

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 Billerica

is authorized to discharge from the facility located at

**Billerica Wastewater Treatment Facility
70 Letchworth Avenue
Billerica, MA 01862**

to receiving water named

Concord River (MA82A-08)

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

This permit will become effective on the first day of the calendar month immediately following sixty days after signature.*

This permit expires at midnight, five (5) years from the last day of the month preceding the effective date.

This permit supersedes the permit issued on September 9, 2005.

This permit consists of 17 pages in Part I including effluent limitations and monitoring requirements, 25 pages in Part II including General Conditions and Definitions, Attachment A – 2013 Freshwater Chronic Whole Effluent Toxicity Test Protocol, Attachment B – 2011 Freshwater Acute Whole Effluent Toxicity Test Protocol, Attachment C -- NPDES Permit Requirement for Industrial Pretreatment Annual Report, Attachment D – Reassessment of Technically Based Industrial Discharge Limits and Attachment E – Required Reports.

Signed this 23rd day of April, 2014

/S/SIGNATURE ON FILE

Ken Moraff, Acting Director
Office of Ecosystem Protection
Environmental Protection Agency
Boston, MA

/ S/SIGNATURE ON FILE

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

* Pursuant to 40 CFR 124.15(b)(3), if no comments requesting a change to the draft permit are received, the permit will become effective upon the date of signature.

PART I.

A.2. From the effective date of the permit until expiration, the permittee is authorized to discharge treated effluent from outfall serial number 001 to the Concord River. Such discharges shall be limited and monitored as specified below.							
<u>EFFLUENT CHARACTERISTIC</u>		<u>EFFLUENT LIMITS</u>				<u>MONITORING REQUIREMENTS</u> ³	
<u>PARAMETER</u>	<u>AVERAGE MONTHLY</u>	<u>AVERAGE WEEKLY</u>	<u>AVERAGE MONTHLY</u>	<u>AVERAGE WEEKLY</u>	<u>MAXIMUM DAILY</u>	<u>MEASUREMENT FREQUENCY</u>	<u>SAMPLE TYPE</u>
FLOW ^{2, 14}	*****	*****	5.55 MGD	*****	Report MGD	CONTINUOUS	RECORDER
FLOW ²	*****	*****	Report MGD	*****	*****	CONTINUOUS	RECORDER
BOD ₅ ⁴	1,389 lbs/Day	2,083 lbs/Day	30 mg/L	45 mg/L	Report mg/L	1/WEEK	24-HOUR COMPOSITE ⁵
TSS ⁴	1,389 lbs/Day	2,083 lbs/Day	30 mg/L	45 mg/L	Report mg/L	1/WEEK	24-HOUR COMPOSITE ⁵
pH RANGE ¹	6.5 - 8.3 SU (SEE PERMIT PAGE 5 OF 17, PARAGRAPH I.A.1.b.)					1/DAY	GRAB
TOTAL CHLORINE RESIDUAL ^{1,7}	*****	*****	36 µg/L	*****	63 µg/L	1/DAY	GRAB
ESCHERICHIA COLI ^{1,6}	*****	*****	126 cfu/100 ml	*****	409 cfu/100 ml	3/WEEK	GRAB
DISSOLVED OXYGEN (April 1 st -October 31 st)	NOT LESS THAN 6.0 mg/L					1/DAY	GRAB

CONTINUED FROM PREVIOUS PAGE

A.2. From the effective date of the permit until expiration, the permittee is authorized to discharge from treated effluent from outfall serial number 001 to the Concord River. Such discharges shall be limited and monitored as specified below.							
<u>EFFLUENT CHARACTERISTIC</u>		<u>EFFLUENT LIMITS</u>				<u>MONITORING REQUIREMENTS</u> ³	
<u>PARAMETER</u>	<u>AVERAGE MONTHLY</u>	<u>AVERAGE WEEKLY</u>	<u>AVERAGE MONTHLY</u>	<u>AVERAGE WEEKLY</u>	<u>MAXIMUM DAILY</u>	<u>MEASUREMENT FREQUENCY</u>	<u>SAMPLE TYPE</u>
AMMONIA-NITROGEN (May 1 – October 31)	278 lbs/day	278 lbs/day	6 mg/L	6 mg/L	9 mg/L	1/WEEK	24-HOUR COMPOSITE ⁵
AMMONIA-NITROGEN (November 1 – April 30)	*****	*****	*****	*****	Report mg/L	2/MONTH	24-HOUR COMPOSITE ⁵
TOTAL PHOSPHORUS (April 1 – October 31)	9.3 lbs/day	*****	200 µg/L	*****	Report µg/L	2/WEEK	24-HOUR COMPOSITE ⁵
TOTAL PHOSPHORUS (November 1 – March 31)	46.3 lbs/day	*****	1,000 µg/L	*****	Report mg/L	1/WEEK	24-HOUR COMPOSITE ⁵
TOTAL COPPER	*****	*****	Report µg/L	*****	Report µg/L	1/MONTH	24-HOUR COMPOSITE ⁵
TOTAL ALUMINUM ⁸	7.9 lbs/day	*****	171 µg/L	*****	Report µg/L	2/MONTH	24-HOUR COMPOSITE ⁵
WHOLE EFFLUENT TOXICITY ^{9,10,11,12, 13} Hardness ¹³ Ammonia, as nitrogen ¹³ Total Cadmium ¹³ Total Lead ¹³ Total Copper ¹³ Total Zinc ¹³ Total Nickel ¹³ Total Aluminum ¹³	Acute LC50 > 100% Chronic C-NOEC > 30% Report maximum daily, mg/L Report maximum daily, µg/L Report maximum daily, µg/L Report maximum daily, µg/L Report maximum daily, µg/L Report maximum daily, µg/L Report maximum daily, µg/L Report maximum daily, µg/L					4/YEAR	24-HOUR COMPOSITE

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 previous eleven months.
3. Effluent sampling shall be taken after appropriate treatment and prior to discharge to Outfall 001. Any change in sampling location must be reviewed and approved in writing by EPA and MassDEP.

A routine sampling program shall be developed in which samples are taken at the same location, same time and same days of the week each month. Occasional deviations from the routine sampling program 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.

4. Sampling required for influent and effluent.
5. 24-hour composite samples 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. *E. coli* monitoring and disinfection shall occur year-round. The monthly average limit for *E. coli* is expressed as a geometric mean. *E. coli* monitoring shall be conducted concurrently with a total residual chlorine sample. The monitoring frequency in the first year of the permit is 3/week. Thereafter, the monitoring frequency will be once per week unless EPA provides the Town with written notice that the higher monitoring frequency be maintained based on its review of the compliance data.
7. Total residual chlorine monitoring is required whenever chlorine is added to the treatment process (i.e. TRC sampling is not required if chlorine is not added for disinfection or other purpose). The limitations are in effect year-round.

The minimum level (ML) for total residual chlorine is defined as 20 µg/l. This value is the minimum level for chlorine using EPA approved methods found in the most currently approved version of Standard Methods for the Examination of Water and Wastewater, Method 4500 CL-E and G. One of these methods must be used to determine total

residual chlorine. For effluent limitations less than 20 µg/l, compliance/non-compliance will be determined based on the ML. Sample results of 20 µg/L or less shall be reported as zero on the discharge monitoring report.

Chlorination and dechlorination systems shall include an alarm system for indicating system interruptions or malfunctions. Any interruption or malfunction of the chlorine dosing system that may have resulted in levels of chlorine that were inadequate for achieving effective disinfection, or interruptions or malfunctions of the dechlorination system that may have resulted in excessive levels of chlorine in the final effluent shall be reported with the monthly DMRs. The report shall include the date and time of the interruption or malfunction, the nature of the problem, and the estimated amount of time that the reduced levels of chlorine or dechlorination chemicals occurred.

8. The total aluminum sample shall be taken at the same time as one of the total phosphorus samples.

Aluminum limits will become effective 48 months after the effective date of the permit. In the interim, the permittee shall submit progress reports every 12 months describing progress made towards attaining the limits during the previous 12 months. The first report shall be submitted one year following the effective date of the permit, and subsequent reports shall be submitted annually on that date. Effluent monitoring requirements are in effect upon the effective date of the permit.

9. The permittee shall conduct chronic and acute 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 March, June, September and December. The test results shall be submitted by the last day of the month following the completion of the test. The results are due April 30, July 31, October 31 and January 31, respectively. The tests must be performed in accordance with test procedures and protocols specified in **Attachments A and B** of this permit.

Test Dates During	Submit Results By:	Test Species	Acute Limit LC ₅₀	Chronic Limit C-NOEC
March June September December	April 30 July 31 October 31 January 31	<i>Ceriodaphnia dubia</i> (daphnid)	> 100%	> 30%

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

shall cause no more than a 50% mortality rate. Please see Attachment B of this permit for acute toxicity testing procedures.

11. C-NOEC (chronic-no observed effect concentration) is defined as the highest concentration of toxicant or effluent to which organisms are exposed in a life cycle or partial life cycle test which causes no adverse effect on growth, survival, or reproduction, 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 "30% or greater" limit is defined as a sample which is composed of 30% (or greater) effluent, the remainder being dilution water.
12. If toxicity test(s) using receiving water as diluent show the receiving water to be toxic or unreliable, the permittee shall either follow procedures outlined in **Attachment A (Toxicity Test Procedure and Protocol) Section IV., DILUTION WATER** in order to obtain an individual approval for use of an alternate dilution water, or the permittee shall follow the Self-Implementing Alternative Dilution Water Guidance which may be used to obtain automatic approval of an alternate dilution water, including the appropriate species for use with that water. This guidance is found in Attachment G of *NPDES Program Instructions for the Discharge Monitoring Report Forms (DMRs)*, which may be found on the EPA Region I web site at <http://www.epa.gov/Region1/enforcementandassistance/dmr.html>. If this guidance is revoked, the permittee shall revert to obtaining individual approval as outlined in **Attachment A**. Any modification or revocation to this guidance will be transmitted to the permittees. However, at any time, the permittee may choose to contact EPA-New England directly using the approach outlined in **Attachment A**.
13. For each whole effluent toxicity test the permittee shall report on the appropriate discharge monitoring report, (DMR), the concentrations of the hardness, ammonia nitrogen as nitrogen, total recoverable aluminum, cadmium, copper, lead, nickel, and zinc found in the 100 percent effluent sample. All these aforementioned chemical parameters shall be determined to at least the minimum quantification level shown in **Attachment A**. Also the permittee should note that all chemical parameter results must still be reported in the appropriate toxicity report.
14. The annual 12-month rolling average flow limit will be 4.7 MGD until the completion of Phase I upgrades to the Billerica WWTF. After the completion of Phase I upgrades, the annual 12-month rolling average flow limit will be 5.1 MGD. After the completion of Phase II upgrades, the monthly average flow limit will be 5.55 MGD. The increase in authorized flow will occur 90 days after a request is made to increase the permitted design flow, unless EPA or MassDEP raise objections in writing within the 90-day period. See Part I.F.1., Special Conditions.

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 or greater than 8.3 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 shall maintain a minimum of 85 percent removal of both total suspended solids and biochemical oxygen demand. The percent removal shall be based on monthly average values.
 - f. The permittee shall minimize the use of chlorine while maintaining adequate bacterial control.
 - g. The results of sampling for any parameter done in accordance with EPA approved methods above its required frequency must also be reported.
 - h. If the average annual flow in any calendar year exceeds 80 percent of the facility's design flow, the permittee shall submit a report to MassDEP by March 31 of the following calendar year describing its plans for further flow increases and describing how it will maintain compliance with the flow limit and all other effluent limitations and conditions.
2. All POTWs must provide adequate notice to the Director of the following:
- a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of the Clean Water Act if it were directly discharging those pollutants; and
 - b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
 - c. For purposes of this paragraph, adequate notice shall include information on:
 - (1) The quantity and quality of effluent introduced into the POTW; and
 - (2) Any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

3. Prohibitions Concerning Interference and Pass Through:

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

4. Toxics Control

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

5. Numerical Effluent Limitations for Toxicants

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

B. UNAUTHORIZED DISCHARGES

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

Notification of SSOs to MassDEP shall be made on its SSO Reporting Form (which includes DEP Regional Office telephone numbers). The reporting form and instruction for its completion may be found on-line at <http://www.mass.gov/eea/agencies/massdep/service/approvals/sanitary-sewer-overflow-bypass-backup-notification.html>.

C. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

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

1. Maintenance Staff

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

2. Preventive Maintenance Program

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

3. Infiltration/Inflow

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

4. Collection System Mapping

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

- a. All sanitary sewer lines and related manholes;
- b. All combined sewer lines, related manholes, and catch basins;
- c. All combined sewer regulators and any known or suspected connections between the sanitary sewer and storm drain systems (e.g. combination manholes);
- d. All outfalls, including the treatment plant outfall(s), CSOs, and any known or suspected SSOs, including stormwater outfalls that are connected to combination manholes;
- e. All pump stations and force mains;
- f. The wastewater treatment facility(ies);
- g. All surface waters (labeled);

- h. Other major appurtenances such as inverted siphons and air release valves;
- i. A numbering system which uniquely identifies manholes, catch basins, overflow points, regulators and outfalls;
- j. The scale and a north arrow; and
- k. The pipe diameter, date of installation, type of material, distance between manholes, and the direction of flow.

5. Collection System Operation and Maintenance Plan

The permittee shall develop and implement a Collection System Operation and Maintenance Plan ("Collection System O & M Plan").

- a. Within six (6) months of the effective date of the permit, the permittee shall submit to EPA and MassDEP
 - (1) A description of the collection system management goals, staffing, information management, and legal authorities;
 - (2) A description of the collection system and the overall condition of the collection system including a list of all pump stations and a description of recent studies and construction activities; and
 - (3) A schedule for the development and implementation of the full Collection System O & M Plan including the elements in paragraphs b.1. through b.8. below.
- b. The full Collection System O & M Plan shall be submitted and implemented to EPA and MassDEP within twenty-four (24) months from the effective date of this permit. The Plan shall include:
 - (1) The required submittal from paragraph 5.a. above, updated to reflect current information;
 - (2) A preventive maintenance and monitoring program for the collection system;
 - (3) Description of sufficient staffing necessary to properly operate and maintain the sanitary sewer collection system and how the operation and maintenance program is staffed;
 - (4) Description of funding, the source(s) of funding and provisions for funding sufficient for implementing the plan;
 - (5) Identification of known and suspected overflows and back-ups, including manholes.
 - (6) 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;
 - (7) 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;

- (8) An educational public outreach program for all aspects of I/I control, particularly private inflow; and
- (9) An Overflow Emergency Response Plan to protect public health from overflows and unanticipated bypasses or upsets that exceed any effluent limitation in the permit.

6. Annual Reporting Requirement

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

- a. A description of the staffing levels maintained during the year;
- b. A map and a description of inspection and maintenance activities conducted and corrective actions taken during the previous year;
- c. Expenditures for any collection system maintenance activities and corrective actions taken during the previous year;
- d. A map with areas identified for investigation/action in the coming year;
- e. If treatment plant flow has reached 80% of the design flow (4.44 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 the portion of the publicly owned treatment works¹ it owns and operates.

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

D. SLUDGE CONDITIONS

1. The permittee shall comply with all existing federal and state laws and regulations that apply to sewage sludge use and disposal practices, including EPA regulations promulgated at 40 CFR Part 503, which prescribe “Standards for the Use or Disposal of Sewage Sludge” pursuant to Section 405(d) of the CWA, 33 U.S.C. § 1345(d).
2. If both state and federal requirements apply to the permittee’s sludge use and/or disposal practices, the permittee shall comply with the more stringent of the applicable requirements.
3. The requirements and technical standards of 40 CFR Part 503 apply to the following sludge use or disposal practices.
 - a. Land application - the use of sewage sludge to condition or fertilize the soil
 - b. Surface disposal - the placement of sewage sludge in a sludge-only landfill
 - c. Sewage sludge incineration in a sludge only incinerator
4. The requirements of 40 CFR Part 503 do not apply to facilities which dispose of sludge in a municipal solid waste landfill. 40 CFR § 503.4. These requirements also do not apply to facilities which do not use or dispose of sewage sludge during the life of the permit but rather treat the sludge (e.g. lagoons, reed beds), or are otherwise excluded under 40 CFR § 503.6.
5. The 40 CFR. Part 503 requirements include the following elements:
 - a. General requirements
 - b. Pollutant limitations
 - c. Operational Standards (pathogen reduction requirements and vector attraction reduction requirements)
 - d. Management practices
 - e. Record keeping
 - f. Monitoring
 - g. Reporting

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

assist it in determining the applicable requirements.²

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

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

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

7. Under 40 CFR § 503.9(r), the permittee is a “person who prepares sewage sludge” because it “is ... the person who generates sewage sludge during the treatment of domestic sewage in a treatment works” If the permittee contracts with *another* “person who prepares sewage sludge” under 40 CFR § 503.9(r) – i.e., with “a person who derives a material from sewage sludge” – for use or disposal of the sludge, then compliance with Part 503 requirements is the responsibility of the contractor engaged for that purpose. If the permittee does not engage a “person who prepares sewage sludge,” as defined in 40 CFR § 503.9(r), for use or disposal, then the permittee remains responsible to ensure that the applicable requirements in Part 503 are met. 40 CFR §503.7. If the ultimate use or disposal method is land application, the permittee is responsible for providing the person receiving the sludge with notice and necessary information to comply with the requirements of 40 CFR Part 503 Subpart B.
8. The permittee shall submit an annual report containing the information specified in the 40 CFR Part 503 requirements (§ 503.18 (land application), § 503.28 (surface disposal), or § 503.48 (incineration)) by **March 15** (*see also* “EPA Region 1 - NPDES Permit Sludge Compliance Guidance”). Reports shall be submitted to the address contained in the reporting section of the permit. If the permittee engages a contractor or contractors for sludge preparation and ultimate use or disposal, the annual report need contain only the following information:
 - a. Name and address of contractor(s) responsible for sludge preparation, use or disposal
 - b. Quantity of sludge (in dry metric tons) from the POTW that is transferred to the sludge contractor(s), and the method(s) by which the contractor will prepare and use or dispose of the sewage sludge.

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>

E. INDUSTRIAL USERS AND PRETREATMENT PROGRAM

1. The permittee shall develop and enforce specific effluent limits (local limits) for Industrial User(s), and all other users, as appropriate, which together with appropriate changes in the POTW Treatment Plant's Facilities or operation, are necessary to ensure continued compliance with the POTW's NPDES permit or sludge use or disposal practices. Specific local limits shall not be developed and enforced without individual notice to persons or groups who have requested such notice and an opportunity to respond. **Within 120 days of the effective date of this permit**, the permittee shall prepare and submit a written technical evaluation to the EPA analyzing the need to revise local limits. As part of this evaluation, the permittee shall assess how the POTW performs with respect to influent and effluent of pollutants, water quality concerns, sludge quality, sludge processing concerns/inhibition, biomonitoring results, activated sludge inhibition, worker health and safety and collection system concerns. In preparing this evaluation, the permittee shall complete and submit the attached form (Attachment D) with the technical evaluation to assist in determining whether existing local limits need to be revised. Justifications and conclusions should be based on actual plant data if available and should be included in the report. Should the evaluation reveal the need to revise local limits, the permittee shall complete the revisions **within 120 days of notification by EPA** and submit the revisions to EPA for approval. The Permittee shall carry out the local limits revisions in accordance with EPA's Local Limit Development Guidance (July 2004).
2. The permittee shall implement the Industrial Pretreatment Program in accordance with the legal authorities, policies, procedures, and financial provisions described in the permittee's approved Pretreatment Program, and the General Pretreatment Regulations, 40 CFR 403. At a minimum, the permittee must perform the following duties to properly implement the Industrial Pretreatment Program (IPP):
 - a. Carry out inspection, surveillance, and monitoring procedures which will determine independent of information supplied by the industrial user, whether the industrial user is in compliance with the Pretreatment Standards. At a minimum, all significant industrial users shall be sampled and inspected at the frequency established in the approved IPP but in no case less than once per year and maintain adequate records.
 - b. Issue or renew all necessary industrial user control mechanisms within 90 days of their expiration date or within 180 days after the industry has been determined to be a significant industrial user.
 - c. Obtain appropriate remedies for noncompliance by any industrial user with any pretreatment standard and/or requirement.
 - d. Maintain an adequate revenue structure for continued implementation of the Pretreatment Program.

3. The permittee shall provide the EPA and MassDEP with an annual report describing the permittee's pretreatment program activities for the twelve (12) month period ending 60 days prior to the due date in accordance with 403.12(i). The annual report shall be consistent with the format described in Attachment C of this permit and shall be submitted **no later than March 15 of each year.**
4. The permittee must obtain approval from EPA prior to making any significant changes to the industrial pretreatment program in accordance with 40 CFR 403.18(c).
5. The permittee must assure that applicable National Categorical Pretreatment Standards are met by all categorical industrial users of the POTW. These standards are published in the Federal Regulations at 40 CFR 405 et. seq.
6. The permittee must modify its pretreatment program, if necessary, to conform to all changes in the Federal Regulations that pertain to the implementation and enforcement of the industrial pretreatment program. The permittee must provide EPA, in writing, within 180 days of this permit's effective date proposed changes, if applicable, to the permittee's pretreatment program deemed necessary to assure conformity with current Federal Regulations. At a minimum, the permittee must address in its written submission the following areas: (1) Enforcement response plan; (2) revised sewer use ordinances; and (3) slug control evaluations. The permittee will implement these proposed changes pending EPA Region I's approval under 40 CFR 403.18. This submission is separate and distinct from any local limits analysis submission described in Part I.E.1.

F. SPECIAL CONDITIONS

Annual Average Flow Increase

The Permittee may request an increase in the annual average flow limit to 5.1 MGD (after Phase I upgrades) and 5.55 MGD (after Phase II upgrades). This request shall be made in writing, to both EPA and MassDEP, at least 90 days prior to completion of the modifications that effect the increase in wastewater treatment plant capacity. The requested increase in the flow limit shall take effect 90 days after the permittee requests the increase, unless written communication from EPA or MassDEP is received during the 90 day period objecting to the flow increase.

G. MONITORING AND REPORTING

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

1. Submittal of Reports Using NetDMR

NetDMR is accessed from: <http://www.epa.gov/netdmr>. DMRs shall be submitted electronically to EPA no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA, including the MassDEP Monthly Operations and Maintenance Report, as an electronic attachment to the DMR. **If the due date of the report does not coincide with the DMR due date, permittees shall submit the report with the next monthly DMR.**

A permittee submitting reports using NetDMR is no longer required to submit hard copies of DMRs or other reports to EPA and no longer required to submit hard copies of DMRs to MassDEP. However, permittees shall continue to send hard copies of reports other than DMRs (including Monthly Operation and Maintenance Reports, Toxicity Test Results and Nutrient Optimization Reports) to MassDEP until further notice from MassDEP.

2. Submittal of Reports in Hard Copy Form

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

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

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

**MassDEP – Northeast Region
Bureau of Resource Protection
205B Lowell Street
Wilmington, MA 01887**

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

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

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

H. STATE PERMIT CONDITIONS

1. This authorization to discharge includes two separate and independent permit authorizations. The two permit authorizations are (i) a federal National Pollutant Discharge Elimination System permit issued by the U.S. Environmental Protection Agency (EPA) pursuant to the Federal Clean Water Act, 33 U.S.C. §§1251 et seq.; and (ii) an identical state surface water discharge permit issued by the Commissioner of the Massachusetts Department of Environmental Protection (MassDEP) pursuant to the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53, and 314 C.M.R. 3.00. All of the requirements contained in this authorization, as well as the standard conditions contained in 314 CMR 3.19, are hereby incorporated by reference into this state surface water discharge permit.
2. This authorization also incorporates the state water quality certification issued by MassDEP under § 401(a) of the Federal Clean Water Act, 40 C.F.R. 124.53, M.G.L. c. 21, § 27 and 314 CMR 3.07. All of the requirements (if any) contained in MassDEP's water quality certification for the permit are hereby incorporated by reference into this state surface water discharge permit as special conditions pursuant to 314 CMR 3.11.
3. Each agency shall have the independent right to enforce the terms and conditions of this permit. Any modification, suspension or revocation of this permit shall be effective only with respect to the agency taking such action, and shall not affect the validity or status of this permit as issued by the other agency, unless and until each agency has concurred in writing with such modification, suspension or revocation. In the event any portion of this permit is declared invalid, illegal or otherwise issued in violation of state law such permit shall remain in full force and effect under federal law as a NPDES Permit issued by the U.S. Environmental Protection Agency. In the event this permit is declared invalid, illegal or otherwise issued in violation of federal law, this permit shall remain in full force and effect under state law as a permit issued by the Commonwealth of Massachusetts.

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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.

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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.

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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.

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- (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

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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

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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

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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.

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- 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.

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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.

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- (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

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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

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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).

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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.

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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.

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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.

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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.

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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,

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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.

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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.

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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 of 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 of 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.

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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.

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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.)

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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

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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.

FRESHWATER CHRONIC TOXICITY TEST PROCEDURE AND PROTOCOL USEPA Region 1

I. GENERAL REQUIREMENTS

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

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

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

II. METHODS

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

III. SAMPLE COLLECTION AND USE

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

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

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

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

IV. DILUTION WATER

Samples of receiving water must be collected from a location in the receiving water body immediately upstream of the permitted discharge's zone of influence at a reasonably accessible location. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist. EPA strongly urges that screening for toxicity be performed prior to the set up of a full, definitive toxicity test any time there is a question about the test dilution water's ability to achieve test acceptability criteria (TAC) as indicated in Section V of this protocol. The test dilution water control response will be used in the statistical analysis of the toxicity test data. All other control(s) required to be run in the test will be reported as specified in the Discharge Monitoring Report (DMR) Instructions, Attachment F, page 2, Test Results & Permit Limits.

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

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

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

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

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

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

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

and

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

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

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

V. TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA

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

V.1. Use of Reference Toxicity Testing

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

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

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

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

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

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

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

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

VI. CHEMICAL ANALYSIS

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

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

<u>Parameter</u>	Effluent	Receiving Water	ML (mg/l)
Hardness ^{1, 4}	x	x	0.5
Total Residual Chlorine (TRC) ^{2, 3, 4}	x		0.02
Alkalinity ⁴	x	x	2.0
pH ⁴	x	x	--
Specific Conductance ⁴	x	x	--
Total Solids ⁶	x		--
Total Dissolved Solids ⁶	x		--
Ammonia ⁴	x	x	0.1
Total Organic Carbon ⁶	x	x	0.5
Total Metals ⁵			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005
Al	x	x	0.02

Other as permit requires

Notes:

1. Hardness may be determined by:

- APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
 - Method 2340B (hardness by calculation)
 - Method 2340C (titration)
2. Total Residual Chlorine may be performed using any of the following methods provided the required minimum limit (ML) is met.
- APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
 - Method 4500-CL E Low Level Amperometric Titration
 - Method 4500-CL G DPD Colorimetric Method
 - USEPA 1983. Manual of Methods Analysis of Water and Wastes
 - Method 330.5
3. Required to be performed on the sample used for WET testing prior to its use for toxicity testing
4. Analysis is to be performed on samples and/or receiving water, as designated in the table above, from all three sampling events.
5. Analysis is to be performed on the initial sample(s) only unless the situation arises as stated in Section III, paragraph 4
6. Analysis to be performed on initial samples only

VII. TOXICITY TEST DATA ANALYSIS AND REVIEW

A. Test Review

1. Concentration / Response Relationship

A concentration/response relationship evaluation is required for test endpoint determinations from both Hypothesis Testing and Point Estimate techniques. The test report is to include documentation of this evaluation in support of the endpoint values reported. The dose-response review must be performed as required in Section 10.2.6 of EPA-821-R-02-013. Guidance for this review can be found at

<http://www.epa.gov/waterscience/methods/wet/pdf/wetguide.pdf> . In most cases, the review will result in one of the following three conclusions: (1) Results are reliable and reportable; (2) Results are anomalous and require explanation; or (3) Results are inconclusive and a retest with fresh samples is required.

2. Test Variability (Test Sensitivity)

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

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

- The test PMSD exceeds the PMSD upper bound test variability criterion in Table 6, the test results are considered highly variable and the test may not be sensitive enough to determine the presence of toxicity at the permit limit concentration (PLC). If the test results indicate that the discharge is not toxic at the PLC, then the test is considered insufficiently sensitive and must be repeated within 30 days of the initial test completion using fresh samples. If the test results indicate that the discharge is toxic at the PLC, the test is considered acceptable and does not have to be repeated.
- The test PMSD falls below the PMSD lower bound test variability criterion in Table 6, the test is determined to be very sensitive. In order to determine which treatment(s) are statistically significant and which are not, for the purpose of reporting a NOEC, the relative percent difference (RPD) between the control and each treatment must be calculated and compared to the lower PMSD boundary. See *Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program*, EPA 833-R-00-003, June 2002, Section 6.4.2. The following link: [Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program](#) can be used to locate the USEPA website containing this document. If the RPD for a treatment falls below the PMSD lower bound, the difference is considered statistically insignificant. If the RPD for a treatment is greater than 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

ATTACHMENT B

**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/methods/cwa/wet/disk2_index.cfm

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°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/enforcement/water/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 TESTS¹

1.	Test type	Static, non-renewal
2.	Temperature (°C)	20 ± 1°C or 25 ± 1°C
3.	Light quality	Ambient laboratory illumination
4.	Photoperiod	16 hour light, 8 hour dark
5.	Test chamber size	Minimum 30 ml
6.	Test solution volume	Minimum 15 ml
7.	Age of test organisms	1-24 hours (neonates)
8.	No. of daphnids per test chamber	5
9.	No. of replicate test chambers per treatment	4
10.	Total no. daphnids per test concentration	20
11.	Feeding regime	As per manual, lightly feed YCT and <u>Selenastrum</u> to newly released organisms while holding prior to initiating test
12.	Aeration	None
13.	Dilution water ²	Receiving water, other surface water, synthetic water adjusted to the hardness and alkalinity of the receiving water (prepared using either Millipore Milli-Q ^R or equivalent deionized water and reagent grade chemicals according to EPA acute toxicity test manual) or deionized water combined with mineral water to appropriate hardness.
14.	Dilution series	≥ 0.5, must bracket the permitted RWC
15.	Number of dilutions	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 TEST¹**

1. Test Type	Static, non-renewal
2. Temperature (°C)	$20 \pm 1^{\circ} \text{C}$ or $25 \pm 1^{\circ} \text{C}$
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 other
8. No. of fish per chamber	10
9. No. of replicate test vessels per treatment	4
10. Total no. organisms per concentration	40
11. Feeding regime	As per manual, lightly feed test age larvae using concentrated brine shrimp nauplii while holding prior to initiating test
12. Aeration	None, unless dissolved oxygen (D.O.) concentration falls below 4.0 mg/L, at which time gentle single bubble aeration should be started at a rate of less than 100 bubbles/min. (Routine D.O. check is recommended.)
13. dilution water ²	Receiving water, other surface water, synthetic water adjusted to the hardness and alkalinity of the receiving water (prepared using either Millipore Milli-Q ^R or equivalent deionized and reagent grade chemicals according to EPA acute toxicity test manual) or deionized water combined with mineral water to appropriate hardness.
14. Dilution series	≥ 0.5 , must bracket the permitted RWC

15. Number of dilutions	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.

<u>Parameter</u>	<u>Effluent</u>	<u>Receiving Water</u>	<u>ML (mg/l)</u>
Hardness ¹	x	x	0.5
Total Residual Chlorine (TRC) ^{2, 3}	x		0.02
Alkalinity	x	x	2.0
pH	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:

- 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)
- 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
- 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-Kärber
- Trimmed Spearman-Kärber
- 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.

NPDES PERMIT REQUIREMENT
FOR
INDUSTRIAL PRETREATMENT ANNUAL REPORT

The information described below shall be included in the pretreatment program annual reports:

1. An updated list of all industrial users by category, as set forth in 40 C.F.R. 403.8(f)(2)(i), indicating compliance or noncompliance with the following:
 - baseline monitoring reporting requirements for newly promulgated industries
 - compliance status reporting requirements for newly promulgated industries
 - periodic (semi-annual) monitoring reporting requirements,
 - categorical standards, and
 - local limits;
2. A summary of compliance and enforcement activities during the preceding year, including the number of:
 - significant industrial users inspected by POTW (include inspection dates for each industrial user),
 - significant industrial users sampled by POTW (include sampling dates for each industrial user),
 - compliance schedules issued (include list of subject users),
 - written notices of violations issued (include list of subject users),
 - administrative orders issued (include list of subject users),
 - criminal or civil suits filed (include list of subject users) and,
 - penalties obtained (include list of subject users and penalty amounts);
3. A list of significantly violating industries required to be published in a local newspaper in accordance with 40 C.F.R. 403.8(f)(2)(vii);
4. A narrative description of program effectiveness including present and proposed changes to the program, such as funding, staffing, ordinances, regulations, rules and/or statutory authority;
5. A summary of all pollutant analytical results for influent, effluent, sludge and any toxicity or bioassay data from the wastewater treatment facility. The summary shall include a comparison of influent sampling results versus threshold inhibitory concentrations for the Wastewater Treatment System and effluent sampling results versus water quality standards. Such a comparison shall be based on the sampling program described in the paragraph below or any similar sampling program described in this Permit.

At a minimum, annual sampling and analysis of the influent and effluent of the Wastewater Treatment Plant shall be conducted for the following pollutants:

- | | |
|--------------------|-------------------|
| a.) Total Cadmium | f.) Total Nickel |
| b.) Total Chromium | g.) Total Silver |
| c.) Total Copper | h.) Total Zinc |
| d.) Total Lead | i.) Total Cyanide |
| e.) Total Mercury | j.) Total Arsenic |

The sampling program shall consist of one 24-hour flow-proportioned composite and at least one grab sample that is representative of the flows received by the POTW. The composite shall consist of hourly flow-proportioned grab samples taken over a 24-hour period if the sample is collected manually or shall consist of a minimum of 48 samples collected at 30 minute intervals if an automated sampler is used. Cyanide shall be taken as a grab sample during the same period as the composite sample. Sampling and preservation shall be consistent with 40 CFR Part 136.

6. A detailed description of all interference and pass-through that occurred during the past year;
7. A thorough description of all investigations into interference and pass-through during the past year;
8. A description of monitoring, sewer inspections and evaluations which were done during the past year to detect interference and pass-through, specifying parameters and frequencies;
9. A description of actions being taken to reduce the incidence of significant violations by significant industrial users; and,
10. The date of the latest adoption of local limits and an indication as to whether or not the permittee is under a State or Federal compliance schedule that includes steps to be taken to revise local limits.

EPA - New England

Reassessment of Technically Based Industrial Discharge Limits

Under 40 CFR §122.21(j)(4), all Publicly Owned Treatment Works (POTWs) with approved Industrial Pretreatment Programs (IPPs) shall provide the following information to the Director: a written evaluation of the need to revise local industrial discharge limits under 40 CFR §403.5(c)(1).

Below is a form designed by the U.S. Environmental Protection Agency (EPA - New England) to assist POTWs with approved IPPs in evaluating whether their existing Technically Based Local Limits (TBLLs) need to be recalculated. The form allows the permittee and EPA to evaluate and compare pertinent information used in previous TBLLs calculations against present conditions at the POTW.

Please read direction below before filling out form.

ITEM I.

- * In Column (1), list what your POTW's influent flow rate was when your existing TBLLs were calculated. In Column (2), list your POTW's present influent flow rate. Your current flow rate should be calculated using the POTW's average daily flow rate from the previous 12 months.
- * In Column (1) list what your POTW's SIU flow rate was when your existing TBLLs were calculated. In Column (2), list your POTW's present SIU flow rate.
- * In Column (1), list what dilution ratio and/or 7Q10 value was used in your old/expired NPDES permit. In Column (2), list what dilution ratio and/or 7Q10 value is presently being used in your new/reissued NPDES permit.

The 7Q10 value is the lowest seven day average flow rate, in the river, over a ten year period. The 7Q10 value and/or dilution ratio used by EPA in your new NPDES permit can be found in your NPDES permit "Fact Sheet."

- * In Column (1), list the safety factor, if any, that was used when your existing TBLLs were calculated.
- * In Column (1), note how your bio-solids were managed when your existing TBLLs were calculated. In Column (2), note how your POTW is presently disposing of its biosolids and how your POTW will be disposing of its biosolids in the future.

ITEM II.

- * List what your existing TBLLs are - as they appear in your current Sewer Use Ordinance (SUO).

ITEM III.

- * Identify how your existing TBLLs are allocated out to your industrial community. Some pollutants may be allocated differently than others, if so please explain.

ITEM IV.

- * Since your existing TBLLs were calculated, identify the following in detail:
 - (1) if your POTW has experienced any upsets, inhibition, interference or pass-through as a result of an industrial discharge.
 - (2) if your POTW is presently violating any of its current NPDES permit limitations - include toxicity.

ITEM V.

- * Using current sampling data, list in Column (1) the average and maximum amount of pollutants (in pounds per day) received in the POTW's influent. Current sampling data is defined as data obtained over the last 24 month period.

All influent data collected and analyzed must be in accordance with 40 CFR §136. Sampling data collected should be analyzed using the lowest possible detection method(s), e.g. graphite furnace.

- * Based on your existing TBLLs, as presented in Item II., list in Column (2), for each pollutant the Maximum Allowable Headwork Loading (MAHL) values derived from an applicable environmental criteria or standard, e.g. water quality, sludge, NPDES, inhibition, etc. For more information, please see p.,3-28 in EPA's Guidance Manual on the Development and Implementation of Local Limits Under the Pretreatment Program, 12/87.

Item VI.

- * Using current sampling data, list in Column (1) the average and maximum amount of pollutants (in micrograms per liter) present your POTW's effluent. Current sampling data is defined as data obtained during the last 24 month period. All effluent data collected and analyzed must be in accordance with 40 CFR §136. Sampling data collected should be analyzed using the lowest possible detection method(s), e.g. graphite furnace.
- * List in Column (2A) what the Water Quality Standards (WQS) were (in micrograms per liter) when your TBLLs were calculated, please note what hardness value was used at that

time. Hardness should be expressed in milligram per liter of Calcium Carbonate.

List in Column (2B) the current WQSs or "Chronic Gold Book" values for each pollutant multiplied by the dilution ratio used in your new/reissued NPDES permit. For example, with a dilution ratio of 25:1 at a hardness of 25 mg/l - Calcium Carbonate (copper's chronic WQS equals 6.54 ug/l) the chronic NPDES permit limit for copper would equal 156.25 ug/l.

ITEM VII.

- * In Column (1), list all pollutants (in micrograms per liter) limited in your new/reissued NPDES permit. In Column (2), list all pollutants limited in your old/expired NPDES permit.

ITEM VIII.

- * Using current sampling data, list in Column (1) the average and maximum amount of pollutants in your POTW's biosolids. Current data is defined as data obtained during the last 24 month period. Results are to be expressed as total dry weight.

All biosolids data collected and analyzed must be in accordance with 40 CFR §136.

In Column (2A), list current State and/or Federal sludge standards that your facility's biosolids must comply with. Also note how your POTW currently manages the disposal of its biosolids. If your POTW is planning on managing its biosolids differently, list in Column (2B) what your new biosolids criteria will be and method of disposal.

In general, please be sure the units reported are correct and all pertinent information is included in your evaluation. If you have any questions, please contact your pretreatment representative at EPA - New England.

**REASSESSMENT OF TECHNICALLY BASED LOCAL LIMITS
(TBLLs)**

POTW Name & Address : _____

NPDES PERMIT # : _____

Date EPA approved current TBLLs : _____

Date EPA approved current Sewer Use Ordinance : _____

ITEM I.

In Column (1) list the conditions that existed when your current TBLLs were calculated. In Column (2), list current conditions or expected conditions at your POTW.		
	Column (1) EXISTING TBLLs	Column (2) PRESENT CONDITIONS
POTW Flow (MGD)		
Dilution Ratio or 7Q10 (from NPDES Permit)		
SIU Flow (MGD)		
Safety Factor		N/A
Biosolids Disposal Method(s)		

ITEM II.

EXISTING TBLLs			
POLLUTANT	NUMERICAL LIMIT (mg/l) or (lb/day)	POLLUTANT	NUMERICAL LIMIT (mg/l) or (lb/day)

ITEM III.

Note how your existing TBLLs, listed in Item II., are allocated to your Significant Industrial Users (SIUs), i.e. uniform concentration, contributory flow, mass proportioning, other. Please specify by circling.

ITEM IV.

Has your POTW experienced any upsets, inhibition, interference or pass-through from industrial sources since your existing TBLLs were calculated?

If yes, explain.

Has your POTW violated any of its NPDES permit limits and/or toxicity test requirements?

If yes, explain. _____

ITEM V.

Using current POTW influent sampling data fill in Column (1). In Column (2), list your Maximum Allowable Headwork Loading (MAHL) values used to derive your TBLLs listed in Item II. In addition, please note the Environmental Criteria for which each MAHL value was established, i.e. water quality, sludge, NPDES etc.

Pollutant	Column (1) Influent Data Analyses		Column (2)	Criteria
	Maximum (lb/day)	Average (lb/day)	MAHL Values (lb/day)	
Arsenic				
Cadmium				
Chromium				
Copper				
Cyanide				
Lead				
Mercury				
Nickel				
Silver				
Zinc				
Other (List)				

ITEM VI.

Using current POTW effluent sampling data, fill in Column (1). In Column (2A) list what the Water Quality Standards (Gold Book Criteria) were at the time your existing TBLLs were developed. List in Column (2B) current Gold Book values multiplied by the dilution ratio used in your new/reissued NPDES permit.				
Pollutant	Column (1)		Columns (2A) (2B)	
	Effluent Data Analyses Maximum Average (ug/l) (ug/l)		Water Quality Criteria (Gold Book) From TBLLs Today (ug/l) (ug/l)	
Arsenic				
*Cadmium				
*Chromium				
*Copper				
Cyanide				
*Lead				
Mercury				
*Nickel				
Silver				
*Zinc				
Other (List)				

*Hardness Dependent (mg/l - CaCO3)

ITEM VII.

In Column (1), identify all pollutants limited in your new/reissued NPDES permit. In Column (2), identify all pollutants that were limited in your old/expired NPDES permit.

[illegible]

ITEM VIII.

<p>Using current POTW biosolids data, fill in Column (1). In Column (2A), list the biosolids criteria that was used at the time your existing TBLLs were calculated. If your POTW is planing on managing its biosolids differently, list in Column (2B) what your new biosolids criteria would be and method of disposal.</p>			
Pollutant	Column (1) Biosolids Data Analyses Average (mg/kg)	Columns (2A) Biosolids Criteria From TBLLs (mg/kg)	(2B) New (mg/kg)
Arsenic			
Cadmium			
Chromium			
Copper			
Cyanide			
Lead			
Mercury			
Nickel			
Silver			
Zinc			
Molybdenum			
Selenium			
Other (List)			

Summary of Required Report Submittals*

Required Report	Date Due	Submitted to:
Whole Effluent Toxicity Test Report (Part I.A.1)	April 30, July 31, October 31, and January 31 of each year	1,2,3
Initial Collection System Operation and Maintenance Plan (Part I.C.5.a.)	Within 6 months of effective date	1,2
Full Collection System Operations and Maintenance Plan (Part I.C.5.b.)	Two years from the effective date of the permit	1,2
Collection System Annual Report (Part I.C.6.)	Annually by April 15	1,2
Notification of Sanitary Sewer Overflows (Part I.B.)	Oral Report -Within 24 hours of discovery of event (contact: George Harding 617.918.1870) Written Report – Within 5 calendar days of discovery of event	1,2
Annual Sludge Report (Part I.D.8)	Annually by March 15	1,2
Local Limits Technical Evaluation (Part I.E.1.)	Within 120 days of effective date of permit	1,2
Pretreatment Annual Report (Part I.E.3.)	By March 15 of each year	1,2
Revisions to Pretreatment Program (if needed) (Part I.E.6.)	Within 180 days of effective date of permit	1,2

* This table is a summary of the reports required to be submitted under this NPDES permit as an aid to the permittee(s). If there are any discrepancies between the permit and this summary, the permittee(s) shall follow the permit requirements.

1. EPA New England - Via NetDMR
2. MassDEP
Bureau of Resource Protection
Northeast Regional Office
205B Lowell Street
Wilmington, MA 01887
3. MassDEP
Division of Watershed Management
Surface Water Discharge Permit Program
627 Main Street, 2nd Floor
Worcester, MA 01608

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

FACT SHEET

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

NPDES PERMIT NO: **MA0101711**

NAME AND ADDRESS OF PERMITTEE:

**Town of Billerica
365 Boston Road
Billerica, MA 01821**

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

**Billerica Wastewater Treatment Facility
70 Letchworth Avenue
Billerica, MA 01862**

RECEIVING WATERS: **Concord River (MA82A-08)**

CLASSIFICATION: **Class B - Warm Water Fishery**

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Figure 1

Location Map

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Treatment Plant Flow Schematic

Appendices

Appendix A

DMR Data January 2010 – December 2012

Appendix B

Copper Reasonable Potential Analysis

I. PROPOSED ACTION

The above-named applicant has applied to the U.S. Environmental Protection Agency (EPA) for the re-issuance of its National Pollutant Discharge Elimination System (NPDES) permit to discharge into the designated receiving water. The current permit became effective November 9, 2005 and expired on October 31, 2010. EPA received the re-application on May 5, 2010. EPA is proposing to reissue the permit for a term of five years.

II. TYPE OF FACILITY AND DISCHARGE LOCATION

The facility's discharge outfalls are listed below:

<u>Outfall</u>	<u>Description of Discharge</u>	<u>Receiving water</u>	<u>Outfall Location</u>
001	Treated Effluent	Concord River	42.601° N 71.286° W

The facility collects and treats domestic wastewater and septage. The discharge from this secondary wastewater treatment facility is via Outfall 001 to the Concord River.

The Billerica Wastewater Treatment Facility is an activated sludge facility with a current average monthly treatment capacity of 4.7 million gallons per day (MGD). The facility is located in Billerica, Massachusetts and serves a population of about 31,000. The collection system serving the plant consists entirely of separate sanitary sewers (i.e. there is no storm water conveyed in the collection system).

The facility previously had a design flow of 5.4 MGD, but modifications made to achieve effluent ammonia limits, and the abandonment of three secondary clarifiers, effectively lowered the treatment capacity to 4.7 MGD. The Town is undertaking treatment plant upgrades to increase the flow capacity to 5.55 MGD. The increased design flow is consistent with the Town's Comprehensive Wastewater Management Plan and is consistent with antidegradation requirements. See Section V.B.3. for a detailed discussion of the flow issue.

MassDEP executed an Administrative Consent Order with Penalty (ACOP) with the Town of Billerica on September 24, 2010 related to infiltration and inflow and sanitary sewer overflows. Please see Section VI., Operations and Maintenance, for more information.

III. DESCRIPTION OF DISCHARGE

Quantitative descriptions of the discharge in terms of significant effluent parameters, based on discharge monitoring reports (DMRs) submitted from January 2010 through December 2012, are shown in Appendix A of this fact sheet.

IV. LIMITATIONS AND CONDITIONS

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

V. PERMIT BASIS AND EXPLANATION OF EFFLUENT LIMITATION DERIVATION

A. PROCESS DESCRIPTION

Influent flow is pumped to the WWTF by two municipally-owned wastewater pumping stations. Preliminary treatment consists of screening and grit removal as well as flow measurement.

Primary treatment consists of three primary settling tanks, sludge handling, and scum handling. The secondary treatment system is an activated sludge system that can be operated in the conventional, step feed, or contact stabilization modes of operation. It consists of aeration tanks, diffused aeration equipment, and secondary settling tanks (SSTs). The aeration tanks are divided into four parallel trains, providing a total of 1.76 million gallons of aeration tank capacity.

Flow is currently split among three secondary settling tanks, with an additional tank under construction. Flow then enters the CoMag tertiary system, which was recently brought online to reduce effluent total phosphorus and aluminum. The CoMag system creates a ballasted floc using magnetite and then separates the flow by gravity, followed by magnetic filters. The system consists of a pumping station, reaction tanks, tertiary settling tanks, solids handling, and chemical feed equipment.

Disinfection is via sodium hypochlorite with contact time provided in a two chambered chlorine contact tank (CCT). The dissolved oxygen concentration of the effluent is increased prior to discharge through four parallel post-aeration channels. Effluent flow is conveyed to the Concord River through a 1,557-foot, 30-inch concrete outfall pipe.

B. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. 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 specified permitting sections of the CWA, one of which is Section 402. *See* CWA §§ 301(a), 402(a).

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

Section 301 of the CWA provides for two types of effluent limitations to be included in NPDES permits: “technology-based” limitations and “water quality-based” limitations. *See* §§ 301, 304(b); 40 CFR §§ 122, 125, 131. Technology-based treatment requirements represent the

minimum level of control that must be imposed under Sections 402 and 301(b) of the CWA. For publicly owned treatment works (POTWs), technology-based requirements are effluent limits based on secondary treatment as defined in 40 CFR 133.102.

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

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

1. Development of Water Quality-based Limits

Receiving stream requirements are established according to numerical and narrative standards adopted under state law for each stream classification. 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 concentration. Maximum daily limits are generally derived from the acute aquatic life criteria, and the average monthly limit is generally derived from the chronic aquatic life criteria. Chemical specific limits are established in accordance with 40 CFR § 122.44(d) and § 122.45(d).

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

In determining reasonable potential, EPA considers: (1) existing controls on point and non-point sources of pollution; (2) pollutant concentration and variability in the effluent and receiving water as determined from the permit application, monthly discharge monitoring reports (DMRs), and State and Federal water quality reports; (3) sensitivity of the species to toxicity testing; (4) statistical approach outlined in *Technical Support Document for Water Quality-based Toxics Controls*, March 1991, EPA/505/2-90-001 in Section 3; and, where appropriate, (5) dilution of the effluent in the receiving water. In accordance with the MA SWQS [314 CMR 4.03(3)],

available dilution for rivers and streams is based on a known or estimated value of the lowest average flow which occurs for seven (7) consecutive days with a recurrence interval of once in ten (10) years (7Q10).

2. Water Quality Standards; Designated Use; Outfall 001

The reach of the Concord River receiving the Billerica WWTF discharge is classified in the MA SWQS (314 CMR 4.00) as a Class B-warm water fishery. Class B waters are designated as a habitat for fish, other aquatic life, and wildlife, including their reproductive growth and other critical functions and for primary and secondary contact recreation. Where designated in 314 CMR 4.06, they shall be suitable as a source for public water supply with appropriate treatment. They shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses and should have consistently good aesthetic value.

A warm water fishery is defined in the MA SWQS (314 CMR 4.02) as waters in which the maximum mean monthly temperature generally exceeds 20° Celsius (68° Fahrenheit) during the summer months and are not capable of supporting a year-round population of cold water stenothermal aquatic life.

Section 303(d) of the Federal Clean Water Act (CWA) requires states to identify those waterbodies that are not expected to meet surface water quality standards after the implementation of technology-based controls and, as such, require the development of total maximum daily loads (TMDL). This reach of the Concord River (MA82A-08), which extends from the Billerica water supply intake to the Rogers Street Bridge in Lowell, is listed on the *Massachusetts 2012 Integrated List of Waters (303d)* as impaired and requiring a TMDL for mercury in fish tissue and total phosphorus. The Northeastern Regional Mercury TMDL was finalized on December 20, 2007. There is no firm schedule for a phosphorus TMDL, but the permit includes a water quality-based phosphorus limitation that EPA believes is sufficient to ensure that the discharge does not cause or contribute to an exceedance of water quality standards.

3. Design Flow, 7Q10, and Available Dilution

Water quality-based limits are established with the use of a calculated available dilution. 314 CMR 4.03(3)(a) requires that effluent dilution be calculated based on the receiving water 7Q10. The 7Q10 is the lowest observed mean river flow for 7 consecutive days, occurring over a 10-year recurrence interval. Additionally, the facility design flow is used to calculate available effluent dilution.

Discharge Flow

The average facility flow between January 2010 and December 2012 was 4.09 MGD. The flow limit in the current permit is 5.4 MGD as a 12-month rolling average. No exceedances of this limit occurred during the data period.

In July 2011, the Town completed a final Comprehensive Wastewater Management Plan (CWMP). In that plan, the Town evaluated its future wastewater needs and proposed a final plan

to expand the wastewater treatment plant to 5.55 MGD. In the plan, the Town identified future sewerage needs and also described that some of its capacity had been used to provide treatment of flow from the Middlesex House of Correction (Middlesex HOC), which was connected to the Town's treatment plant in 2005. Prior to the tie-in, the Middlesex HOC operated its own treatment facility, and was authorized by its NPDES permit to discharge 150,000 gallons per day of treated wastewater to the Concord River. The Middlesex HOC treatment plant was shut down upon the tie-in, and its permit was transferred to the Town. As part of its CWMP evaluations, the Town concluded that it would not re-open the former Middlesex HOC treatment plant.

EPA notified the Town in October 2007 that if the discharge from the Middlesex HOC facility was permanently closed and the discharge permit terminated, EPA would allow a 150,000-gallon per day increase in the flow limit for the Town of Billerica WWTF, and because that increase was balanced by the decrease in authorized flow from the Middlesex HOC (which also discharged to the Concord River, upstream of the Billerica wastewater treatment plant), it would be consistent with antidegradation requirements and not require an antidegradation review.

However, a complicating factor was also described in the CWMP. Specifically, the Town has indicated that solids loading considerations, efforts to achieve the ammonia limits in the current permit, and the retirement of three obsolete secondary clarifiers have resulted in a reduction in the flow capacity of the existing WWTF to 4.7 MGD.

In consideration of all of these factors, EPA has decided to grant the flow increase in the draft permit, but require that Billerica not discharge more than 4.7 MGD until Phase I is complete, and not surpass 5.1 MGD flow until Phase II is complete.

Phase I of the WWTF upgrade includes a new final settling tank, a recirculation and waste pumping station, upgraded chlorination and dechlorination equipment, and a process return pump station. These upgrades will bring the capacity of the WWTF to 5.1 MGD. Phase II of the upgrade includes aeration system upgrades and a post-aeration system, which will raise the WWTF capacity to 5.55 MGD.

7Q10

Water quality-based limitations are established with a calculated available dilution. 314 CMR 4.03(3)(a) requires that effluent dilution be calculated based on the receiving water 7Q10. The 7Q10 is the lowest observed mean river flow for 7 consecutive days, recorded over a 10-year recurrence interval. The 7Q10 for the Concord River at the Billerica WWTF has been calculated as 13.0 MGD (20.1 cfs) as described below.

The Billerica treatment plant discharge is located between USGS gages in Maynard MA and Lowell MA. To obtain an estimate of a 7Q10 flow at a point between these two USGS gages, the drainage areas (DA) between them must be calculated and other flows included or excluded as explained below. All drainage area values for the locations below are estimated from USGS topographic maps and the USGS gazetteer of 1984 for the Merrimack River, in which the SUASCO (Sudbury-Assabet-Concord) river basin is included. The streamflows were determined using DFlow 3.1b, a streamflow modeling computer program.

Lowell, MA USGS gage (01099500), 7Q10 for 4/1/1993 – 3/31/2012 (20 years): **28.0 cfs**

(drainage area = 400 mi²)

Maynard, MA USGS gage (01097000), 7Q10 for 4/1/1993 – 3/31/2012 (20 years): **11.1 cfs**
(drainage area = 114 mi²)

The first step in estimating the 7Q10 upstream of the discharge is to calculate the watershed flow factor. The flow factor is an estimate of the non wastewater flows generated by the watershed per unit area during 7Q10 periods. It has been calculated using the 7Q10s and drainage areas at the Lowell and Maynard gages, the dry weather flows from the POTWs between the gages, and the direct drinking water withdrawal by the Town of Billerica.

1) The watershed area between the two gages is:

Area at the Lowell gage – area at the Maynard gage

400 square miles -114 square miles = **286 mi²**

2) Non wastewater 7Q10 flow between gages:

7Q10 at Lowell gage – 7Q10 at Maynard gage – wastewater flow from POTWs between the gages+ water withdrawal by Billerica

28.0 cfs -11.1 cfs – 10.0 cfs* + 9.1 cfs** = **16.0 cfs**

*This is the sum of the average effluent flow from the four WWTPs between the Maynard gage and the Lowell gage for the period of June to Sept of 2010-2012, reflecting the low flow season over that period.

- Maynard WWTP: 1.7 cfs
- MCI Concord WPCF: 0.35 cfs
- Concord WWTF: 1.7 cfs
- Billerica WWTF: 6.2 cfs

**Since the Town of Billerica has a water withdrawal from the Concord River above the Billerica WWTF discharge point, the average daily withdrawal for the period of June to September for 2010 of 5.84 MGD (9.1 cfs) has been added to the flow factor and subtracted from the 7Q10.

3) Flow factor for this stretch of river:

Non wastewater 7Q10 between gages/watershed area between gages:

16.0 cfs / 286 square miles = **0.05594 cfs/sq. mile**

Using the flow factor, the watershed area between the Billerica discharge and the Maynard gage and the other estimated flows, the 7Q10 at the Billerica discharge is then estimated as follows:

4) Estimated 7Q10 flow at Billerica WWTF: (watershed drainage area at Billerica WWTF = 369 mi²)

7Q10 at Maynard gage + wastewater flow from POTWs below the Maynard gage but upstream of Billerica discharge + non wastewater flow generated by watershed – Billerica drinking water withdrawal

$$11.1 \text{ cfs} + 3.75 \text{ cfs}^{***} + (369 \text{ mi}^2 - 114 \text{ mi}^2) * 0.05594 - 9.1 \text{ cfs}^{**} = \mathbf{20.0 \text{ cfs (12.9 MGD)}}$$

***This is the sum of the average effluent flow from the three WWTPs below the Maynard gage and upstream of the Billerica WWTF (Maynard, MCI Concord, and Concord).

The dilution factor can then be calculated using the discharge design flow and the receiving water 7Q10:

Dilution Factor = (Facility Flow + 7Q10)/Facility Flow

Dilution Factor = (5.55 MGD + 12.9 MGD)/5.55 MGD = **3.3**

4. Monitoring Frequency Reductions

The Town of Billerica has requested a monitoring frequency reduction for total residual chlorine (TRC) from 3 times per day to once per day and a reduction in *Escherichia coli* (*E. coli*) monitoring from 3 times per week to once per week.

EPA sets monitoring frequency on a case-by-case basis. EPA's Permit Writers' Manual advises that monitoring frequency should be established to ensure that there is sufficient data to characterize effluent quality and to detect events of noncompliance¹, and also advises the permit writer to consider effluent variability, design capacity, treatment method, compliance history, cost of monitoring relative to the permittee's capabilities, location of the discharge and the nature of the pollutants².

EPA's "Interim Guidance for Performance-based Reduction of NPDES Permit Monitoring Frequencies"³ sets forth guidance on how to best implement reduction in reporting and monitoring based on historical performance. EPA Region 1 has used this guidance to evaluate the proposed reduction of Billerica's monitoring frequency for total residual chlorine (TRC) and *E. coli*.

Among the factors that EPA must consider when proposing a monitoring frequency reduction are facility enforcement history, compliance for the parameter being considered, and the performance history for the parameter being considered. Based on a review of EPA Region 1's records, there have been no recent enforcement actions against the facility. There was one violation of the maximum daily fecal coliform limit (1300 cfu/100 mL in June 2010) but no effluent violations for TRC within the past two years. The performance history criterion requires

¹ EPA, 2010, "NPDES Permit Writers' Manual, p 8-5.

² *Ibid.*

³ EPA, 1996, "Interim Guidance for Performance-Based Reduction of NPDES Permit Monitoring Frequencies".

EPA to use, at a minimum, the two most recent years of monthly average effluent data to calculate the long term average discharge rate. A ratio is then calculated between the long-term average and the permitted concentration for the selected parameters.

Table 1: Parameter-By-Parameter Evaluation of Performance History

	Average of Monthly Average Discharges*	Monthly Average Limit	Ratio [(Average /Permit Limit)*100]	Current Monitoring Frequency	Frequency Based on Guidance
Monthly Average TRC	7.5 µg/L	45 µg/L	17%	3/day	N/A
Monthly Average Fecal Coliform	5.5 cfu/100 mL	200 cfu/100 mL	3%	3/week	1/week

*from January 2010 through December 2012

The ratio of the long term TRC effluent average to the discharge limit is 17%, which indicates little probability that the effluent exceeds the monthly average TRC limits. The current monitoring frequency of 3/day is more frequent than the examples listed in the guidance. However, in cases where facilities have current monitoring frequencies of 3/week and effluent to limit ratios of less than 25%, the guidance suggests a monitoring reduction to once per week. Therefore, EPA has decided to reduce Billerica's TRC monitoring frequency to once per day.

The ratio of the long term fecal coliform effluent average to the discharge limit is 3%, which indicates a consistently high level of disinfection at the facility. The suggested reduced monitoring frequency is once per week for parameters with 3/week current monitoring frequency and long term effluent ratios of 25% or less. However, EPA must also consider that there was one violation of the single sample maximum in June 2010, and that the parameter is changing from fecal coliform to *E. coli*, which uses slightly different testing methods. EPA has decided that the frequency of *E. coli* monitoring for the first year of the permit will be 3/week and thereafter will be reduced to once per week⁴, unless EPA provides the Town with written notice that the higher monitoring frequency be maintained based on its review of the compliance data.

Permittees are expected to maintain the performance levels that were used as the basis for granting monitoring reductions. To remain eligible for these reductions, the permittee may not have any Significant Noncompliance (SNC) violations for effluent limitations of the parameters for which reductions have been granted or failure to submit DMRs, or may not be subject to a new formal enforcement action. For facilities that do not maintain performance levels, the EPA may require increased monitoring in accordance with a Section 308 Order.

5. Conventional Pollutants: BOD₅, TSS, pH, and E. coli

BOD₅ and TSS

⁴ This permit provision shall not diminish EPA's authority under federal regulations to reasonably increase the monitoring frequency through a permit modification during the term of the permit. See 40 CFR § 122.62.

Under Section 301(b)(1)(B) of the CWA, POTWs must have achieved effluent limitations based on secondary treatment by July 1, 1977. The secondary treatment requirements are set forth at 40 CFR Part 133. Effluent limitations for monthly and weekly average Biochemical Oxygen Demand (BOD₅) and Total Suspended Solids (TSS) are based on requirements under Section 301(b)(1)(B) of the CWA and 40 CFR 133.102.

The BOD₅ and TSS draft limits are based on secondary treatment requirements. Discharge monitoring data was reviewed from January 2010 through December 2012. There was one violation of the TSS average weekly loading limit in April 2010, and one violation of the BOD₅ weekly average loading limit in September 2011. The BOD₅ and TSS removal percentages have met the 85% removal requirement, with the exception of April 2010, when the BOD₅ percentage removal was 82%.

The draft permit carries forward the average weekly limit of 45 mg/L and average monthly limit of 30 mg/L for BOD₅ and TSS. The loading limits in the draft permit have been recalculated based on increased capacity of the WWTF once upgrades are complete. Requirements for removal of 85% of the influent BOD₅ and TSS load, which are based on secondary treatment requirements, have also been carried over from the current permit.

Load (lbs/day) = Design Flow (MGD) x Limit (mg/L) x 8.34 (conversion factor)

Monthly Average Load (lbs/day) = 5.55 MGD x 30 mg/L x 8.34 = 1,389 lbs/day

Weekly Average Load Limit (lbs/day) = 5.55 MGD x 45 mg/L x 8.34 = 2,083 lbs/day

E. coli

The current permit contains fecal coliform limits of 200 colony forming units (cfu)/100 ml average monthly and 400 cfu/100 ml maximum daily. There was one violation of the maximum daily limit in June 2010, with a result of 1,300 cfu/100 ml.

The *E. coli* limits in the draft permit are based on the MA SWQS for Class B waters (314 CMR 4.05(3)(b)4). The Commonwealth of Massachusetts promulgated *E. coli* criteria in the Surface Water Quality Standards (314 CMR 4.00) on December 29, 2006, replacing the fecal coliform bacteria criteria. EPA approved these new criteria on September 19, 2007.

The *E. coli* limits proposed in the draft permit are a monthly geometric mean of 126 cfu/100 ml (cfu/100 ml) and a daily maximum of 409 cfu/100 ml (this is the 90% distribution of the geometric mean of 126 cfu/100 ml). The proposed *E. coli* monitoring frequency in the draft permit is three times per week for the first year of the permit, then once per week, provided that the facility complies with the *E. coli* effluent limit. The draft permit requires that *E. coli* samples be collected at the same time as one of the total residual chlorine samples.

pH

The pH range requirement has been maintained at 6.5 S.U. to 8.3 S.U. The pH monitoring frequency in the draft permit remains once per day. There were no pH violations from 2010 through 2012.

6. Non-Conventional Pollutants

Total Residual Chlorine

Chlorine is a toxic chemical, and chlorine compounds produced from the disinfection of wastewater can be extremely toxic to aquatic life. The acute and chronic water quality criteria for chlorine defined in the 2002 EPA National Recommended Water Quality Criteria for freshwater are 19 µg/L and 11 µg/L, respectively.

The current permit contains an average monthly TRC limit of 45 µg/L and a maximum daily TRC limit of 78 µg/L. These limits were determined by multiplying the dilution factor by the criteria. From January 2010 through December 2012, there were no exceedances of TRC permit limits.

The draft permit contains an average monthly limit of 36 µg/L, and a maximum daily limit of 63 µg/L. These limits are in effect year round. Sampling will be required once each day.

$$TRC_{Acute} = 19 \mu\text{g/L} * 3.3 = 63 \mu\text{g/L}$$

$$TRC_{Chronic} = 11 \mu\text{g/L} * 3.3 = 36 \mu\text{g/L}$$

Ammonia Nitrogen

High levels of ammonia in the water column can be toxic to fish by making it more difficult for fish to excrete this chemical via passive diffusion from gill tissues. Ammonia toxicity varies with pH and temperature. Ammonia can also lower dissolved oxygen levels by conversion to nitrate/nitrite, a process that consumes oxygen.

The current permit limits includes monthly average and weekly average ammonia limits of 6 mg/L and a maximum daily limit of 9 mg/L for the months of May through October. These limits are based on toxicity. DMR data show that monthly average effluent ammonia concentrations range from 0.04 mg/L to 6.0 mg/L during these months (see Appendix A), with one violation of the weekly average limit in May 2010.

For the months of November through April, the current permit requires sampling for ammonia and reporting of the average monthly and maximum daily discharges. The monthly average effluent ammonia concentration during these months ranges from 0.06 mg/L to 6.9 mg/L.

The current permit limits have been carried forward into the draft permit. With regards to the flow increase, concentration limits have been held constant, and new loading limits will take effect. This is because the current ammonia limits are based on toxicity, and ammonia does not persist in the environment.

Load (lbs/day) = Design Flow (MGD) x Limit (mg/L) x 8.34 (conversion factor)

Monthly Average/Weekly Average Load (lbs/day) = 5.55 MGD x 6 mg/L x 8.34 = 278 lbs/day
(April 1st – October 31st)

The limits in the draft permit are average monthly and average weekly limits of 6 mg/L and a maximum daily limit of 9 mg/L for the months of May through October. A monthly average mass limit of 278 lbs/day is also included for the months of May through October. The draft permit also requires reporting of the average monthly and maximum daily ammonia concentrations for the months of November through April.

Total Phosphorus

The MA SWQS (314 CMR 4.00) do not contain numerical criteria for total phosphorus. The narrative criteria for nutrients is found at 314 CMR 4.05(5)(c), which states that “[u]nless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses and shall not exceed the site specific criteria developed in a TMDL or as otherwise established by the Department pursuant to 314 CMR 4.00.” The Standards also require that “[a]ny existing point source discharges containing nutrients in concentrations that would cause or contribute to cultural eutrophication, including the excessive growth of aquatic plants or algae, in any surface water shall be provided with the most appropriate treatment as determined by the Department including, where necessary, highest and best practicable treatment (HBPT) for POTWs and BAT (Best Available Technology Economically Achievable) for non POTWs, to remove such nutrients to ensure protection of existing and designated uses”. MassDEP has established that a monthly average total phosphorus limit of 0.2 mg/L (200 µg/L) represents highest and best practical treatment for POTWs.

The current permit contains a monthly average phosphorus limit of 0.2 mg/L (200 µg/L), calculated as a 60-day rolling average, for the months of April through October, and a limit of 1 mg/L for the rest of the year. The limit is based on highest and best treatment, as defined by MassDEP. The permit included a compliance schedule for attaining this limit that provided the Town with time to upgrade the facility to meet the final limit. From September 2005 through October 2009, the summer interim total phosphorus limit was 0.75 mg/L. After the 0.2 mg/L limit went into effect in September 2009, the permittee exceeded the limit for the entire season, from June 2010 (the first month to show a violation of the 60-day rolling average) through October 2010. Billerica WWTF added a CoMag phosphorus removal process in the fall of 2010, and it met the 0.2 mg/L seasonal effluent limitation in 2011 and 2012.

EPA calculated the downstream phosphorus concentration with the existing 0.2 mg/L permit limit to verify that the existing limit is sufficiently protective of water quality standards. The upstream concentration, 50 µg/L, is the median phosphorus concentration reported for the Concord River at Lowell Road, Billerica by OARS (Organization for the Assabet River) in 2010 and 2011. As the calculation below shows, with an upstream concentration of 50 µg/L and with the Billerica WWTF discharging 0.2 mg/L phosphorus at its future design flow of 5.55 MGD, the downstream phosphorus concentration would be 95 µg/L during 7Q10 conditions, less than the Gold Book criteria of 100 µg/L.

Downstream Phosphorus Concentration			
Where			
C_r	=	Concentration below outfall	
Q_d	=	Discharge flow	= 5.55 MGD
C_d	=	Discharge concentration	= 200 µg/L
Q_s	=	Upstream flow	= 12.9 MGD
C_s	=	Upstream concentration	= 50 µg/L
Q_r	=	Streamflow below outfall	= 18.45 MGD
			(effluent + upstream)
Therefore,			
C_r	=	$\frac{(5.55 \text{ MGD} \times 200 \text{ µg/L}) + (12.9 \text{ MGD} \times 50 \text{ µg/L})}{18.45 \text{ MGD}}$	
		$= 95 \text{ µg/L} < 100 \text{ µg/L (Gold Book criterion)}$	

EPA has determined that the existing limit of 200 µg/L is still protective. Ongoing improvements to wastewater treatment plants upstream on the Assabet and Sudbury Rivers will lower the upstream phosphorus concentration further, such that the Gold Book criteria is maintained downstream of the Billerica WWTF, even with an increased flow to 5.55 MGD.

As in the current permit, the proposed average monthly total phosphorus limit is 200 µg/L for the months of April through October. EPA has changed the averaging period for the limit. The current permit establishes 0.2 mg/L as a 60-day rolling average, which is not consistent with 40 CFR 122.45(d)(2), which requires limitations for POTWs to be established as average weekly and average monthly limitations, unless impracticable. Accordingly, the averaging period for the limit in the draft permit has been changed to monthly. For the months of November through March, the proposed average monthly limit is 1,000 µg/L. Sampling frequency will be twice per week for the months of April through October and once per week for the months of November through March. The load limits are calculated below.

Load (lbs/day) = Design Flow (MGD) x Limit (mg/L) x 8.34 (conversion factor)

Monthly Average Load (lbs/day) = 5.55 MGD x 0.2 mg/L x 8.34 = 9.3 lbs/day (April through October)

Monthly Average Load (lbs/day) = 5.55 MGD x 1.0 mg/L x 8.34 = 46.3 lbs/day (November through March)

Aluminum

Aluminum, in the form of alum or other compounds, is a commonly used chemical additive in wastewater treatment to remove phosphorus. The release of metals such as aluminum into the environment can result in levels that are highly toxic to aquatic life. Therefore, it is necessary to

evaluate the downstream effects of discharges of aluminum from wastewater treatment plants. Water quality-based effluent limitations are included in NPDES permits when limitations more stringent than technology-based limitations are necessary to achieve or maintain water quality standards in the receiving water (40 CFR § 122.44(d)(1)). Such determinations are made when EPA finds that there is reasonable potential for the discharge to cause or contribute to an instream excursion above a water quality criterion contained within applicable state water quality standards (40 CFR § 122.44(d)(1)(i)).

The current permit includes water quality-based limits on aluminum. The average monthly limit of 357 µg/L was calculated by multiplying the chronic water quality criterion, 87 µg/L, by the then dilution factor, 4.1. The Billerica WWTF has violated the average monthly limit 23 times in the past 36 months. In the re-application, Billerica indicated that the upgrade of the WWTF to a CoMag system would improve removal of phosphorus and aluminum from the effluent. Although the compliance record improved in 2012, there were still two violations of the monthly average aluminum limit in March and April 2012. There were no violations for the remainder of 2012.

EPA evaluated the existing 357 µg/L permit limit to verify that it is sufficiently protective of designated uses. The median upstream concentration of aluminum from recent Whole Effluent Toxicity (WET) tests (January 2010 through December 2012) is 90 µg/L, over the chronic water quality criterion. This means that the Concord River has no remaining assimilative capacity, and that any discharge concentration over 87 µg/L would cause an exceedance of water quality standards. The current permit limit, 357 µg/L, is therefore not sufficiently protective of water quality standards. EPA has calculated a new permit limit to account for upstream concentrations.

Table 1. Upstream Aluminum Concentrations from Quarterly WET tests.

Date	Al (µg/L)
Jan-10	40
Mar-10	60
Jun-10	100
Sep-10	133
Dec-10	43
Mar-11	60
Jun-11	127
Sep-11	111
Dec-11	64
Mar-12	64
Jun-12	111
Sep-12	183
Dec-12	90
Median	90

Table 2. Monthly Average Effluent Aluminum Concentrations (Limit = 357 µg/L)

Date	Monthly Average	Date	Monthly Average
Jan 2011	260.	Jan 2012	230.
Feb 2011	330.	Feb 2012	260.
Mar 2011	248.	Mar 2012	460.
Apr 2011	430.	Apr 2012	510.
May 2011	360.	May 2012	320.
Jun 2011	338.	Jun 2012	320.
Jul-2011	430	Jul 2012	140
Aug 2011	260.	Aug 2012	130.
Sep 2011	243.	Sep 2012	160.
Oct 2011	640.	Oct 2012	300.
Nov 2011	320.	Nov 2012	354.
Dec 2011	210.	Dec 2012	250.

EPA also took into account that upstream concentrations of aluminum will change due to updated permit limits on nearby facilities. The draft permit for the Concord WWTP, which discharges to the Concord River upstream of the Billerica WWTF, includes a more stringent aluminum permit limit that will reduce the background level of aluminum at the Billerica WWTF discharge. The

proposed monthly average permit limit for Concord is 255 µg/L, compared to Concord's average effluent concentration of 709 µg/L in 2010-2012. The limitation proposed in the Billerica WWTF draft permit takes this into account by estimating the decrease in aluminum load in the Concord River:

Current Loading from Concord WWTF:

Concentration: 709 µg/L (0.709 mg/L)

Current Average Flow: 1.10 MGD

Loading = 0.709 mg/L x 1.1 MGD x 8.34 = 6.50 lbs/day

Projected Loading from Concord WWTF with 255 µg/l average monthly aluminum limit:

Concentration: 255 µg/L (0.255 mg/L)

Current Average Flow: 1.10 MGD

Loading = 0.255 mg/L x 1.10 MGD x 8.34 = 2.34 lbs/day

Difference in Loading:

6.50 lbs/day – 2.34 lbs/day = 4.16 lbs/day decrease

Current Instream Load, upstream of Billerica:

Concentration: 90 µg/l (0.090 mg/L)

7Q10 Flow: 12.9 MGD

Load = 0.090 mg/L x 12.9 MGD x 8.34 = 9.68 lbs/day

Projected Instream Load, upstream of Billerica = Current Instream Load – Reduction in
Concord WWTF Load
= 9.68 lbs/day – 4.16 lbs/day = 5.52 lbs/day

Rearranging the Load equation to solve for concentration,

Projected Instream Concentration = $\frac{\text{Load (lbs/day)}}{\text{Flow (MGD)} \times 8.34}$

= $\frac{5.52 \text{ lbs/day}}{12.9 \text{ MGD} \times 8.34}$

= **0.051 mg/L (51 µg/l)**

The proposed limit in the draft permit has been calculated to ensure that the projected downstream concentration does not exceed 87 µg/L, based on an upstream concentration of 51 µg/L.

Monthly Average Aluminum Limit			
C_d	=	$\frac{(Q_r C_r - Q_s C_s)}{Q_d}$	
Where			
C_d	=	Discharge concentration	= ?
C_r	=	Concentration below outfall	= 87 µg/L (chronic criterion)
Q_d	=	Discharge flow	= 5.55 MGD
Q_s	=	Upstream flow	= 12.9 MGD
C_s	=	Upstream concentration	= 51 µg/L
Q_r	=	Streamflow below outfall (effluent + upstream)	= 18.45 MGD
C_d	=	$\frac{(18.45 \text{ MGD})(87 \text{ µg/L}) - (12.9 \text{ MGD})(51 \text{ µg/L})}{5.55 \text{ MGD}}$	
	=	170.7 µg/L	

The draft permit contains an average monthly aluminum limit of 171 µg/L and mass limit of 6.9 lbs/day based on a flow of 5.55 MGD (see calculation below).

Load (lbs/day) = Design Flow (MGD) x Limit (mg/L) x 8.34 (conversion factor)

Monthly Average Load (lbs/day) = 5.55 MGD x 0.171 mg/L x 8.34 = 7.9 lbs/day

The draft permit also requires the maximum daily aluminum concentration to be reported on the monthly DMR. The monitoring frequency remains twice per month.

Copper

Certain metals, including copper, can be toxic to aquatic life. The *National Recommended Water Quality Criteria: 2002* (US EPA 2002 [EPA-822-R-02-047]) includes copper criteria for the protection of aquatic life.

The current permit requires quarterly monitoring for copper as part of the Whole Effluent Toxicity testing. An examination of the Billerica WWTF's effluent data from 2010-2012 indicates that effluent copper concentrations range from 5.0 µg/L to 12.1 µg/L (see Appendix B). EPA used this information to perform a Reasonable Potential Analysis to determine the potential for discharges of copper from the Billerica WWTF to cause or contribute to an excursion above water quality criteria.

First, EPA used hardness data from the Billerica WWTF WET test reports from January 2010 through December 2012 to estimate instream hardness in order to calculate the copper criteria, which is hardness-dependent. The hardness values used in this calculation are the median

hardness values measured in the treatment plant discharge and the upstream receiving water during this period.

Hardness Analysis			
$Q_r C_r = Q_d C_d + Q_s C_s$			
Where			
C_r	=	Concentration below outfall	
Q_d	=	Discharge flow	= 5.55 MGD
C_d	=	Discharge concentration	= 83.5 mg/L
Q_s	=	Upstream flow	= 12.9 MGD
C_s	=	Upstream concentration	= 53.5 mg/L
Q_r	=	Streamflow below outfall (effluent + upstream)	= 18.45 MGD
Therefore,			
C_r	=	$\frac{(5.55 \text{ MGD} \times 83.5 \text{ mg/L}) + (12.9 \text{ MGD} \times 53.5 \text{ mg/L})}{18.45 \text{ MGD}}$	
	=	63 mg/L	
1. Acute Criteria (Total Recoverable) = $\exp\{m_a [\ln(h)] + b_a\} = 9.1 \mu\text{g/L}$			
Where:			
m_a	=	Pollutant-specific coefficient	= 0.9422
b_a	=	Pollutant-specific coefficient	= -1.700
\ln	=	Natural logarithm	
h	=	hardness of the receiving water	= 63 mg/L

2. Chronic Criteria (Total Recoverable) = $\exp\{m_c [\ln(h)] + b_c\} = 6.3 \mu\text{g/L}$			
Where:			
m_c	=	Pollutant-specific coefficient	= 0.8545
b_c	=	Pollutant-specific coefficient	= -1.702
\ln	=	Natural logarithm	
h	=	hardness of the receiving water	= 63 mg/L

EPA then estimated the maximum effluent concentration as 13.0 $\mu\text{g/l}$ by calculating the 95th percentile of the available effluent data from January 2010 through December 2012 (see Appendix B).

The background concentration of copper in the Concord River was determined from the WET chemistry dilution water samples from January 2010 through December 2012. For the purpose of calculating reasonable potential, EPA used the median of the upstream concentrations, 3 $\mu\text{g/L}$. This pollutant concentration was then inserted into a steady-state mixing equation to determine whether the projected discharge could cause or contribute to an excursion from water quality criteria under critical conditions.

Reasonable Potential Analysis for Copper

$$Q_r C_r = Q_d C_d + Q_s C_s$$

Where

C_r	=	Concentration below outfall	
Q_d	=	Discharge flow	= 5.55 MGD
C_d	=	Discharge concentration	= 13.0 µg/L
Q_s	=	Upstream flow	= 12.9 MGD
C_s	=	Upstream concentration	= 3 µg/L
Q_r	=	Streamflow below outfall (effluent + upstream)	= 18.45 MGD

Therefore,

$$C_r = \frac{(5.55 \text{ MGD} \times 13.0 \text{ µg/L}) + (12.9 \text{ MGD} \times 3 \text{ µg/L})}{18.45 \text{ MGD}}$$

$$= 6.0 \text{ µg/L} < 9.1 \text{ µg/L (acute criterion)}$$

$$= 6.0 \text{ µg/L} < 6.3 \text{ µg/L (chronic criterion)}$$

Therefore, there is **no** reasonable potential for the discharge at 5.55 MGD to cause or contribute to an exceedance of the chronic copper criterion. The draft permit requires the Billerica WWTF to continue testing for copper as part of the quarterly whole effluent toxicity testing.

Other Toxic Metals

Data from whole effluent toxicity testing indicates that levels of other toxic metals; including zinc, cadmium, and lead; are below water quality criteria. Therefore, the discharge of these metals cannot have the reasonable potential to cause or contribute to exceedances of the applicable water quality criteria, so no reasonable potential analysis has been done for these metals. The Billerica WWTF will continue to monitor levels of these metals in the effluent as part of whole effluent toxicity testing.

Outfall 001 – Whole Effluent Toxicity

Under Section 301(b)(1)(C) of the CWA, discharges are subject to effluent limitations based on water quality standards. The MA SWQS at 314 CMR 4.05(5)(c) include the following narrative 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.”

National studies conducted by the EPA have demonstrated that domestic sources contribute toxic constituents to POTWs. These constituents include metals, chlorinated solvents, aromatic hydrocarbons and others. Based on the potential for toxicity from domestic sources, the state narrative water quality criterion, the limited dilution at the discharge location, and in accordance with EPA national and regional policy and 40 C.F.R. § 122.44(d), the draft permit includes whole

effluent chronic and acute toxicity limitations ($C\text{-NOEC} \geq 30\%$ and $LC50 \geq 100\%$). (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 toxicity limits in the current permit were established using the Massachusetts Toxics Policy (the "Policy"). The Policy requires that for discharges with dilution factors of 10 and under, the C-NOEC must equal or exceed the receiving water concentration (RWC) of the effluent, which is the inverse of the dilution factor.

$$C\text{-NOEC} \geq RWC = 1/\text{dilution factor}$$

$$=1/3.3$$

$$=0.30 \text{ (30\%)}$$

The Policy also requires that for discharges with dilution factors less than 100 an acute LC50 limit of 100 percent or greater be included in the permit.

On October 9, 2009, Billerica requested a reduction in their WET testing requirements. EPA conducted a review of the four most recent available WET tests for the Billerica WWTF: September 2009, December 2009, March 2010, and June 2010. The March, June, and September test results show compliance with permit requirements. The December 2009 report did not meet Test Acceptability Criteria for the fathead minnow (*Pimephales promelas*) test; however, a satisfactory re-test was performed in January 2010. Because the four previous test reports did meet permit and WET test requirements, EPA removed the requirement to perform the *P. promelas* test for the remainder of the permit term on October 21, 2010.

The requirements for WET testing recently changed such that the modified acute toxicity test in the current permit, which is conducted as part of the chronic toxicity test, is no longer used for compliance. Thus, the modified acute testing requirement is being replaced by a standalone acute toxicity test. The acute toxicity testing protocol is Attachment B to the draft permit.

The draft permit carries forward the requirements for quarterly chronic and acute toxicity tests using only the species *Ceriodaphnia dubia*. The acute toxicity endpoint, expressed as LC50, must equal or exceed 100% effluent. The chronic toxicity endpoint, expressed as C-NOEC (no effect concentration), must equal or exceed 30% effluent. The tests must be performed in accordance with the test procedures and protocols specified in **Permit Attachments A and B**. The tests will be conducted four times a year, during the following months: March, June, September and December.

VI. OPERATION AND MAINTENANCE OF THE COLLECTION SYSTEM

EPA regulations set forth a standard condition for "Proper Operation and Maintenance" that is included in all NPDES permits. See 40 CFR § 122.41(e). This condition is specified in Part II.B.1 (Standard Conditions) of the draft permit and it requires the proper operation and

maintenance of all wastewater treatment systems and related facilities installed or used to achieve permit conditions.

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

Proper operation of collection systems is critical to prevent blockages and equipment failures that would cause overflows of the collection system (sanitary sewer overflows, or SSOs), and to limit the amount of non-wastewater flow entering the collection system (inflow and infiltration or I/I). I/I in a collection system can pose a significant environmental problem because it may displace wastewater flow and thereby cause, or contribute to causing, SSOs. Moreover, I/I could reduce the capacity and efficiency of the treatment plant and cause bypasses of secondary treatment. Therefore, reducing I/I will help to minimize any SSOs and maximize the flow receiving proper treatment at the treatment plant. There is presently estimated to be approximately 200,000 gallons per day of I/I in the sewer system.

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

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

MassDEP executed an Administrative Consent Order with Penalty (ACOP) with the Town of Billerica on September 24, 2010. The ACOP requires the Town to develop and implement a Sanitary Sewer Overflow Abatement Plan (SSOAP). MassDEP approved the Town’s SSOAP on April 11, 2012. As an element of the work needed to develop the SSOAP, the Town completed an Infiltration and Inflow Analysis in December 2011. The I/I Analysis estimated approximately 3.6 mgd of peak infiltration and 13.5 mgd of peak inflow into the Town’s sewer system. The Town is proceeding with three phases of Sewer System Evaluation Surveys (SSES) pursuant to the recommendations of the I/I Plan, and will implement I/I abatement work in line with the findings of the SSES work, and subject to the terms of the ACOP.

VII. PRETREATMENT PROGRAM

Billerica WWTF is required to have a pretreatment program regulating five Categorical Industrial Users (CIUs) and twelve non-categorical Significant Industrial Users (SIUs) that contribute flow to the facility. A CIU is an industrial user that is subject to categorical pretreatment standards under Section 307 of the CWA. A non-categorical SIU is an industrial user that meets one of the following criteria: a) contributes more than 25,000 gallons per day of process wastewater or b) contributes process wastewater that comprises more than 5% of dry weather hydraulic flow to the POTW, or c) is designated by the POTW as having the potential to disrupt operation of the POTW or cause violation of pretreatment standards. Process wastewater is water that comes into contact with the industrial process, raw materials, finished materials, or byproducts. Non-process wastewaters include non-contact cooling water, boiler blow-down, and domestic wastewater.

Billerica WWTF has imposed local limits on all of its industrial users. Of its 17 industrial users, only Baker Commodities has caused operational problems at the Billerica WWTF during the current permit term, when it discharged large amounts of solids to the WWTF in January 2009.

The permittee is required to administer a pretreatment program based on authority granted under 40 C.F.R. Part 403 and Section 307 of the CWA. The permittee's pretreatment program received EPA approval on July 16, 1985 and, as a result, appropriate pretreatment program requirements were incorporated into the existing permit that were consistent with the approval and federal pretreatment regulations in effect when the permit was issued.

Periodically, the Federal Pretreatment Regulations in 40 C.F.R. Part 403 are amended. Those amendments establish new requirements for implementation of the pretreatment program. Upon reissuance of this NPDES permit, the permittee is obligated to modify its pretreatment program to be consistent with the current Federal regulations. Those activities that the permittee must address include, but are not limited to, the following: (1) develop and enforce EPA approved specific effluent limits (technically-based local limits); (2) revise the local sewer use ordinance or regulation, as appropriate, to be consistent with Federal regulations; (3) develop an enforcement response plan; (4) implement a slug control evaluation program; (5) track significant noncompliance for industrial users; and (6) establish a definition of and track significant industrial users. These requirements are necessary to ensure continued compliance with the NPDES permit.

In addition to the requirements described above, the draft permit requires the permittee to submit to EPA in writing, within 180 days of the effective date of the permit, a description of proposed changes to the permittee's pretreatment program deemed necessary to assure conformity with current federal pretreatment regulations. These requirements are included in the draft permit to ensure that the pretreatment program is consistent and up to date with all pretreatment requirements in effect. Lastly, the permittee must continue to submit, annually on March 15th, a pretreatment report detailing the activities of the program during the previous calendar year.

VIII. SLUDGE INFORMATION AND REQUIREMENTS

The permittee transports its sludge to the Woonsocket, Rhode Island Regional Incinerator for final treatment and disposal. The Billerica WWTF generates approximately 1,300 dry metric tons of sludge each year.

In February 1993, EPA promulgated standards for the use and disposal of sewage sludge. The regulations were promulgated under the authority of §405(d) of the CWA. Section 405(f) of the CWA requires that these regulations be implemented through permits. This permit is intended to implement the requirements set forth in the technical standards for the use and disposal of sewage sludge, commonly referred to as the Part 503 regulations.

Section 405(d) of the CWA requires that sludge conditions be included in all municipal permits. The sludge conditions in the draft permit satisfy this requirement and are taken from EPA's proposed Standards for the Disposal of Sewage Sludge to be codified at 40 CFR Part 503 (February 19, 1993 - Volume 58, pp 9248-9415). These conditions are outlined in the draft permit.

IX. ESSENTIAL FISH HABITAT

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 such as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. § 1802 (10)). Adversely impact means any impact which reduces the quality and/or quantity of EFH (50 C.F.R. § 600.910 (a)). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

Essential fish habitat (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 Billerica WWTF discharges to the Concord River, which is a tributary of the Merrimack River. The Merrimack River system has been designated as EFH for Atlantic salmon. Although EFH has been designated for this general location, EPA has concluded that this activity is not likely to affect EFH or its associated species for the following reasons:

- The effluent receives advanced treatment;
- The facility withdraws no water from the Concord River; therefore no life stages of Atlantic salmon are vulnerable to impingement or entrainment from this facility;
- Limits specifically protective of aquatic organisms have been established for ammonia, chlorine, phosphorus and aluminum, and are based on EPA water quality criteria;
- Acute and chronic toxicity testing on *Ceriodaphnia dubia* is required four (4) times per year and the recent toxicity results are in compliance with permit limits;
- The permit prohibits any violation of state water quality standards.

EPA believes that the conditions and limitations contained within the draft permit adequately protect all aquatic life, including those species with EFH designation. Impacts associated with issuance of this permit to the EFH species, their habitat and forage, have been minimized to the extent that no significant adverse impacts are expected. Further mitigation is not warranted.

X. ENDANGERED SPECIES

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

EPA has reviewed the 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 one federally protected species, the small whirled pogonia (*Isotria medeoloides*), an orchid, merited further discussion.

The small whirled pogonia orchid has been identified in Groton, Massachusetts, which is three towns away from the Billerica WWTP. The small whorled pogonia is found in “forests with somewhat poorly drained soils and/or a seasonally high water table,” according to the USFWS website. This species is not aquatic; therefore it is unlikely that it would come into contact with the facility discharge.

EPA is coordinating a review of this finding with USFWS and NMFS through the draft permit and fact sheet, and consultation under Section 7 of the ESA with USFWS and NMFS is not required.

XI. MONITORING AND REPORTING

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

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.

Billerica WWTF has been using NetDMR since 2012; therefore, the draft permit does not contain a compliance schedule for NetDMR adoption. 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.

XII. STATE PERMIT CONDITIONS

The NPDES Permit is issued jointly by EPA and MassDEP 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 MassDEP Commissioner. Additional State permit conditions are included in Part H of the draft permit.

XIII. GENERAL CONDITIONS

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

XIV. STATE CERTIFICATION REQUIREMENTS

The staff of MassDEP have reviewed the draft permit. EPA has requested permit certification by the State pursuant to 40 CFR Part 124.53 and expects that the draft permit will be certified.

XV. PUBLIC COMMENT PERIOD 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 by the close of the public comment period, to the U.S. EPA, Office of Ecosystem Protection, 5 Post Office Square, Suite 100, Boston, Massachusetts 02109-3912. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues proposed to be raised in the hearing. Public hearings may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates a significant public interest. In reaching a final decision on the draft permit, the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston office.

Following the close of the comment period and after 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.

XVI. EPA CONTACT

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:

Robin L. Johnson
EPA New England – Region 1
5 Post Office Square, Suite 100
Mail Code OEP06-1
Boston, MA 02109-3912
Telephone: (617) 918-1045
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August 2013

Ken Moraff, Acting Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency

Appendix A - Effluent Characteristics

Monitoring Period End Date	Flow, daily Max MGD	Flow, 12- month rolling avg MGD	pH Min s.u.	pH Max s.u.	BOD, avg monthly loading lb/day	BOD, weekly avg loadiing lb/day	BOD, max daily loading lb/day	BOD, monthly avg mg/l	BOD, weekly avg mg/l	BOD, percent removal %	TSS, avg monthly loading lb/day
01/31/2010	6.4	4.	6.8	7.2	470.	600.	1770.	8.	11.	91.	279.
02/28/2010	9.3	4.	6.8	7.6	314.	512.	1389.	8.	13.	95.	335.
03/31/2010	14.1	4.4	6.6	7.1	713.	1119.	1307.	11.	15.	82.	901.
04/30/2010	14.	4.5	6.6	7.3	423.	975.	1068.	12.	25.	87.	807.
05/31/2010	4.2	4.6	7.1	7.9	207.	427.	11.7	8.	9.	92.	245.
06/30/2010	6.	4.5	6.9	7.4	212.	308.	651.	7.	8.	92.	199.
07/31/2010	5.7	4.3	7.	7.5	200.	231.	378.	10.	14.	94.	246.
08/31/2010	3.7	4.3	7.	7.9	80.	115.	156.	7.	7.	98.	130.
09/30/2010	4.9	4.3	6.9	7.7	98.	130.	161.	5.	6.	99.	116.
10/31/2010	4.2	4.3	7.	7.7	59.	99.	186.	4.	5.	99.	114.
11/30/2010	3.6	4.2	6.9	7.4	58.	86.	342.	4.	6.	99.	117.
12/31/2010	3.9	4.2	6.5	7.6	85.	162.	226.	4.	5.	98.	108.
01/31/2011	3.6	4.1	6.8	7.8	77.	112.	235.	3.	4.	98.	73.
02/28/2011	5.2	4.	6.9	7.6	94.	1446.	478.	3.	3.5	94.	154.
03/31/2011	9.7	3.8	6.8	7.4	355.	764.	1040.	6.	10.	93.	349.
04/30/2011	6.	3.7	7.	7.9	154.	166.	275.	4.	4.	97.	211.
05/31/2011	4.5	3.7	6.9	7.5	105.	120.	354.	3.	4.	97.	176.
06/30/2011	4.	3.7	7.	7.4	58.	67.	132.	2.	2.	99.	99.
07/31/2011	3.5	3.7	6.8	7.5	60.	55.	89.	2.	4.	100.	125.
08/31/2011	4.7	3.7	7.	7.6	58.	6.	106.	2.	3.	100.	102.
09/30/2011	7.7	3.9	6.9	7.6	79.	3109.	1258.	2.	3.	100.	141.
10/31/2011	5.7	3.9	6.5	7.4	129.	217.	350.	4.	4.	100.	208.
11/30/2011	5.6	4.1	6.6	7.6	124.	136.	374.	3.	5.	100.	170.
12/31/2011	6.9	4.2	6.5	8.	195.	353.	398.	6.	8.	100.	199.
01/31/2012	5.2	4.3	6.7	8.3	170.	216.	470.	5.	6.	100.	215.
02/29/2012	4.8	4.3	6.5	7.3	199.	148.	396.	3.	3.	100.	199.
03/31/2012	4.4	4.1	6.9	7.7	122.	160.	241.	4.	6.	100.	222.
04/30/2012	4.3	4.	6.9	7.5	41.9	51.	90.	1.	2.	100.	130.
05/31/2012	4.4	4.	6.8	7.4	33.	38.	64.	1.	1.	100.	161.
06/30/2012	3.8	4.	6.7	7.5	51.	36.	246.	1.	2.	100.	194.
07/31/2012	3.09	4.	7.1	7.9	26.	1019.	51.	1.	1.	100.	136.
08/31/2012	3.5	4.	7.3	7.7	26.	32.	67.	1.	1.	100.	134.
09/30/2012	3.3	3.9	7.3	7.8	29.	32.	75.	1.	2.	100.	119.
10/31/2012	3.7	3.2	6.8	7.7	101.	78.	82.	2.	2.	100.	101.
11/30/2012	3.6	3.86	6.7	7.9	177.	237.	303.	7.	8.	100.	149.
12/31/2012	3.5	4.1	6.6	7.	224.	259.	303.	9.	7.	100.	170.
Jan 2006 limits	Report	5.4	6.5	8.3	1350	2030	Report	30	45	85	1350
Minimum	3.09	3.2	6.5	7.	26.	6.	11.7	1.	1.	82.	73.
Maximum	14.1	4.6	7.3	8.3	713.	3109.	1770.	12.	25.	100.	901.
Average	5.41	4.05	6.84	7.59	155.75	378.36	420.08	4.56	6.10	97.33	209.28
Standard Deviation	2.64	0.28	0.21	0.27	145.04	584.01	437.39	3.06	4.87	4.23	171.26
#measurement	36	36	36	36	36	36	36	36	36	36	36
#exceed 2006 limits	N/A	0	0	0	0	1	N/A	0	0	1	0

*from June through October, 60-day rolling monthly avg limited to 0.2 mg/l. From November through May, monthly avg limited to 1.0 mg/L.

**from May through October, monthly avg is limited to 6 mg/L. From November through April there is a reporting requirement.

**357 µg/l limit went into effect October 2009

Appendix A - Effluent Characteristics

Monitoring Period End Date	TSS, average weekly loading lb/day	TSS, avg monthly mg/l	TSS, avg weekly mg/l	TSS, percent removal %	Total Chlorine Residual, avg monthly µg/l	Total Chlorine Residual, max daily µg/l	Fecal coliform, geo avg #/100 ml	Fecal coliform, daily max #/100 ml	Dissolved oxygen mg/l	Monthly Avg Total Phosphor us, mg/l	Total Phosphor us, daily max mg/l
01/31/2010	419.	8.	11.	97.	5.4	22.	2.	7.	7.8	1.5	2.
02/28/2010	1244.	8.	13.	96.	.7	2.4	2.	18.	8.5	.7	1.
03/31/2010	1910.	11.	15.	90.	11.	43.	2.	59.	6.7	.6	1.
04/30/2010	4717.	12.	25.	93.	8.	32.	3.	44.	8.	.8	.5
05/31/2010	402.	8.	9.	97.	22.	45.	3.	43.	8.3	.7	1.05
06/30/2010	522.	7.	8.	96.	13.	44.	7.	1300.	8.	.5	.57
07/31/2010	614.	10.	14.	97.	3.	30.	2.	62.	7.2	.43	.7
08/31/2010	306.	7.	7.	98.	12.	35.	6.	73.	8.	.49	.8
09/30/2010	163.	5.	6.	99.	13.	33.	2.	16.	8.3	.4	.8
10/31/2010	225.	4.	5.	99.	4.	22.	1.	7.	7.8	.3	.48
11/30/2010	342.	4.	6.	98.	8.	45.	2.	71.	8.2	.18	1.05
12/31/2010	188.	4.	5.	98.	6.	38.	1.	9.	9.	.27	1.65
01/31/2011	163.	3.	4.	99.	6.	40.	2.	2.	7.	.13	.21
02/28/2011	435.	5.	7.	99.	7.	35.	1.	2.	10.1	.5	1.9
03/31/2011	998.	6.	10.	97.	10.	40.	3.	27.	8.5	.5	1.6
04/30/2011	324.	5.	7.	98.	6.	20.	2.	40.	10.5	.2	.3
05/31/2011	589.	5.	7.	98.	6.	36.	1.	45.	10.	.17	.27
06/30/2011	405.	3.	8.	99.	5.	22.	2.	40.	9.2	.1	.44
07/31/2011	433.	5.	8.	100.	7.	39.	2.	17.	7.	.11	.15
08/31/2011	211.	4.	6.	100.	4.	13.	1.	45.	7.3	.1	.17
09/30/2011	185.	4.	5.	100.	4.	16.	2.	16.	86.	.08	.1
10/31/2011	240.	6.	7.	100.	3.	16.	9.	36.	6.1	.1	.24
11/30/2011	169.	4.	5.	99.	10.	33.	5.	29.	9.	.4	.8
12/31/2011	216.	5.	8.	100.	9.	17.	11.	29.	10.	.7	1.
01/31/2012	240.	6.	6.	100.	8.	22.	7.	15.	9.9	.7	.8
02/29/2012	180.	6.	6.	100.	8.	14.	5.	25.	10.4	.8	1.
03/31/2012	253.	7.	8.	100.	6.	21.	3.	14.	10.	.6	.8
04/30/2012	130.	4.	4.	100.	12.	22.	2.	3.	9.3	.2	.2
05/31/2012	128.	5.	6.	100.	6.	16.	1.	3.	7.	.1	.1
06/30/2012	110.	4.	5.	100.	5.	13.	15.	78.	9.4	.07	.06
07/31/2012	177.	6.	7.	100.	5.	15.	16.	66.	8.8	.04	.06
08/31/2012	218.	6.	9.	100.	5.	24.	4.	18.	11.	.05	.1
09/30/2012	154.	5.	7.	100.	6.	19.	4.	12.	9.3	.05	.12
10/31/2012	101.	4.	4.	100.	9.	21.	9.	45.	8.3	.1	.4
11/30/2012	182.	5.8	10.	100.	9.	42.	27.	200.	9.8	.7	1.07
12/31/2012	201.	7.	10.	100.	8.	48.	30.	200.	9.4	1.	1.2
Jan 2006 limits	2030	30	45	85	45	78	200	400	6	Varies*	Report
Minimum	101.	3.	4.	90.	.7	2.4	1.	2.	6.1	.04	.06
Maximum	4717.	12.	25.	100.	22.	48.	30.	1300.	86.	1.5	2.
Average	485.94	5.80	8.00	98.53	7.50	27.65	5.47	75.44	10.81	0.40	0.69
Standard Deviation	808.29	2.09	3.95	2.17	3.83	11.78	6.81	214.67	12.95	0.33	0.53
#measurement	36	36	36	36	36	36	36	36	36	36	36
#exceed 2006 limits	1	0	0	0	0	0	0	1	0	5	N/A

Appendix A - Effluent Characteristics

Monitoring Period End Date	Ortho- phosphate, avg monthly mg/l	Ortho- phosphate, max daily mg/l	Ammonia , monthly avg mg/l	Ammonia , weekly avg mg/l	Ammonia , daily max mg/l	Aluminum, monthly avg*** µg/l	Aluminum, daily max µg/l
01/31/2010	1.	1.6	2.		6.	385.	440.
02/28/2010	.3	.7	.6		1.1	438.	620.
03/31/2010	.2	.7	4.		4.9	440.	550.
04/30/2010			6.9		9.2	273.	340.
05/31/2010			6.	8.	8.	333.	430.
06/30/2010			.2	.4	.7	330.	460.
07/31/2010			.3	.4	.4	468.	720.
08/31/2010			.3	1.	.2	360.	530.
09/30/2010			1.	2.	1.	277.	330.
10/31/2010			.3	.4	.5	450.	710.
11/30/2010	.18	.81	.5		1.3	440.	570.
12/31/2010	.27	1.17	.23		.38	328.	410.
01/31/2011	.06	.14	2.01		3.	260.	320.
02/28/2011	.27	.55	3.9		5.6	330.	600.
03/31/2011	.34	1.18	5.		7.	248.	400.
04/30/2011			.3		.4	430.	620.
05/31/2011			.4	1.	1.	360.	670.
06/30/2011			.5	.7	.7	338.	530.
07/31/2011			.3	.8	.8	430.	710.
08/31/2011			.6	2.	2.	260.	350.
09/30/2011			.5	1.1	1.1	243.	280.
10/31/2011			.1	.1	.1	640.	710.
11/30/2011	.32	.7	.4		1.3	320.	540.
12/31/2011	.6	.9	.6		1.3	210.	270.
01/31/2012	.5	.7	.1		.2	230.	270.
02/29/2012	.6	1.	.19		.3	260.	300.
03/31/2012	.5	.6	1.7		2.7	460.	720.
04/30/2012			1.		2.5	510.	760.
05/31/2012			.9	1.	1.7	320.	500.
06/30/2012			.04	.05	.1	320.	440.
07/31/2012			.1	.1	.1	140.	160.
08/31/2012			.1	.1	.1	130.	170.
09/30/2012			.1	.1	.1	160.	190.
10/31/2012			.1	.1	.2	300.	600.
11/30/2012	.04	1.05	.06		.08	354.	430.
12/31/2012	.1	.2	.1		.2	250.	430.
Jan 2006 limits	Report	Report	Varies**	6	9	357	Report
Minimum	.04	.14	.04	.05	.08	130.	160.
Maximum	1.	1.6	6.9	8.	9.2	640.	760.
Average	0.35	0.80	1.15	1.08	1.84	334.03	474.44
Standard Deviation	0.25	0.38	1.76	1.83	2.44	108.45	171.34
#measurement	15	15	36	18	36	36	36
#exceed 2006 limits	N/A	N/A	0	1	0	13	N/A

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Appendix B
Copper Calculations

Hardness Analysis

Hardness (mg/l)	Background	Effluent
1/10/2010	53.5	83.5
3/8/2010	34	70
6/8/2010	56	94
9/13/2010	84	132
12/13/2010	76	116
3/7/2011	38	80
6/6/2011	60	78
9/5/2011	43.5	97
12/5/2011	36.1	58.8
3/5/2012	50.2	82.4
6/4/2012	51.8	80.1
9/3/2012	60.1	104
12/3/2012	63.6	92.9
median	53.5	83.5
average	54.4	90.4

$$\text{Conc downstream} = (Q_e C_e + Q_s C_s) / (Q_e + Q_s) \quad 62.52439$$

Q _e	5.55 MGD	Design flow
C _e	83.50 mg/l	Effluent Hardness
Q _s	12.9 MGD	7Q10 Stream flow
C _s	53.5 mg/l	Background concentration

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Appendix B
Copper Calculations

Copper Reasonable Potential Analysis

no non-detect, >10 samples

Date	Cu (mg/L)	$Y_i \ln Cu$ (ug/L)	$(y_i - u_y)^2$	# samples per month
1/10/2010	7.0	1.9459	0.0046	1
3/8/2010	7.0	1.9459	0.0046	1
6/6/2010	8.0	2.0794	0.0043	1
9/1/2010	8.0	2.0794	0.0043	1
12/1/2010	7.0	1.9459	0.0046	1
3/1/2011	7.0	1.9459	0.0046	1
6/6/2011	7.5	2.0149	0.0000	1
9/5/2011	5.2	1.6486586	0.133158	1
12/5/2011	5.0	1.6094379	0.163321	1
3/5/2012	8.6	2.1517622	0.019098	1
6/4/2012	10.4	2.3418058	0.10774	1
9/3/2012	7.2	1.974081	0.001559	1
3-Dec-12	12.1	2.4932055	0.230053	1

Daily Maximum Concentration - 99th percentile

$$\begin{aligned}
 u_y &= \text{Avg of Nat. Log of daily Discharge (lbs/day)} = 2.01357 \\
 \sigma_y &= \text{Std Dev. of Nat Log of daily discharge} = 0.23838 \\
 \sigma_y^2 &= 0.05683 \\
 k &= \text{number of daily samples} = 13 \\
 \sigma_y^2 &= \text{estimated variance} = (\sum (y_i - u_y)^2) / (k-1) = 0.05683
 \end{aligned}$$

RP analysis/Limit calculation:

$$\text{99th percentile daily max limit} = \exp(u_y + 2.326 \cdot \sigma_y)$$

$$\text{Daily Max Limit}^* = 13.0403 \mu\text{g/l}$$

TSD-Table E-1, no ND, 99th percentile

Average Monthly Concentration - 95th percentile

$$\begin{aligned}
 \text{Number of samples per month, } n &= 1 \\
 E(x) &= \text{Daily Avg} = \exp(u_y + 0.5 \sigma_y^2) = 7.70586 \\
 V(x) &= \text{Daily Variance} = \exp(2u_y + \sigma_y^2) * [\exp(\sigma_y^2) - 1] = 3.47210 \\
 \sigma_n^2 &= \text{Monthly Average variance} = \ln\{V(x) / [E(x)]^2 + 1\} = 0.05683 \\
 \sigma_n &= \text{Monthly Average standard deviation} = \sigma_n^2^{0.5} = 0.23838 \\
 u_n &= \text{n-day monthly average} = \ln(E(x)) - 0.5 \sigma_n^2 = 2.01357
 \end{aligned}$$

RP analysis/Limit calculation:

$$\text{95th percentile monthly average limit} = \exp(u_n + 1.645 \cdot \sigma_n)$$

$$\text{Monthly Avg Limit}^* = 11.09 \mu\text{g/l}$$

TSD-Table E-2, no ND, 95th percentile

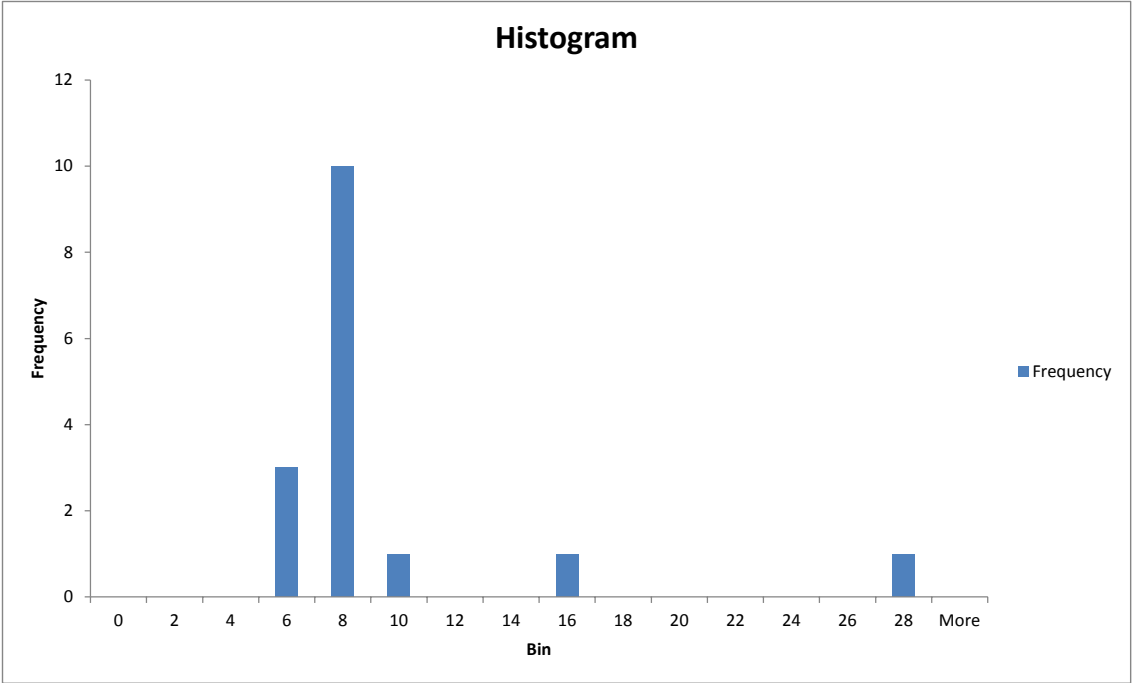
*Take dilution and ambient conc into consideration to determine potential conc after mix, if conc after mix > criteria, then RP exists

**TSD Table 3-1

***TSD Table 3-2

MA0101711
Appendix B
Copper Calculations

<i>Bin</i>	<i>Frequency</i>
0	0
2	0
4	0
6	3
8	10
10	1
12	0
14	0
16	1
18	0
20	0
22	0
24	0
26	0
28	1
More	0



MA0101711
Appendix B
Copper Calculations

Background Copper Determination

Date background

1/10/2010	1
3/8/2010	2
6/6/2010	0.5
9/7/2010	0.5
12/6/2010	5
3/5/2011	3
6/6/2011	3.5
9/5/2011	3
12/5/2011	0.9
3/5/2012	1
6/4/2012	6.7
9/3/2012	3.2
12/3/2012	5.7

result <1, changed to 0.5 to determine median
result <1, changed to 0.5 to determine median

Streamflow

1060
333
1280
1190
935
1350
437
353
1130
727
2300
343
81

Median 3

Reasonable Potential Analysis for 4.7 MGD

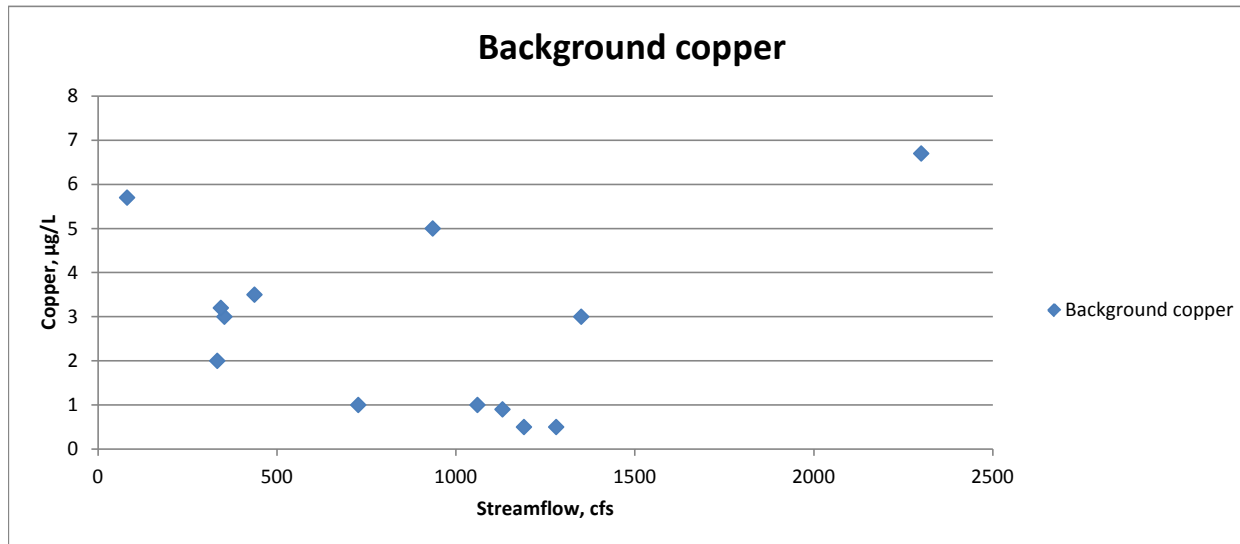
Acute			Water Quality Criterion
Downstream conc = $(Q_e C_e + Q_s C_s) / Q_r$			#REF!
			#REF!
Qr =	18.45 cfs	7Q10 + design flow	
Qs =	12.9 MGD	7Q10	
Cs =	3 ug/l	Background conc	
Qe =	5.55 cfs	design flow	
Ce =	11.09 ug/l	99th percentile projection	

Chronic			Water Quality Criterion
Downstream conc = $(Q_e C_e + Q_s C_s) / Q_r$			#REF!
			#REF!
Qr =	21.8 MGD	7Q10 + design flow	
Qs =	17.1 MGD	7Q10	
Cs =	3 ug/l	Background conc	
Qe =	4.7 MGD	design flow	
Ce =	11.09 ug/l	95th percentile projection	

Reasonable Potential Analysis for 5.55 MGD

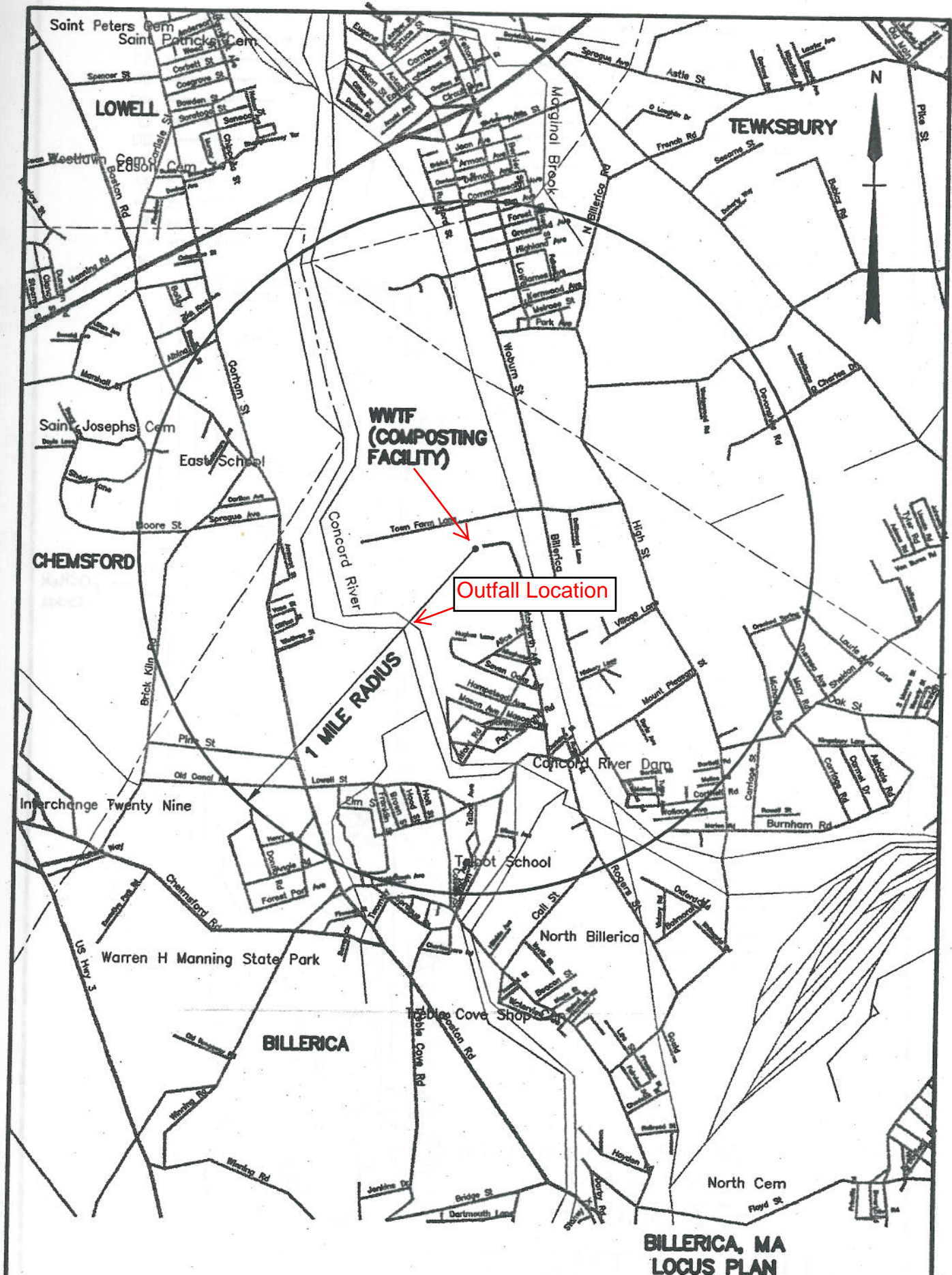
Acute			Water Quality Criterion
Downstream conc = $(Q_e C_e + Q_s C_s) / Q_r$			#REF!
			#REF!
Qr =	22.65 cfs	7Q10 + design flow	
Qs =	17.1 MGD	7Q10	
Cs =	3 ug/l	Background conc	
Qe =	5.55 cfs	design flow	
Ce =	20.61 ug/l	99th percentile projection	

Chronic			Water Quality Criterion
Downstream conc = $(Q_e C_e + Q_s C_s) / Q_r$			#REF!
			#REF!
Qr =	22.65 MGD	7Q10 + design flow	
Qs =	17.1 MGD	7Q10	
Cs =	3 ug/l	Background conc	
Qe =	5.55 MGD	design flow	
Ce =	15.62 ug/l	95th percentile projection	



Acute	Downstream conc = (QeCe + QsCs)/Qr		6.00813	Water Quality Criterion 6.3
				There is NO reasonable potential
Qr =	18.45 MGD	7Q10 + design flow		
Qs =	12.9 MGD	7Q10		
Cs =	3 ug/l	Background conc		
Qe =	5.55 MGD	design flow		
Ce =	13.00 ug/l	projected 99th percentile		

Chronic	Downstream conc = (QeCe + QsCs)/Qr		6.00813	Water Quality Criterion 9.1
				There is NO reasonable potential
Qr =	18.45 MGD	7Q10 + design flow		
Qs =	12.9 MGD	7Q10		
Cs =	3 ug/l	Background conc		
Qe =	5.55 MGD	design flow		
Ce =	13.00 ug/l	projected 99th percentile		



**BODIES OF WATER WITHIN 1 MILE
OF COMPOSTING FACILITY**

SCALE: 1"=2000'

MARCH 1996

FAY, SPOFFORD & THORNDIKE, INC., ENGINEERS

**RESPONSE TO COMMENTS
NPDES PERMIT NO. MA0101711
BILLERICA WASTEWATER TREATMENT FACILITY
BILLERICA, MASSACHUSETTS**

From August 6 through October 4, 2013, the U.S. Environmental Protection Agency Region 1 (EPA-New England) and the Massachusetts Department of Environmental Protection (MassDEP) solicited public comments on the draft National Pollutant Discharge Elimination System (NPDES) permit to be reissued to the Billerica Wastewater Treatment Facility in Billerica, MA.

EPA-New England and MassDEP received comments from the Town of Billerica (the Town.) The following are responses by EPA-New England to those comments and descriptions of any changes made to the permit as a result of those comments.

The final permit is substantially the same as the draft permit that was available for public comment. Although EPA's knowledge of the facility has benefited from the various comments and additional information submitted, the information and arguments presented did not raise any substantial new questions concerning the permit. EPA did, however, make certain clarifications in response to comments. These improvements and changes are detailed in this document and reflected in the final permit. A summary of the changes made in the final permit are listed below. The analyses underlying these changes are explained in the responses to individual comments that follow.

A copy of the final permit and this response to comments document will be posted on the EPA Region 1 web site: http://www.epa.gov/region1/npdes/permits_listing_ma.html.

A copy of the final permit may also be obtained by writing or calling Robin Johnson, United States Environmental Protection Agency, 5 Post Office Square, Suite 100 (Mail Code: OEP06-1), Boston, Massachusetts 02109-3912; Telephone (617) 918-1045.

1. Changes made to the permit

- a. Page 2 of 17: The monitoring frequencies for BOD5 and TSS were reduced from 3/week to 1/week. See Response A4, page 5 of 8.
- b. Page 5 of 17: In Footnote 9, the words "second week of" were deleted from the leftmost column in the table and the word "during" was added to indicate that WET testing may occur any time during the specified month. See Response A6, page 6 of 8.
- c. Page 5 of 17, Footnote 8: A 48-month compliance schedule has been added to the final permit for achieving the aluminum effluent limit. The purpose of this schedule is to allow the Town time to characterize sources of aluminum in the system and to analyze alternatives for meeting the limit. The Town is required to submit progress reports every 12 months describing progress made toward attaining the aluminum limit in the previous 12 months. See Response A8, page 7 of 8.
- d. Page 13 of 17: In Section D.8., the due date for the sludge annual report has been changed from February 19 to March 15 to facilitate electronic reporting via NetDMR.
- e. Page 16 of 17: In Section G.1., the following sentence has been added regarding submittal of reports: "If the due date of the report does not coincide with the DMR due date, permittees shall submit the report with the next monthly DMR." This change was made to facilitate electronic reporting.
- f. Page 11 of 17: In Section C.6., the due date for the annual O&M report has been changed from March 31 to April 15 to facilitate electronic reporting.

2. COMMENTS FROM THE TOWN OF BILLERICA

OPENING COMMENT:

The Town of Billerica (Town) appreciates the opportunity to review the Draft NPDES Permit for the Town's Wastewater Treatment Facility (WWTF). The Town hereby submits the following comments on the Draft Permit pursuant to the Public Notice dated August 6, 2013.

RESPONSE TO OPENING COMMENT:

EPA acknowledges the comment.

COMMENT A1:

On page 3 of the permit, a monitoring parameter for Flow appears as two separate line items. The second flow parameter should be removed or provide an explanation for what this parameter is for.

RESPONSE A1:

The first line in the permit table contains the flow limit, which is expressed as a 12-month rolling average. The permittee is required to calculate and report this value pursuant to Footnote 2 of the permit. The second line contains additional flow reporting requirements. Specifically, the permittee is required to report the average monthly flow for the reporting month, and also the maximum daily flow for that month. EPA believes that routine reporting of all three of these flow statistics is necessary to characterize both the long term flow trend and shorter term responses to seasonal and daily conditions.

COMMENT A2:

The flow limit has been increased from 5.40 MGD to 5.55 MGD to reflect the transfer of the Middlesex House of Correction (HOC) NPDES Permitted flow to the Town. However, as described in the Town's NPDES Permit renewal application, the Massachusetts Division of Capital Management and Maintenance (DCAMM) determined at the time of the permit renewal in 2010 that they required the full 0.20 MGD to accommodate the long term needs of the facility. Therefore, the Town requested that the flow limit be increased to 5.60 MGD to accommodate the State's request.

Unbeknownst to the Town at the time of the 2010 permit renewal, the State had been in the planning and design stages of a major \$37M expansion of the HOC facility. DCAMM recently submitted a Sewer Connection Permit to MassDEP requesting approval for the addition of 99,200 gallons per day (gpd) to the existing 123,000 gpd for a total build out flow of 222,200 gpd (0.22 MGD). This additional flow was not accounted for in the Town CWMP (EOEA No. 14283) and accepting the flow without a one-for-one increase to the WWTF's NPDES permit would be using up capacity allocated for identified sewer needs areas. Under EOEA No. 14283, MassDEP included mandates for the Town to maintain NPDES Permit limits by adopting an "aggressive Town-wide I/I removal program and water conservation program." The approved CWMP addressed these issues with its maximum buildout flow. Any approval by MassDEP for a sewer connection that exceeds the flow included in the approved CWMP is contradictory to MassDEP's CWMP public comments. We have attached DCAMM's Sewer Connection Permit as well as the Town's comment letter to MassDEP for your review and consideration.

MassDEP approved DCAMM's Sewer Connection Permit on August 20, 2013 effectively forcing the Town to accept unplanned flow from the HOC. The Town has formally appealed this decision with the

MassDEP Office of Appeals and Dispute Resolution with a Prescreening Conference currently set for October 29, 2013.

As stated in the above reference comment letter, it is the Town's position that the proposed sewer connection for the HOC expansion can only be granted to the State if the NPDES permit is expanded to account for the entire proposed HOC build out flow of 0.22 MGD for a total of 5.62 MGD. If the permit cannot be increased to accommodate the requested flow, then the HOC facility must only be allowed to discharge up to the 0.15 MGD as described in the Draft Permit. The Town cannot support a gap in the total need for the HOC and the total available permit capacity for the Town as a whole.

We request that EPA and MassDEP provide a position on this issue so that DCAMM can properly plan their ongoing HOC expansion project.

RESPONSE A2:

As described in the fact sheet, the flow increase in the draft permit of 0.15 MGD, to 5.55 MGD, is consistent with the Town's Comprehensive Wastewater Management Plan (CWMP) and did not require an antidegradation review because the increase is balanced by the elimination of flow from the House of Correction (which had an authorized flow of 0.15 MGD.) EPA will not further increase the authorized discharge flow at this time, because there are no plans to increase the flow capacity at the Billerica WWTF beyond the currently planned 5.55 MGD authorized in the draft permit, and because any such increase would require an antidegradation review pursuant to state water quality standards, and we do not currently have information necessary to conduct such a review. Also, as a matter of longstanding practice, EPA prefers that the Town complete the state planning process, including any required evaluation of alternatives, before it processes a request for a flow increase in an NPDES permit. Processing a flow increase that the state may ultimately not approve or fund would be an inefficient use of EPA's resources.

Regarding the request that EPA provide a position regarding whether the Town must accept the additional 99,200 gallons per day from the HOC, EPA believes that this is a matter that should be resolved between the Commonwealth and the Town. EPA understands the Town's position; that it can only connect flows up to the amount authorized by the permit, and that the increased flows from the HOC may preclude the Town from connecting other flows it had planned in its CWMP. We encourage the Town and the Commonwealth to work to a solution that would satisfy both entities, which might include allowing the increase from HOC, with the Commonwealth providing funding of projects that would ensure adequate capacity for all CWMP-planned connections, or alternative treatment (such as subsurface disposal) for some of the CWMP-planned connections.

In December 2013, the Town of Billerica and the MA Department of Capital Asset Management and Maintenance (DCAMM) entered into a Memorandum of Agreement (MOA) on issues related to the MassDEP sewer connection permit for the Billerica House of Correction (BHOC). The MOA sets forth the mitigation requirements to be met by DCAMM to offset the additional flows related to the expansion of the BHOC. The Town's appeal of the MassDEP sewer connection permit was subsequently withdrawn.

COMMENT A3:

Page 6, footnote 14 of the Permit further limits the flow to coincide with completion milestones of the Town's planned WWTF expansion program. The Town requests removal of these tiered flow limits. The Town has a MEPA approved CWMP (EOEA No. 14283) that requires completion of these phases of the facility expansion prior to continuing the approved sewerage program. The Town cannot stray from the

approved CWMP Recommended Plan without filing a Notice of Project Change with MEPA triggering MassDEP review and comment. The Town feels that the regulatory framework for requiring the facility expansion phases to occur prior to the sewerage phases of the capital plan already exists and that including this provision in the NPDES permit is redundant and unnecessary. Given the major political upheaval currently being caused by the HOC flow as described above and in the attached correspondence, this requirement only serves to fan the flame. The Town recommends that EPA remove footnote 14 and regulate the sewerage program through the approved CWMP process and through the 80% of design flow provision.

RESPONSE A3:

While the MEPA-approved CWMP does establish a blueprint for coordinated treatment plant expansions and sewerage projects, it is not a federally enforceable document. While failure to follow the CWMP would jeopardize state funding, and possibly represent a state-enforceable violation, the only way for EPA, the NPDES permitting authority, to ensure that necessary treatment plant expansions are completed prior to flow increases is to include these requirements in the NPDES permit or other federally enforceable document.

COMMENT A4:

For both BOD₅ and TSS, the facility consistently produces effluent flow below 10 mg/L and often in the 1-2 mg/L range during phosphorus removal season. Given that the operation of the CoMag process for total phosphorus removal, as a rule, results in a consistently high level of BOD₅ and TSS removal, we request that the frequency of monitoring these two parameters be reduced to 1/Week. The Town performs their own lab analysis and reducing this requirement will free limited staff up to perform higher level process control and preventative maintenance tasks.

RESPONSE A4:

EPA sets monitoring frequency on a case-by-case basis. EPA's Permit Writers' Manual advises that monitoring frequency should be established to ensure that there is sufficient data to characterize effluent quality and to detect events of noncompliance, and also advises the permit writer to consider effluent variability, design capacity, treatment method, compliance history, cost of monitoring relative to the permittee's capabilities, location of the discharge and the nature of the pollutants.

EPA's "Interim Guidance for Performance-based Reduction of NPDES Permit Monitoring Frequencies" sets forth guidance on how to best implement reduction in reporting and monitoring based on historical performance. EPA Region 1 has used this guidance to evaluate the proposed reduction of Billerica's monitoring frequency for BOD₅ and TSS.

Among the factors that EPA reviews when proposing a monitoring frequency reduction are facility enforcement history, compliance for the parameter being considered, and the performance history for the parameter being considered.

There was one violation of the weekly average BOD₅ loading limit and one violation of the minimum 85% BOD₅ removal limit during the past 3 years. There was one violation of the weekly average TSS loading limit during the past 3 years. These exceedances appear to be isolated and, on their own, do not preclude a monitoring frequency reduction.

The performance history criterion recommends EPA to use, at a minimum, the two most recent years of monthly average effluent data to calculate the long term average discharge rate. A ratio is then calculated between the long-term average and the permitted concentration for the selected parameters.

Table 1: Parameter-By-Parameter Evaluation of Performance History

	Average of Monthly Average Discharges*	Monthly Average Limit	Ratio [(Average /Permit Limit)*100]	Current Monitoring Frequency	Frequency Based on Guidance
Monthly Average BOD₅	3.17 mg/l	30 mg/l	11%	3/week	1/week
Monthly Average TSS	5.03 mg/l	30 mg/l	17%	3/week	1/week

*from January 2011 through December 2012

The ratio of the long term BOD effluent average to the discharge limit is 11%, which indicates little probability that the effluent exceeds the monthly average BOD limits. In cases where facilities have current monitoring frequencies of 3/week and effluent to limit ratios of less than 25%, the guidance suggests a monitoring reduction to once per week. Therefore, EPA has decided to reduce Billerica's BOD₅ monitoring frequency to once per week.

Similarly, the ratio of the long term TSS effluent average to the discharge limit is 17%, a ratio for which the guidance indicates a monitoring frequency reduction from 3/week to 1/week. Therefore, EPA has decided to reduce TSS monitoring frequency to once per week.

COMMENT A5:

Pages 8 and 10 of the Fact Sheet describe the calculation of the 7Q10 flow of 12.9 MGD and resultant dilution factor of 3.3. These figures are much lower than the flow of 17.1 MGD and dilution factor of 4.1 used as a basis for the 2001 and 2005 permits. We are unaware of any major changes along the Concord River that would affect the 7Q10 flow so dramatically. Please provide an explanation for this major difference in 7Q10 and dilution factor between past permits and this draft permit. The dilution factor affects the WET test limits, aluminum limits and TRC limits as well as the copper reasonable potential.

RESPONSE A5:

EPA updated the time period used for the 7Q10 calculation from 1971 through 2000, to 1993 through 2012. This was to ensure that the permit protects the receiving segment of the Concord at its current 7Q10, which may change over time. Indeed, the resulting calculations indicate that the 7Q10 at the gages dropped from 9.0 MGD to 7.2 MGD at USGS Gage 01097000 (Assabet River at Maynard) and from 24.6 MGD to 18.1 MGD at USGS Gage 01099500 (Concord River Below Meadow Brook, At Lowell, MA). These results are based on a robust data set and were calculated and rechecked using DFLOW, a statistical design flow calculator.

The reduced 7Q10 at the gages resulted in a reduction in the calculated 7Q10 at the point of the Billerica discharge from 17.1 MGD to 12.9 MGD, a 24% decrease.

The decrease in 7Q10 could be caused by climatic factors, i.e. more severe droughts. Another possible factor may be lower base flow due to impervious area in the river's drainage basin or groundwater

pumping. The decision by the Region to use the most currently available data set to represent prevailing receiving water flow is logical and rational in light of the Region's obligations under the Act to assure compliance with WQS.

COMMENT A6:

Page 5, footnote 9 of the Permit (table) requires that the WET testing be completed during the second week of March, June, September, and December. We request that the test period should only be stated by the month and not the particular week. We note that WET laboratories have indicated that such selection of the week results in an imbalance in their workload. The Town will establish a particular testing time period with its WET laboratory and will keep that time period unless circumstances require a change in the particular week.

RESPONSE A6:

The Final Permit has been changed to require that WET testing be completed during the months of March, June, September, and December. As described in its comment, the Town must conduct WET testing as part of a routine sampling program at the same time each month.

COMMENT A7:

On page 3 of the Permit, the Total Aluminum effluent limit has been reduced from 357 µg/L to 171 µg/L based on a Gold Book water quality criterion of 87 µg/L. The reduced limit takes into consideration of the fact that upstream facilities will also be subjected to reduced effluent limits and therefore the Billerica limit is slightly higher than otherwise would be required. We are aware that the 87 µg/L water quality criterion being applied is widely considered to be inappropriate for use on the Concord River and in Massachusetts in general. There is currently a regional initiative being undertaken to establish a site specific criterion currently being employed for setting effluent limits. Therefore, we request that the aluminum limit remain at 357 µg/L until the results of the site specific criteria are approved and the new limit can be based on a more appropriate criterion. Other EPA regions and many states now use dissolved criteria and some have actually eliminated the criteria from their water quality standards after research showed that the total aluminum is not the proper way to control aluminum.

RESPONSE A7:

The aluminum criterion used to calculate the limit in the draft permit is from EPA's *National Recommended Water Quality Criteria: 2002*, which have been adopted by MassDEP into its water quality standards (see 314 CMR 4.05(5)(e)). Footnote I to the aluminum criteria specifies that the values are expressed in term of total recoverable metal. Recent research into the toxicity of aluminum in freshwater mussels indicates that the current criteria are necessary to protect aquatic life, and in fact further lowering of the chronic aluminum criterion may be warranted.

We are aware that MassDEP is currently studying the possibility of site specific aluminum criteria or statewide aluminum criteria. If the Town wishes to pursue site-specific criteria or to encourage Massachusetts to develop new statewide aluminum criteria, then we suggest that the Town contact MassDEP on this issue. We are happy to provide any guidance and assistance that we can if the Commonwealth decides to pursue either of these approaches. EPA encourages MassDEP to monitor the latest research and updates to EPA's 304(a) criteria in order to ensure that any site-specific criteria developed for Massachusetts are scientifically based and protective of aquatic life.

However, we cannot wait for such a process to commence to set an effluent limitation for aluminum in light of our obligation under the CWA to ensure attainment of state water quality standards. The Region's decision to move forward with an effluent limit for aluminum at this time 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). This regular and periodic review supports the CWA's goal of restoring and maintaining the chemical, physical and biological integrity of the Nation's waters.

COMMENT A8:

The Town has attempted to optimize the CoMag facility around the maximum aluminum removal and has been unsuccessful in achieving effluent aluminum levels lower than the current proposed limit 171 µg/L. It appears at this time that capital modification to the CoMag system will be necessary to achieve compliance with this limit. These modifications, in conjunction with the site specific criteria currently being pursued for aluminum, will require planning, design, and construction. We therefore request that the permit include a compliance schedule, or a compliance schedule be established under some other regulatory document, to allow the Town to properly plan and implement a treatment strategy for aluminum removal.

RESPONSE A8:

EPA has added a Compliance Schedule of 48 months for the aluminum limit to the final permit to give the Town time to evaluate sources of aluminum in the treatment system and to evaluate alternatives in meeting the limit. In addition, the final permit requires the Town to submit progress reports every 12 months, describing actions taken to meet the permit limit during the previous 12 months. Such schedules are authorized by Massachusetts Water Quality Standards for "limitations that are based on new, newly interpreted or revised water quality standards..." [see 314 CMR4.03(1)(b)].

COMMENT A9:

Attachment A & B reference Daphnid and Fathead Minnow. We note that the permit requires Daphnid only.

RESPONSE A9:

The final permit requires WET testing using *Ceriodaphnia dubia* only. The WET test attachments are generic guidance documents that include other possible testing organisms.

COMMENT A10:

Pages 9 through 11 of the Permit lay out detailed requirements for Collection System Mapping, a Collection System Operations and Maintenance Plan and Annual Reporting Requirements. The Town is aware that other NPDES Permits in NH and MA include this requirement and that recently the Town of Concord, MA appealed their final permit partially based on this issue. The Town of Billerica agrees with the Town of Concord's rationale for opposing this requirement. The Town feels that this regulatory requirement is well beyond the scope of the NPDES permit program and the requirement should be removed from the permit. Proper O&M of the collection system is clearly the responsibility of the Town and the means and methods incorporated to perform this critical duty should remain with the Town.

RESPONSE A10:

The Clean Water Act gives EPA the authority to require permittees to establish monitoring methods and to prescribe permit conditions for data collection and reporting. Section 402(a)(2) provides that the conditions of an NPDES permit may include “conditions on data and information collection, reporting, and such other requirements as [the Administrator] deems appropriate.” The Environmental Appeals Board has stated that where the monitoring or reporting “relates to maintaining a State water quality standard...nothing in the CWA or the implementing regulations...constrain[s] the Region's authority to include...monitoring provision[s].”¹ Thus, the EPA is justified to invest Part II standard conditions with “particularized meaning,” and need not be constrained to merely transcribing the general regulation.² EPA’s decision to include specific, in addition to generalized, conditions in the permit is reasonable and consistent with its responsibilities under the Act, particularly given the environmental imperatives identified by the Region as driving the collection system requirements (e.g., SSO prevention) and receiving water conditions.

Indeed, it has become clear in recent years that the standard permit conditions for operation and maintenance of publicly owned treatment works (POTW) collection systems were not always successful in fostering proper asset management and preventing sanitary sewer overflows (SSOs). The Town itself has experienced such problems, which resulted in a 2010 MassDEP Administrative Compliance Order with Penalty (ACOP) to the Town following the discovery of an unauthorized overflow structure and several SSOs during wet weather events. The immediate causes of the SSOs included pump station failures, sewer collapses, faulty alarm systems, and grease buildup. The intent of the O&M mapping requirements is to encourage operators of sewer systems to map their systems so that all structures are known and accounted for. The O&M Plan allows municipalities to plan for maintenance of the sewer system to prevent costly and environmentally harmful events like the ones that preceded the ACOP issued to Billerica.

As such, 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 A11:

The Town requests that the issues presented in the above comments be incorporated into the Final Permit.

RESPONSE A11:

The changes to the permit are summarized at the beginning of this document. The reasoning for these changes and the reasoning for not making other requested changes is included in the responses to the individual comments.

¹ In re Town of Ashland Wastewater Treatment Facility, 9 E.A.D. 661, 672 (EAB 2001).

² In re City of Moscow, 10 E.A.D. 135, 170 (EAB 2001).