
Aluminum	0.03	0.03	0.05	0.01	0.02	0.24	0.52
Copper	0.016	0.023	0.053	0.015	0.024	0.01	0.014
Lead	bdl	bdl	bdl	bdl	bdl	bdl	bdl
Zinc	---	---	0.044	0.014	0.017	0.014	0.028
Nickel	0.004	0.002	0.003	0.003	0.005	0.002	0.002
Cadmium	bdl	bdl	bdl	bdl	bdl	bdl	bdl

Effluent Chemistry WET Data, mg/l (after construction upgrades were fully functioning):

Parameter	2/01/10	5/03/10	7/26/10	11/01/10	2/28/11	5/16/11
Aluminum	0.056	0.52	0.14	0.67	0.35	0.68
Copper	0.019	0.014	0.01	0.011	0.007	0.013
Lead	bdl	bdl	0.0006	0.0007	bdl	0.0006
Zinc	0.019	0.028	0.019	0.031	---	0.022
Nickel	0.002	0.002	bdl	0.002	0.002	0.002
Cadmium	bdl	bdl	bdl	bdl	bdl	bdl

ATTACHMENT A, Continued;

Instream Chemistry WET Data, mg/l (located upstream of the Hopedale WWTF):

Parameter	Quantifiable Limit, mg/l	8/13/08	11/6/08	2/27/09	5/7/09	8/25/09	11/12/09	2/4/10	5/11/10
Aluminum	0.02	0.09	0.03	0.07	0.06	0.075	0.04	bdl	0.072
Copper	0.002	0.002	bdl	0.003	0.002	bdl	0.002	0.01	0.014
Lead	0.0005	0.003	0.0007	bdl	0.001	0.0014	0.0007	0.001	0.001
Zinc	0.002	0.008	0.01	0.01	0.008	0.011	0.004	0.005	0.005
Nickel	0.003	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
Cadmium	0.0005	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl

Parameter	7/26/10	11/1/10	2/28/11	5/16/11	8/8/11	11/14/11
Aluminum	0.044	0.045	0.13	0.93	0.031	0.57
Copper	0.004	bdl	bdl	bdl	bdl	bdl
Lead	0.002	0.001	0.001	0.002	0.001	0.0007
Zinc	0.004	0.012	0.008	0.004	0.003	0.002
Nickel	bdl	bdl	bdl	bdl	bdl	bdl
Cadmium	bdl	bdl	bdl	bdl	bdl	bdl

Average and Median Instream Chemistry WET Data, mg/l (located upstream of the Hopedale WWTF):

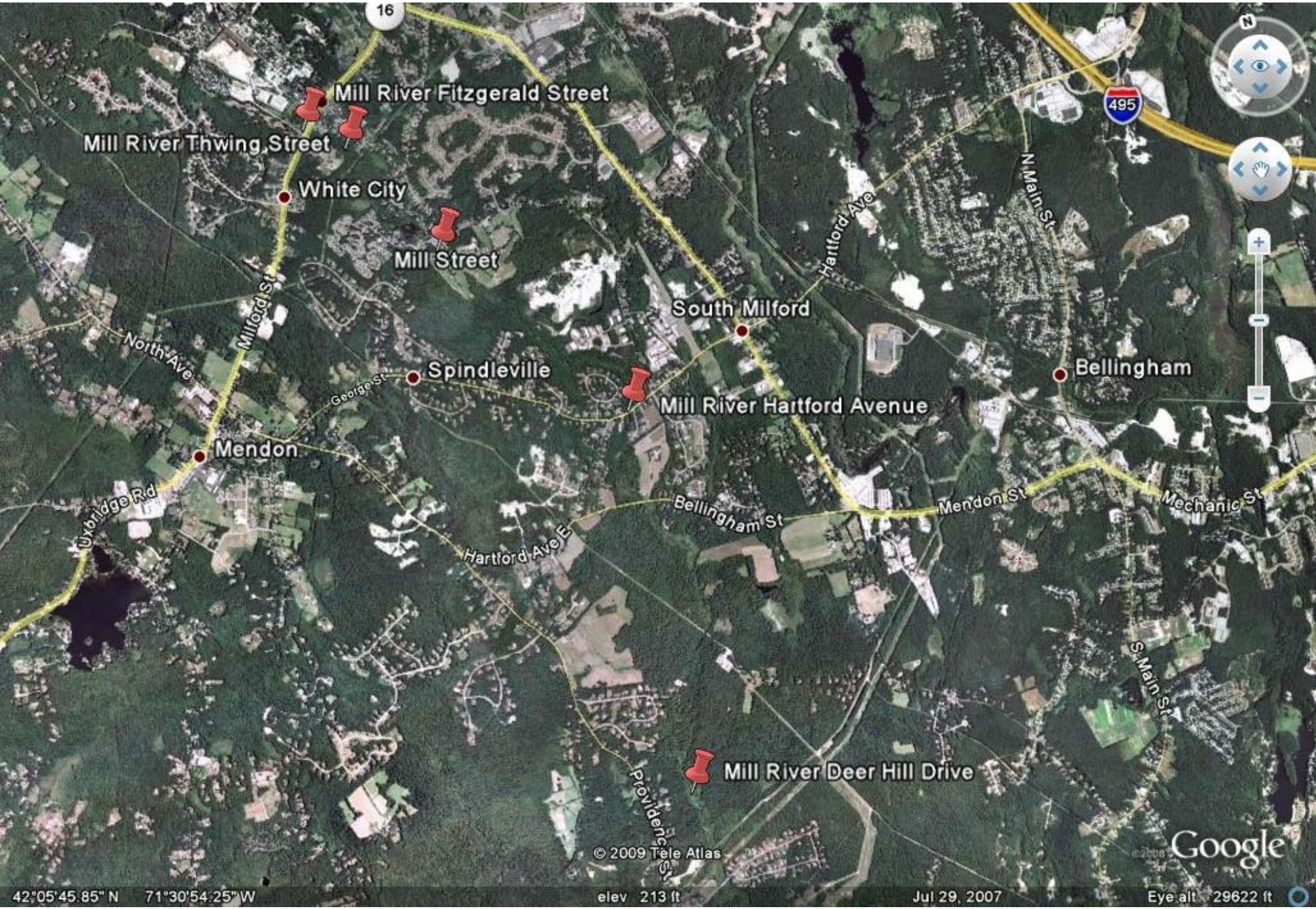
Parameter	Average (8/13/08 – 11/14/11)	Median (8/13/08 – 11/14/11)
Aluminum	0.162	0.065
Copper	0.003	0.002
Lead	0.0012	0.001
Zinc	0.007	0.0065
Nickel	bdl	bdl
Cadmium	bdl	bdl

Note: “bdl” means below detection level. When calculating the average values above, half the quantifiable limit was used for “bdl” values.

ATTACHMENT B
BLACKSTONE RIVER INITIATIVE
VOLUNTEER MONITORING PROGRAM
PHOSPHORUS SAMPLING DATA
NPDES Permit No. MA0102202
HOPEDALE, MA

The following sampling data was collected from the Mill River by the Blackstone River Volunteer Monitoring Program, downstream from the Hopedale Wastewater Treatment Facility. Specifically, the "Mill Street" sampling location is approximately one mile downstream of the Hopedale WWTF's discharge at the outlet of Spindleville Pond, and the "Downstream" sampling location is approximately fifteen (15) feet downstream from the Hopedale WWTF's discharge.

DATE	SAMPLING LOCATION	ORTHOPHOSPHATE AS PHOSPHORUS (mg/l)
5//15/08	Mill Street	0.189
6/22/08	Downstream	0.557
6/22/08	Mill Street	0.124
7/30/08	Downstream	0.401
7/30/08	Mill Street	0.083
8/21/08	Downstream	0.176
8/21/08	Mill Street	0.044
9/23/08	Downstream	0.059
9/23/08	Mill Street	0.065
4/10/10	Mill Street	0.059
5/8/10	Mill Street	0.065
6/12/10	Mill Street	0.033
7/10/10	Mill Street	0.052
8/14/10	Mill Street	0.062
9/11/10	Mill Street	0.062
10/9/10	Mill Street	0.055
11/13/10	Mill Street	0.062


16
Mill River Fitzgerald Street
Mill River Thwing Street
White City
Mill Street
Milford St
North Ave
Spindleville
George St
Mendon
Uxbridge Rd
South Milford
Hartford Ave
N Main St
495
Bellingham
Mill River Hartford Avenue
Bellingham St
Mendon St
Mechanic St
Hartford Ave E
S Main St
Mill River Deer Hill Drive
Providence St
© 2009 Tele Atlas
Google
42°05'45.85" N 71°30'54.25" W
elev 213 ft
Jul 29, 2007
Eye alt 29622 ft

Map Reference: USGS Milford and Blackstone Quads, 1982

TATA & HOWARD INCORPORATED

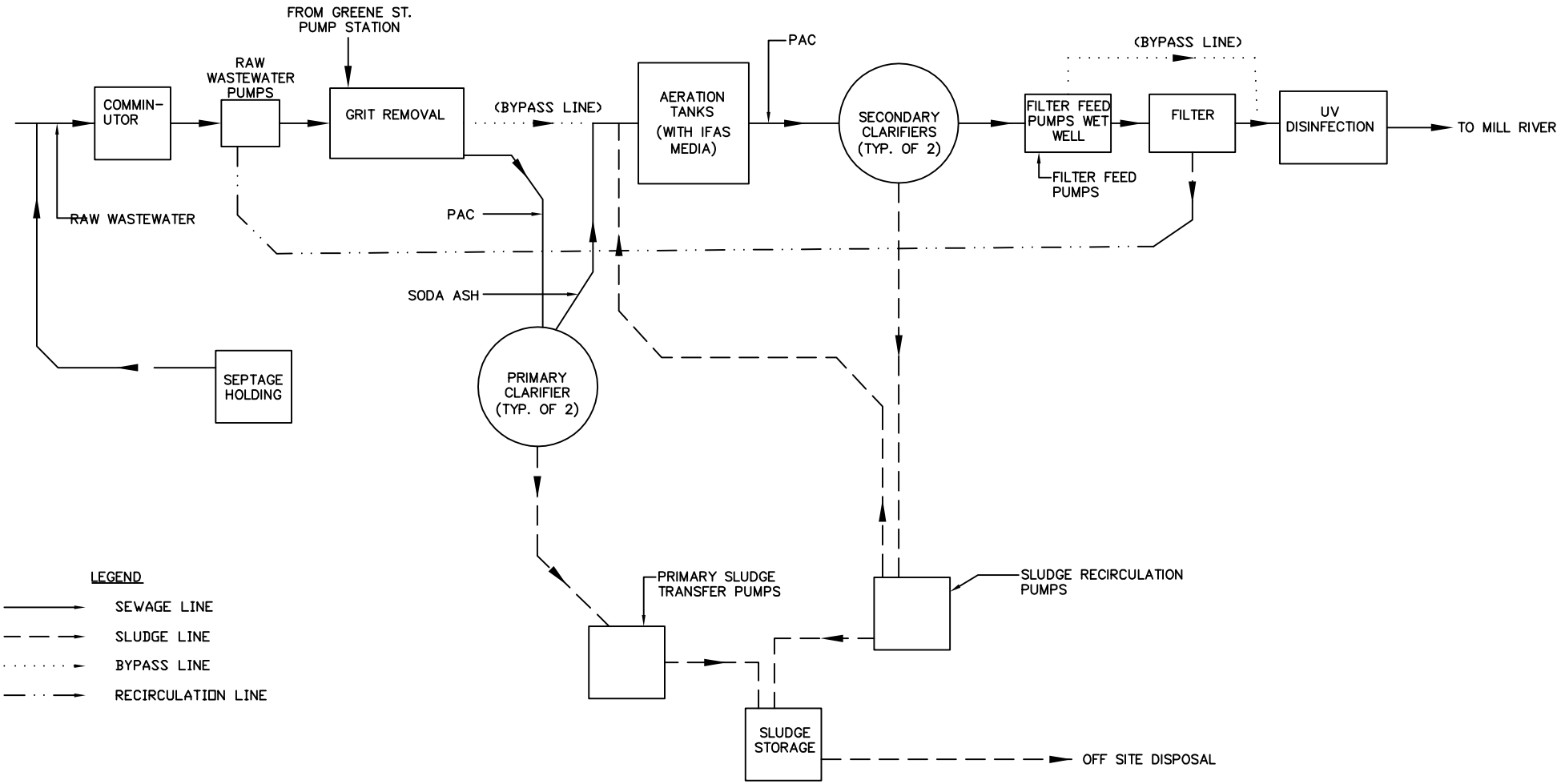
Date: January 2011 Scale: 1:12,000

Locus Map

Operation and Maintenance Manual
Hopedale, Massachusetts

Figure No.

1-1



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Facility Flow Schematic

Operation and Maintenance Manual

Hopedale, Massachusetts

Figure No.

1-2