

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 Upton
P.O. Box 75
Upton, MA 01568**

is authorized to discharge from the facility located at

**Upton Wastewater Treatment Facility
43 Maple Avenue
Upton, MA 01568**

to receiving water named

unnamed tributary stream of the West River

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

This permit will become effective on the date of 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 March 1, 2006

This permit consists of 17 pages in Part I including effluent limitations and monitoring requirements, 25 pages in Part II including NPDES Part II Standard Conditions, and Attachment A – Freshwater Chronic Toxicity Test Procedure and Protocol (May, 2007).

Signed this 26th day of April, 2013.

/S/ SIGNATURE ON FILE

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

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

PART I

A.1. During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge treated effluent from outfall serial number **001** to an unnamed tributary of the West River. Such discharges shall be limited and monitored as specified below.

<u>EFFLUENT CHARACTERISTIC</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS¹</u>		
PARAMETER	AVERAGE MONTHLY	AVERAGE WEEKLY	AVERAGE MONTHLY	AVERAGE WEEKLY	MAXIMUM DAILY	MEASUREMENT FREQUENCY	SAMPLE TYPE
FLOW ²	*****	*****	0.4 MGD	*****	Report MGD	CONTINUOUS	RECORDER
FLOW ²	*****	*****	Report MGD	*****	*****	CONTINUOUS	RECORDER
BOD ₅ ³ (May 1-October 31)	38 lbs/Day	63 lbs/Day	12 mg/l	20 mg/l	Report mg/l	1/WEEK	24-HR COMPOSITE ⁴
BOD ₅ ³ (November 1 - April 30)	75 lbs/Day	113 lbs/Day	22 mg/l	34 mg/l	Report mg/l	1/WEEK	24-HR COMPOSITE ⁴
TSS ³ (May 1-October 31)	38 lbs/Day	63 lbs/Day	12 mg/l	20 mg/l	Report mg/l	1/WEEK	24-HR COMPOSITE ⁴
TSS ³ (November 1 - April 30)	75 lbs/Day	113 lbs/Day	22 mg/l	34 mg/l	Report mg/l	1/WEEK	24-HR COMPOSITE ⁴
pH RANGE ⁵	6.5 - 8.3 SU (SEE PERMIT PARAGRAPH I.A.1.b.)					1/DAY	GRAB
TOTAL RESIDUAL CHLORINE ⁶	*****	*****	11.2 ug/l	*****	19.4 ug/l	3/DAY	GRAB
ESCHERICHIA COLI ^{5,7} (April 1 - October 31)	*****	*****	126 cfu/100 ml	*****	409 cfu/100 ml	2/WEEK	GRAB
TOTAL ALUMINUM	*****	*****	88.7 ug/l	*****	765 ug/l	2/MONTH	24-HR COMPOSITE ⁴
TOTAL CADMIUM ⁸	*****	*****	0.19 ug/l	*****	1.3 ug/l	4/YEAR	24-HR COMPOSITE ⁴
TOTAL COPPER	*****	*****	19.2 ug/l	*****	27.3 ug/l	2/MONTH	24-HR COMPOSITE ⁴
TOTAL LEAD ⁸	*****	*****	1.62 ug/l	*****	Report ug/l	4/YEAR	24-HR COMPOSITE ⁴

Sampling Location: Samples shall be taken after dechlorination chemical addition point and prior to discharge.

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A.1. During the period beginning the effective date and lasting through expiration, the permittee is authorized to discharge from treated effluent from outfall serial number 001 to an unnamed tributary of the West River. Such discharges shall be limited and monitored as specified below.							
<u>EFFLUENT CHARACTERISTIC</u>		<u>EFFLUENT LIMITS</u>			<u>MONITORING REQUIREMENTS¹</u>		
<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>
TOTAL ZINC	*****	*****	77.0 ug/l	*****	77.0 ug/l	4/YEAR	24-HR COMPOSITE ⁴
TOTAL PHOSPHORUS (April 1 - October 31)	0.67 lbs/Day	*****	0.20 mg/l	*****	Report mg/l	1/WEEK	24-HR COMPOSITE ⁴
TOTAL PHOSPHORUS (November 1 - March 31)	3.3 lbs/Day	*****	1.0 mg/l	*****	Report mg/l	1/WEEK	24-HR COMPOSITE ⁴
ORTHOPHOSPHORUS (November 1 - March 31)	Report lbs/Day	*****	Report mg/l	*****	Report mg/l	1/WEEK	24-HR COMPOSITE ⁴
AMMONIA-NITROGEN ⁹ (June 1 - September 30)	7.7 lbs/Day	*****	2.3 mg/l	*****	*****	1/WEEK	24-HR COMPOSITE ⁴
AMMONIA-NITROGEN ⁹ (October 1 - May 31)	21.0 lbs/Day	*****	6.3 mg/l	*****	Report mg/l	1/WEEK	24-HR COMPOSITE ⁴
TOTAL KJELDAHL NITROGEN ⁹	Report lbs/Day	*****	Report mg/l	*****	Report mg/l	1/MONTH	24-HR COMPOSITE ⁴
TOTAL NITRATE ⁹	Report lbs/Day	*****	Report mg/l	*****	Report mg/l	1/MONTH	24-HR COMPOSITE ⁴
TOTAL NITRITE ⁹	Report lbs/Day	*****	Report mg/l	*****	Report mg/l	1/MONTH	24-HR COMPOSITE ⁴
TOTAL NITROGEN ^{9,10}	Report lbs/Day	*****	Report mg/l	*****	Report mg/l	1/MONTH	24-HR COMPOSITE ⁴

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A.1. During the period beginning the effective date and lasting through expiration, the permittee is authorized to discharge from treated effluent from outfall serial number 001 to an unnamed tributary stream to the West River. Such discharges shall be limited and monitored as specified below.							
<u>EFFLUENT CHARACTERISTIC</u>		<u>EFFLUENT LIMITS</u>				<u>MONITORING REQUIREMENTS¹</u>	
PARAMETER	<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>
WHOLE EFFLUENT TOXICITY ^{11, 12, 13, 14}	Acute LC ₅₀ ≥ 100% Chronic C-NOEC ≥ 98%					4/YEAR	24-HOUR COMPOSITE ⁴
Hardness ¹⁵	*****	*****	*****	*****	Report mg/l	4/YEAR	24-HR COMP ⁴
Ammonia Nitrogen as N ¹⁵	*****	*****	*****	*****	Report mg/l	4/YEAR	24-HR COMP ⁴
Total Recoverable Aluminum ¹⁵	*****	*****	*****	*****	Report mg/l	4/YEAR	24-HR COMP ⁴
Total Recoverable Cadmium ¹⁵	*****	*****	*****	*****	Report mg/l	4/YEAR	24-HR COMP ⁴
Total Recoverable Copper ¹⁵	*****	*****	*****	*****	Report mg/l	4/YEAR	24-HR COMP ⁴
Total Recoverable Nickel ¹⁵	*****	*****	*****	*****	Report mg/l	4/YEAR	24-HR COMP ⁴
Total Recoverable Lead ¹⁵	*****	*****	*****	*****	Report mg/l	4/YEAR	24-HR COMP ⁴
Total Recoverable Zinc ¹⁵	*****	*****	*****	*****	Report mg/l	4/YEAR	24-HR COMP ⁴

Footnotes:

1. Effluent sampling shall be of the discharge and shall be collected at the point specified on page 2. 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.

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. Sampling required for influent and effluent.
4. 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.
5. Required for State Certification.
6. 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 ug/l. This value is the minimum level for chlorine using EPA approved methods found in the most currently approved version of Standard Methods for the Examination of Water and Wastewater, Method 4500 CL-E and G. One of these methods must be used to determine total residual chlorine. For effluent limitations less than 20 ug/l, compliance/non-compliance will be determined based on the ML. Sample results of 20 ug/l or less shall be reported 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.

7. 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.
8. The minimum level (ML) for lead and cadmium is defined as 0.5 ug/l. This value is the minimum level for this metal using the Furnace Atomic Absorption analytical method (EPA Method 220.2). Compliance or non-compliance with limits lower than this minimum level will be determined based on the ML from this method, or another approved method that has an equivalent or lower ML, one of which must be used. Sample results of 0.5 ug/l or less shall be reported in accordance with the DMR instructions. The sampling from the WET testing may be used to satisfy this requirement.
9. Total ammonia nitrogen, total Kjeldahl nitrogen, nitrite nitrogen, and nitrate nitrogen samples shall be collected concurrently. Total nitrogen may be calculated from the sum of total Kjeldahl nitrogen, nitrate and nitrite.
10. The permittee shall operate the treatment facility to reduce the discharge of total nitrogen to the maximum extent possible, using existing treatment equipment at the facility. **Within one (1) year after the effective date** of the permit, the permittee shall submit a report to EPA and the MassDEP that describes the measures it has taken to enhance the removal of nitrogen by its treatment facility and summarizes the effectiveness of these measures.
11. The permittee shall conduct chronic (and modified acute) toxicity tests *four* times per year. The chronic test may be used to calculate the acute LC₅₀ at the 48 hour exposure interval. The permittee shall test the daphnid, Ceriodaphnia dubia, only. Toxicity test samples shall be collected during the months of January, April, July and October. The test results shall be submitted by the last day of the month following the completion of the test. The results are due February 28, May 31, August 31 and November 30, respectively. The tests must be performed in accordance with test procedures and protocols specified in **Attachment A** of this permit.

Test Dates Second Week in	Submit Results By:	Test Species	Acute Limit LC ₅₀	Chronic Limit C-NOEC
January April July October	February 28 May 31 August 31 November 30	<u>Ceriodaphnia dubia</u> (daphnid)	≥ 100%	≥ 98%

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

12. The LC₅₀ is the concentration of effluent which causes mortality to 50% of the test organisms. Therefore, a 100% limit means that a sample of 100% effluent (no dilution) shall cause no more than a 50% mortality rate.
13. 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 **98%** or greater" limit is defined as a sample which is composed of **98%** (or greater) effluent, the remainder being dilution water.
14. 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**.
15. For each whole effluent toxicity test the permittee shall report on the appropriate discharge monitoring report, (DMR), the concentrations of the hardness, ammonia nitrogen as nitrogen, total recoverable aluminum, cadmium, copper, lead, nickel, and zinc found in the 100 percent effluent sample. All these aforementioned chemical parameters shall be determined to at least the minimum quantification level shown in **Attachment A**. Also the permittee should note that all chemical parameter results must still be reported in the appropriate toxicity report.

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 MassDEP Regional Office telephone numbers). The reporting form and instruction for its completion may be found on-line at <http://www.mass.gov/dep/water/approvals/surffms.htm#sso>.

C. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

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

1. Maintenance Staff

The permittee shall provide an adequate staff to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this permit. Provisions to meet this requirement shall be described in the Collection

System O & M Plan required pursuant to Section C.5. below.

2. Preventive Maintenance Program

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

3. Infiltration/Inflow

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

4. Collection System Mapping

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

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

5. Collection System Operation and Maintenance Plan

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

- a. Within six (6) months of the effective date of the permit, the permittee shall submit to EPA and MassDEP:
 - (1) A description of the collection system management goals, staffing, information management, and legal authorities;
 - (2) A description of the collection system and the overall condition of the collection system including a list of all pump stations and a description of recent studies and construction activities; and
 - (3) A schedule for the development and implementation of the full Collection System O & M Plan including the elements in paragraphs b.1. through b.8. below.
- b. The full Collection System O & M Plan shall be completed, implemented and submitted to EPA and MassDEP within twenty-four (24) months from the effective date of this permit. The Plan shall include:
 - (1) The required submittal from paragraph 5.a. above, updated to reflect current information;
 - (2) A preventive maintenance and monitoring program for the collection system;
 - (3) Description of sufficient staffing necessary to properly operate and maintain the sanitary sewer collection system and how the operation and maintenance program is staffed;
 - (4) Description of funding, the source(s) of funding and provisions for funding sufficient for implementing the plan;
 - (5) Identification of known and suspected overflows and back-ups, including manholes. A description of the cause of the identified overflows and back-ups, corrective actions taken, and a plan for addressing the overflows and back-ups consistent with the requirements of this permit;
 - (6) A description of the permittee's programs for preventing I/I related effluent violations and all unauthorized discharges of wastewater, including overflows and by-passes and the ongoing program to identify and remove sources of I/I. The program shall include an inflow identification and control program that focuses on the disconnection and redirection of illegal sump pumps and roof down spouts; and
 - (7) An educational public outreach program for all aspects of I/I control, particularly private inflow.
 - (8) An Overflow Emergency Response Plan to protect public health from overflows and unanticipated bypasses or upsets that exceed any effluent limitation in the permit.

6. Annual Reporting Requirement

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

- a. A description of the staffing levels maintained during the year;
- b. A map and a description of inspection and maintenance activities conducted and corrective actions taken during the previous year;
- c. Expenditures for any collection system maintenance activities and corrective actions taken during the previous year;
- d. A map with areas identified for investigation/action in the coming year;
- e. If treatment plant flow has reached 80% of its design (0.32 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.

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

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

- c. Sewage sludge incineration in a sludge only incinerator
4. The requirements of 40 CFR Part 503 do not apply to facilities which dispose of sludge in a municipal solid waste landfill. 40 CFR § 503.4. These requirements also do not apply to facilities which do not use or dispose of sewage sludge during the life of the permit but rather treat the sludge (e.g. lagoons, reed beds), or are otherwise excluded under 40 CFR § 503.6.
 5. The 40 CFR. Part 503 requirements including the following elements:
 - General requirements
 - Pollutant limitations
 - Operational Standards (pathogen reduction requirements and vector attraction reduction requirements)
 - Management practices
 - Record keeping
 - Monitoring
 - Reporting

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

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

²This 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>

that purpose. If the permittee does not engage a “person who prepares sewage sludge,” as defined in 40 CFR § 503.9(r), for use or disposal, then the permittee remains responsible to ensure that the applicable requirements in Part 503 are met. 40 CFR § 503.7. If the ultimate use or disposal method is land application, the permittee is responsible for providing the person receiving the sludge with notice and necessary information to comply with the requirements of 40 CFR Part 503 Subpart B.

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

E. MONITORING AND REPORTING

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

- a. Submittal of Reports Using NetDMR

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

DMRs shall be submitted electronically to EPA no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA, including the MassDEP Monthly Operations

and Maintenance Report, as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA and will no longer be required to submit hard copies of DMRs to MassDEP. However, permittees shall continue to send hard copies of reports other than DMRs (including Monthly Operation and Maintenance Reports) to MassDEP until further notice from MassDEP.

b. Submittal of NetDMR Opt-Out Requests

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

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

And

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

c. Submittal of Reports in Hard Copy Form

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

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

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

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

Copies of toxicity tests and nitrogen optimization reports only to:

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

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

F. STATE PERMIT CONDITIONS

1. This authorization to discharge includes two separate and independent permit authorizations. The two permit authorizations are (i) a federal National Pollutant Discharge Elimination System permit issued by the U.S. Environmental Protection Agency (EPA) pursuant to the Federal Clean Water Act, 33 U.S.C. §§1251 et seq.; and (ii) an identical state surface water discharge permit issued by the Commissioner of the Massachusetts Department of Environmental Protection (MassDEP) pursuant to the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53, and 314 CMR 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/y-cvgtuekgpeglo-gvj-qf-uly-gvlf-hly-gvi-wkf-g0fh>. 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

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

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES PURSUANT TO THE
CLEAN WATER ACT (CWA)

NPDES PERMIT NUMBER: **MA0100196**

PUBLIC NOTICE START AND END DATES: March 8, 2013 – April 6, 2013

NAME AND MAILING ADDRESS OF APPLICANT:

**Town of Upton
P.O. Box 75
Upton, MA 01568**

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

**Upton Wastewater Treatment Facility
43 Maple Avenue
Upton, MA 01568**

RECEIVING WATER(S): **Unnamed Tributary Stream of West River**

RECEIVING WATER CLASSIFICATION(S): **Class B – Warm Water Fishery (Blackstone
River Watershed)**

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

The applicant applied to the U.S. Environmental Protection Agency (EPA) on November 11, 2010 for reissuance of its National Pollutant Discharge Elimination System (NPDES) permit to discharge into the designated receiving water. The current permit expired on May 1, 2011; it has been administratively continued and remains in effect. This draft permit will expire five (5) years after the effective date.

The facility is engaged in the collection and treatment of municipal wastewater. The discharge is from an advanced wastewater treatment plant and the effluent is discharged to an unnamed stream that is a tributary of the West River.

2. Description of Discharge

A quantitative description of the wastewater treatment plant discharge in terms of significant effluent parameters based on recent monitoring data is shown on attached **Table 1** of this fact sheet.

3. Receiving Water Description

The Upton Wastewater Treatment Plant (WWTP) discharges into an unnamed tributary of the West River. The West River is a major tributary of the Blackstone River. It flows south from Grafton, MA through Upton, MA and Northbridge, MA and joins the Blackstone River in Uxbridge, MA. The Blackstone River then joins the Seekonk River in Pawtucket, Rhode Island. The unnamed tributary of the West River, and the West River are a part of the Blackstone River Basin and the Narragansett Bay Basin.

The unnamed tributary is classified as a Class B warm water fishery by the Massachusetts Department of Environmental Protection (MassDEP or the Department) in the Massachusetts Surface Water Quality Standards, 314 Code of Massachusetts Regulations ("CMR") 4.05(3)(b). The Massachusetts Surface Water Quality Standards (MA SWQS) describes Class B waters as having the following uses: (1) a habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical function, (2) primary and secondary contact recreation, (3) a source of public water supply (i.e., where designated and with appropriate treatment), (4) suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses, and (5) will have consistently good aesthetic value.

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

The West River has been identified as impaired under Section 303(d) of the Federal Clean Water Act (CWA), which 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). The segment of the West River downstream of the Upton discharge (51-12) appears on the state's 2010 303(d) list with water quality impairments attributed to metals, nutrients, pH, organic enrichment/low dissolved oxygen, and salinity/TDS/chlorides. MassDEP, *Massachusetts Year 2010 Integrated List of Water* (2010). In addition, West River Pond, a 37 acre impoundment located in Uxbridge, MA, downstream of the Upton WWTF, has been considered part of this segment since 2008 and has noted impairment caused by noxious plants (exotic species), although these are not considered to be caused by a pollutant. Exotic species in the West River Pond have included fanwort (*cabomba caroliniana*), watermilfoil (*Miriophyllum sp.*) and water chestnut (*Trapa natans*). MassDEP, *Blackstone River Watershed 2003-2007 Water Quality Assessment Report* (2010).¹

4. Limitations and Conditions

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

¹ Water chestnuts in particular are a significant problem on the West River downstream in Uxbridge. The Blackstone River Watershed Association has coordinated mechanical harvesting and hand-pulling events for a number of years. http://www.thebrwa.org/Membership/2012_newsletter.pdf

5. Permit Basis: Statutory and Regulatory Authority

Congress enacted the 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 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 MA SWQS at 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. EPA is required to limit any pollutant or pollutant parameter that is or may be discharged at a level that caused, has reasonable potential to cause or contributes to an excursion above any water quality criterion. Massachusetts regulations similarly require that its permits contain limitations that are adequate to assure the attainment and maintenance of the water quality standards of the receiving waters as assigned in the MA SWQS. *See* 314 CMR 3.11(3). EPA is required to obtain certification from the state in which the discharge is located that all water quality standards or other applicable requirements of state law, in accordance with Section 301(b)(1)(C) of the CWA, are satisfied, unless the state waives certification.

Section 401(a)(2) of the CWA and 40 CFR § 122.44(d)(4) require EPA to condition NPDES permits in a manner that will ensure compliance with the applicable water quality standards of a “downstream affected state,” in this case Rhode Island. The Rhode Island Water Quality Regulations (RI WQR) also establish designated uses of the State’s waters, criteria to protect those uses, and an antidegradation provision to ensure that existing uses and high quality waters are protected and maintained.

In addition, a permit may not be renewed, reissued or modified with less stringent limitations or conditions than those contained in the previous permit unless in compliance with the anti-

backsliding requirements of the CWA Section 402(o) and 40 CFR §122.44(l). States are also required to develop antidegradation policies pursuant to 40 CFR § 131.12. No lowering of water quality is allowed, except in accordance with the antidegradation policy.

6. Explanation of the Permit's Effluent Limitation(s)

6.1 Facility Information

The Upton WWTP is a 0.4 MGD municipal advanced wastewater treatment facility that discharges to an unnamed tributary of the West River. Wastewater treatment processes consist of aeration, secondary settling, phosphorus removal, sand filtration, chlorine contact and sodium bisulfite dechlorination. Figure 2 contains a flow process diagram for the facility. The sludge from this facility is transported by a licensed hauler to the Synagro incineration facility at Woonsocket, RI. The Upton WWTP does not currently serve any industrial users, and this facility does not anticipate serving any industrial users during the life of this permit. The facility's location is shown on Figure 1 of this fact sheet.

The permittee was issued an administrative compliance order by EPA on July 19, 2004 to address aluminum, ammonia and copper permit limitation exceedances. The Order included a requirement to prepare detailed evaluations and explanations of the specific causes of the violations of the aluminum and ammonia limitations in the NPDES permit. The Town was required to develop an Aluminum Report and an Ammonia Report including interim and long-term corrective measures to eliminate the ammonia-nitrogen violations and an implementation schedule for achieving and maintaining compliance with their NPDES permit. In addition, the Order included a requirement to submit an annual Copper Optimization Report detailing the actions taken during the prior calendar year to identify sources of copper entering the POTW and to further optimize the removal of copper from the POTW effluent. The Order established an interim average monthly copper limit of 20 ug/l.

All of the Order's required reports, submissions, and construction schedules have been met by the Town. The Town's final construction and process upgrades were completed by 2008. Since that time, the facility's DMRs document a dramatic decrease in ammonia discharges (averaging 0.13 mg/l in 2010-11 as compared to over 1 mg/l in 2006-2007) as well as consistent compliance with the aluminum and interim copper limits.

6.2 Derivation of Effluent Limits under the Federal CWA and the Commonwealth of Massachusetts Water Quality Standards

A. FLOW

The 12 month rolling average flow limitation of 0.4 MGD in the current permit has been maintained in the draft permit. This is the design flow of the facility found in Form 2A, Part A, Section a.6. of the permit application. The draft permit requires continuous flow measurement, and also requires reporting of the average monthly and maximum daily flows.

The dilution factor for the facility is calculated from 7Q10 flow and plant design flow. The

7Q10 flow at the facility is calculated based on the 7Q10 flow of 0.5 cfs at the low flow partial record USGS streamgage 01111150, West River at Pleasant Street, West Upton. USGS, *Gazetteer of Hydrologic Characteristics of Streams in Massachusetts – Blackstone River Basin*, WRI 84-4286 (1985). A drainage area adjustment is applied as follows.

Given:

7Q10 at USGS gage 01111150 = 0.5 cfs

Drainage area at USGS gage 01111150 = 14.7 sq mi

Drainage area at discharge = 0.36 sq mi

Then:

7Q10 at discharge = 0.5 cfs x 0.36 sq mi/14.7 sq mi = 0.12 cfs (0.008 MGD)

Dilution factor = (7Q10 flow + facility design flow)/facility design flow
= (0.008 MGD + 0.4 MGD)/0.4 MGD = 1.02

B. CONVENTIONAL POLLUTANTS

Biochemical Oxygen Demand (BOD₅) and Total Suspended Solids (TSS)

Section 301(b)(1)(B) of the CWA requires publicly owned treatment works (POTWs) to have achieved effluent limitations based upon **secondary treatment** by July 1, 1977. The secondary treatment requirements are set forth at 40 CFR Part 133, and include monthly average and weekly average concentration limitations on BOD₅ and TSS as well as monthly average percent removal limitations on BOD₅ and TSS. The monthly average percent removal limits for BOD₅ and TSS of 85 percent or greater are included in the draft permit. The BOD₅ and TSS concentration limits in the draft permit are more stringent than required by the secondary treatment requirements.

The BOD₅ and TSS concentration limits in the draft permit are the same as the limits in the current permit. The current permit limits were made more stringent in connection with the 2002 reissuance, in order to maintain the same mass loading of BOD₅ and TSS at the increased flow limit of 0.4 MGD that was included in that permit. Specifically, the authorized mass loadings at the previous design flow of 0.3 were calculated, and then lower concentration limits were back-calculated using the increased design flow of 0.4 MGD. The mass limits are the same as in the current permit and were calculated using the concentration limits and the flow limit of 0.4 MGD.

There have been no violations of BOD or TSS monthly average or weekly average concentration limits during the period of January 2010 through June 2012. The long term average for 2010-2011 was 1.2 mg/l BOD and 0.8 mg/l TSS. The maximum daily concentration reported was 3.7 mg/l and 5.2 mg/l for BOD and TSS, respectively. The BOD and TSS removal percentages have both averaged 98 % and 99 %, respectively with no violations during this same time period (See Table One for details).

pH

The draft permit includes pH limitations that are required by MA SWQS at 314 CMR 4.00, and are at least as stringent as pH limitations set forth at 40 C.F.R. §133.102(c). Class B waters shall

be in a range of 6.5 through 8.3 standard units and not more than 0.5 standard units outside of the normally occurring range [314 CMR 4.05 (3)(b)3]. There shall be no change from background conditions that would impair any use assigned to this class. The monitoring frequency is once (1) per day.

Bacteria

Limitations for bacteria in the existing permit are based upon state water quality standards for Massachusetts. There were no violations of the fecal coliform limit in the period 2010 to 2011. Violations of the limits in 2012 were traced to the presence of a bird nest located above the effluent channel, after the chlorine contact chamber, which resulted in contamination from bird droppings in the effluent samples. The bird nest has been removed and violations have not recurred.

The limits are modified in the Draft Permit to reflect the *E. coli* criteria in the revisions to the MA SWQS, 314 CMR 4.05(3)(b)4, approved by EPA in 2007. The monthly average limitation in the draft permit is 126 colony forming units (cfu) per 100 ml, and shall be expressed as a monthly geometric mean. The daily maximum limitation in the draft permit is 409 cfu/100 ml. These limitations are a State certification requirement and are consistent with EPA guidance recommending that no dilution be considered in establishing permit limits for discharges to rivers designated for primary contact recreation. *EPA Memorandum re: Initial Zones of Dilution for Bacteria in Rivers and Streams Designated for Primary Contact Recreation*, November 12, 2008. The monitoring frequency is maintained at three times per week.

C. NON-CONVENTIONAL POLLUTANTS

Ammonia-Nitrogen

The draft permit continues the current permit's warm weather (May 1 through October 31) average monthly concentration limit for ammonia-nitrogen of 2.3 mg/l. The limit in the current permit was calculated to maintain ammonia nitrogen loading authorized by the 1995 permit using that permit's concentration limit of 3.0 mg/l and the pre-upgrade design flow of 0.3 MGD, and then back-calculating the concentration limit for the upgraded plant using the new design flow of 0.4 MGD. This limit is continued to ensure that receiving water quality is maintained. Biological decomposition of ammonia-nitrogen uses dissolved oxygen, and if the mass discharge were increased in the warm weather months this could result in lowering of instream concentrations of dissolved oxygen. Based on the USEPA (1999) ammonia guidance document, an instream ammonia criteria of 3.21 mg/l at a pH of 7 and temperature of 24° C (75° F) is recommended if early life states of sensitive vertebrate species are present.

There were no violations of the warm weather limit between January 2010 and November 2012 (see Table 1). The average value for the warm weather monthly average concentration was 0.12 mg/l (n = 16). Monthly average ammonia-nitrogen values for the warm weather (May through October) ranged between 0.02 mg/l to 0.27 mg/l.

The cold weather limit has been modified from the current permit due to an apparent error in the calculation in the previous fact sheet. The prior limit was based on a calculation of winter

30Q10 flow at the facility of 0.08 cfs. This was incorrectly calculated.² The corrected and updated calculation is shown below:

West River, at the West Hill Dam gage station, Uxbridge, MA:

30Q10 flow = 2.5 cfs = $(2.5 \times 0.646272 \text{ MGD/cfs}) = 1.61 \text{ MGD}$ (October - April)

Drainage Area = 27.8 square miles

Unnamed Stream, at the Point of Discharge, Upton, MA:

Drainage Area = 0.36 square miles

30Q10 flow = 2.5 cfs $\times 0.36 \text{ sq mi} / 27.8 \text{ sq mi} = 0.043 \text{ cfs} =$

$(0.043 \text{ cfs} \times 0.646272 \text{ MGD/cfs}) = 0.028 \text{ MGD}$ (October - April)

30Q10 dilution factor (winter) = $(\text{Unnamed Tributary 30Q10} + \text{design flow}) / \text{design flow}$
 $= (0.028 + 0.4) / 0.4 = 1.07$

Ammonia-Nitrogen Cold weather Limit:

Critical instream temperature = 10 OC (winter instream temperature)

Critical instream pH = 7.0 (winter instream pH)

Chronic Ammonia Criteria (Chronic Criterion for Early Life Stages Present) = 5.91

Therefore, the Ammonia-Nitrogen winter limit:

$(30\text{Q10 winter dilution factor} \times \text{instream ammonia criteria})$

$(1.07 \times 5.91) = 6.3 \text{ mg/l}$

The Ammonia-Nitrogen winter limit is therefore revised to 6.3 mg/l.

Total Nitrogen

Nutrients such as phosphorus and nitrogen are necessary for the growth of aquatic plants and animals to support a healthy ecosystem. In excess, however, nutrients can contribute to fish disease, brown tide, algae blooms and low dissolved oxygen (DO). Excessive nutrients, generally phosphorus in freshwater and nitrogen in salt water, stimulate the growth of algae, which could start a chain of events detrimental to the health of the aquatic ecosystem. The algae prevent sunlight from penetrating through the water column. As the algae decay, they depress the DO levels in the water. Fish are in turn deprived of oxygen. Excessive algae may also cause foul smells and decrease aesthetic value, which could affect swimming and recreational uses.

It has been documented that the Providence and Seekonk Rivers (in Rhode Island) are impacted by low DO levels and high phytoplankton concentrations that stem from excessive nitrogen loadings. Significant areas of these rivers suffer from hypoxic (low DO) and anoxic (no DO) conditions and violate water quality Federal and State (Rhode Island) water quality standards. In its Section 305(b) report, the State of Rhode Island Department of Environmental Management (RIDEM) assessed the health of its receiving waters. Significant nutrient impairments to shellfish

² The 30Q10 calculation was based on a winter 30Q10 flow of 3.33 cfs at the West Hill Dam gage, with a drainage area of 27.8 square miles. Adjusting for the relative drainage area at the facility (0.36 sq. mi) gives: $3.33 \text{ cfs} \times 0.36 \text{ sq mi} / 27.8 \text{ sq mi} = 0.043 \text{ cfs}$ – not 0.08 cfs. For the new calculation EPA has updated the winter 30Q10 at West Hill Dam using the full period of record, as we have been unable to verify the source of the 3.33 cfs value. The updated value is 2.5 cfs.

harvesting and swimming, due to nitrogen, were noted in the Providence River, Seekonk River and Upper Narragansett Bay. These waters were given the highest priority consistent with the State of RI's goal of restoring such waters.

RIDEM conducted water quality modeling to estimate the nitrogen loading that was being contributed to Upper Narragansett Bay from Massachusetts sources. It was found that WWTFs contributed over 90% of the nitrogen loading to the MA/RI state line. The analysis also demonstrated that a significant portion of the overall nitrogen loading discharged to Narragansett Bay originates from WWTF effluents in Massachusetts. In particular, based on an annual estimate of nitrogen flux into the Upper Narragansett Bay from rivers, the Blackstone River was estimated to be the largest contributor of nitrogen. EPA has therefore included nitrogen monitoring in all POTW permits in the Blackstone River watershed and has included nitrogen limits in permit reissuances where necessary to ensure that discharges do not cause or contribute to nitrogen impairments.

According to 40 CFR §122.44(d)(4), EPA should include any requirements in permits to “conform to applicable water quality requirements under Section 401(a)(2) of the CWA when the discharge affects a State other than the certifying State.” Based on the Upton DMR data and monitoring conducted in the Blackstone River in support of RIDEM's assessment efforts, the nitrogen input from the Upton WWTF to the main stem of the Blackstone River (and eventually to Upper Narragansett Bay) is relatively small in comparison to other larger wastewater treatment facilities, and controls on these larger facilities should be sufficient to ensure that water quality standards are attained. See *Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers*, RIDEM December 2004. Total nitrogen discharges from the Upton WWTF averaged 24 lb/day in the summers of 2010-2011. Therefore, EPA has not included nitrogen limits at this time.

EPA has included in the draft permit a requirement to optimize nitrogen removal. The draft permit also includes a requirement to submit a report to the permitting agencies within one year, summarizing the measures taken to enhance the removal of nitrogen by its treatment facility and the effectiveness of these measures. The proposed nitrogen requirements in the draft permit are consistent with the requirements for other small WWTFs that ultimately discharge to Narragansett Bay. EPA has also continued the nitrogen monitoring requirements of the current permit.

Phosphorus

The draft permit carries over the current permit's monthly average total phosphorus limit of 0.2 mg/l from April to October. The West River downstream of the Upton discharge has documented impairments for nutrients and organic enrichment/low DO. See *Massachusetts Year 2010 Integrated List of Waters*. The effluent limit of 0.2 mg/l in the current permit is based on the MA SWQS requirement for the implementation of “highest and best practical treatment,” interpreted by MassDEP as an effluent limit of 0.2 mg/l for POTWs, where necessary to control cultural eutrophication. As noted in the prior fact sheet, while EPA found at that time that a limit of at least 0.2 mg/l was necessary to meet water quality standards, there was potential for a lower limit to be required in the future upon completion of a future TMDL or updated water quality analysis, or adoption of a state numeric water quality criterion for phosphorus.

While no TMDL or state numeric criterion has been adopted, EPA reviews the available data to determine whether the existing permit limit is sufficient to ensure that the Upton discharge does not cause or contribute to cultural eutrophication. MassDEP has not published monitoring data for the West River since 2008, but the Blackstone River Coalition (BRC) has conducted monitoring on multiple sites in the West River since at least 2006, including both upstream (Hartford Ave) and downstream (Pleasant St and Glen Ave) of the Upton WWTF. As reported in the BRC Water Quality Monitoring Report Cards, nutrient conditions have been characterized as ‘Good’ at the downstream site every year since 2008, with two years showing better nutrient conditions downstream of the WWTF than upstream (see 2009, Hartford Ave ‘Fair’; Pleasant St and Glen Ave ‘Good’; 2008, Hartford Ave ‘Poor’; Pleasant St and Glen Ave ‘Good’). (http://zaptheblackstone.org/whatwedoing/water_quality/wqm.shtml). Moreover the last year with less than ‘Good’ conditions at the downstream site corresponds to a year with multiple violations of the Total Phosphorus limit at the Upton WWTF (May 2007 – 0.53 mg/l; June 2007 – 0.31 mg/l) during its first full season under the 0.2 mg/l permit limit. Effluent concentrations in 2011 and 2012, in contrast, averaged 0.08 mg/l and 0.10 mg/l, respectively.

EPA also reviewed loads discharged from the Upton WWTF to determine the impacts on the West River. Phosphorus loads discharged by the Upton WWTF ranged between 0.06 and 0.37 lb/day in the phosphorus control season (April to October) of 2011 and 2012. Assuming 7Q10 conditions in the West River of 0.5 cfs with an upstream concentration of 0.04 mg/l, under the maximum load conditions (0.16 mg/l TP, 0.28 MGD monthly average, or 3.7 lb/day), the resulting instream concentration would be 0.096 mg/l, less than the 0.1 mg/l Gold Book standard. This is a conservative calculation, as the facility would not be discharging its maximum loads under the extremely dry 7Q10 conditions.

On that basis EPA concludes that, based on the available information, the current 0.2 mg/l permit limit is sufficient and maintains that limit in this draft permit. EPA notes that this segment of the West River remains listed for impairments and that further analysis or additional information, including increase in the flow from the facility (currently approximately 50% of design flow), may indicate a need for a lower limit. Should a future TMDL or updated water quality analysis indicate the need for a lower limit, this permit may be re-opened and modified to account for a more stringent limit.

In addition to the seasonal phosphorus limit of 0.2 mg/l, the current permit contains a winter period total phosphorus limit of 1.0 mg/l in effect from November 1 through March 31. A higher phosphorus effluent discharge limitation in the winter period is appropriate because the expected predominant form of phosphorus, the dissolved fraction, lacking plant growth to absorb it, will likely remain dissolved and flow out of the system. Imposing a limit on phosphorus during the cold weather months is, however, necessary to ensure that phosphorus discharged during the cold weather months does not result in the accumulation of phosphorus in the sediments, and subsequent release during the warm weather growing season. To confirm that EPA’s assumption of the anticipated behavior of dissolved and particulate phosphorus is correct, a monitoring requirement for orthophosphorus was included in the current permit for the winter period in order to determine the dissolved particulate fraction of phosphorus in this discharge. DMR data from the facility confirms that the orthophosphorus fraction is predominant, as expected: in the

winter periods from 2008-09 through 2011-12 the average total phosphorus concentration was 0.28 mg/l with an orthophosphorus component of 0.23 mg/l (84% of the total P). The 1 mg/l winter limit is therefore maintained in the draft permit.

Total Residual Chlorine (TRC)

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

In its issuance of the current permit EPA determined that there is reasonable potential for TRC concentrations discharged in the effluent to cause or contribute to an exceedance of the water quality criteria given and calculated an average monthly limitation of 11.2 ug/l and maximum daily limitation of 19.4 ug/l for TRC based on the dilution under 7Q10 conditions. 7Q10 dilution factor, multiplied by the acute and chronic fresh water criteria, provide the appropriate TRC limits. As shown below, the calculated limits are 11.2 ug/l and 19.4 ug/l.

Given:

acute freshwater criterion 19 ug/l chlorine
chronic freshwater criterion 11 ug/l chlorine
dilution factor 1.02

Then:

acute criterion x dilution factor = Daily Maximum Limit
 $19 \text{ ug/l} \times 1.02 = 19.38 \text{ ug/l}$
chronic criterion x dilution factor = Monthly Average Limit
 $11 \text{ ug/l} \times 1.02 = 11.22 \text{ ug/l}$

The draft permit continues the requirement of the current permit that individual TRC daily results (three per day) will be reported only when chlorination is being used, including the 1) individual sample result, 2) time at which the sample was taken, and 3) sampling date. The information for each sample will be reported in an attachment to the monthly DMRs. It should be noted that the draft permit requires that a routine sampling program be developed in which samples are taken at the same location, same time and same day(s) of every month. Any deviations from the routine sampling program shall be documented in correspondence appended to the applicable discharge monitoring report that is submitted to EPA.

The draft permit also continues the current permit's requirement that chlorination and dechlorination systems provide an alarm for indicating system interruptions or malfunctions. Any interruption or malfunction of the chlorine dosing system may result in levels of chlorine that are inadequate for achieving effective disinfection, or interruptions and/or malfunctions of the dechlorination system may result in excessive levels of chlorine in the final effluent. The draft permit requires that all interruptions or malfunctions be reported with the monthly DMRs. The draft permit requires that the report 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.

Copper

The limits for copper in the existing permit were calculated based on the chronic and acute criteria set forth in the 1998 *National Recommended Water Quality Criteria*, pursuant to the Massachusetts Water Quality Standards in effect when the existing permit was issued in 2002. The MA SWQS were revised in December 2006 to include site specific criteria for copper that were developed for specific receiving waters where national criteria are invalid due to site-specific physical, chemical, or biological considerations, and do not exceed the safe exposure levels determined by toxicity testing [314 CMR 4.05(5)(e), Table 28]. EPA approved an acute criterion of 25.7 ug/l (dissolved, “d”) and chronic criterion of 18.1 ug/l (d) for the West River on March 26, 2007. The draft permit contains effluent limits of 18.1 ug/l(total recoverable “tr”)(monthly average) and 27.3 ug/l(tr)(maximum daily). The derivation of these limits is set forth below.

In determining the appropriate effluent limitation in response to this revised standard, EPA must apply the requirements of the revised state standard, as set forth in the MA SWQS, specifically at 314 CMR 4.05(5)(e)1 and 314 CMR 4.06, Table 28 (the “site-specific protocol”), and the requirements of the anti-backsliding provisions of the Clean Water Act §§ 402(o) and 303(d)(4).

Site-Specific Protocol: In determining effluent limitations under the revised standard, the site-specific protocol allows for relaxation of permit limits to reflect the higher criteria only to the extent required to reflect the actual performance that the facility has been able to achieve. It states:

[A]s part of the site-specific criteria, all reasonable efforts to minimize the loads of metals, and copper in this case, are part of the criteria revision protocol. So, the Department on a case-by-case basis will develop permit copper limits. Each determination will be based not only on the adjusted concentration resulting from the appropriate multiplier but will reflect the demonstrated level of copper reduction routinely achievable at the facility in order to minimize copper loads and thereby reduce its accumulation in the sediment.

Thus, determination of the appropriate effluent limits under the site-specific protocol requires calculating both (i) the required effluent limits that would meet the numeric criteria (criteria-based limits) and (ii) the actual effluent concentrations achieved by the facility (performance-based limits), and selecting the more stringent of the two.

Antibacksliding: The reissuance of a permit with less stringent effluent limits must meet the requirements of the CWA’s anti-backsliding provision, § 402(o), which allows relaxation of water quality based standards only if they comply with CWA § 303(d)(4), and only if the revised limit meets current effluent guidelines and will not cause a violation of water quality standards.³

³ The anti-backsliding rule also contains a number of exceptions that are not applicable here. See CWA § 402(o)(2); 40 CFR § 122.44(l).

The Massachusetts antidegradation policy is set forth in 314 CMR 4.04, providing, *inter alia*, “[i]n all cases existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.”

The analysis under the site-specific protocol addresses the antibacksliding and antidegradation requirements by relaxing the copper limits to the more stringent of the limits necessary to achieve the revised criteria, or to the limits that have historically been achieved by the facility (unless the facility has historically discharged an effluent concentration lower than the current permit limits, in which those limits are retained). Because any relaxed limits will result in attainment of the site-specific criteria and not be less stringent than the facility’s current performance, the facility will not be able to scale back its efforts to reduce copper concentrations in the effluent. Therefore, the less stringent limits will not have the result of exceeding the revised criteria or worsening water quality in the receiving water, and the antidegradation requirement will be met.

As set forth above, the effluent limitations are determined by calculating both (i) the required effluent limits that would meet the numeric criteria (criteria-based limits) and (ii) the actual effluent concentrations achieved by the facility (performance-based limits), and selecting the more stringent of the two. The only exception to this procedure is if the actual effluent concentration is lower than the current (non site-specific) limits, then the current limits are retained in the permit

Criteria-based calculation. The criteria-based limits are calculated based on dilution under 7Q10 conditions:

Calculation of acute limit for copper:

Acute criteria (dissolved) = 25.7 ug/l(d)

Dilution factor = 1.02

Effluent limitation for dissolved copper = $25.7 \text{ ug/l(d)} * 1.02 = 26.2 \text{ ug/l(d)}$

Effluent limitation for total recoverable copper = $26.2 \text{ ug/l(d)} / 0.960 = 27.3 \text{ ug/l (tr)}$

Calculation of chronic limit for copper:

Chronic criteria (dissolved) = 18.1 ug/l(d)

Dilution factor = 1.02

Effluent limitation for dissolved copper = $18.1 \text{ ug/l} * 1.02 = 18.5 \text{ ug/l(d)}$

Effluent limitation for total recoverable copper = $18.5 \text{ ug/l} / 0.960 = 19.2 \text{ ug/l (tr)}$

Performance-based calculation. The level of copper removal routinely achieved by the facility (i.e., the past demonstrated performance of the facility) is determined by a statistical analysis of discharge data submitted by the facility over the two year period from December 2009 through November 2011, using the methodology set forth in the *Technical Support Document for Water Quality-based Toxics Control, EPA/505/2-90-001 (March 1991) (Appendix E)*. The average monthly and maximum daily limits are based on the 95th and 99th percentile of a lognormal distribution, based on the facility’s monthly average effluent data as shown in Table 2. These calculations indicate that limits based solely on past performance would result in a monthly average limit of 20.2 µg/l(tr) and a maximum daily limit of 31.9 µg/l(tr).

Resulting Effluent Limitation. As noted above, pursuant to the site-specific protocol, effluent limits will be relaxed only to the more stringent of the criteria-based or performance-based limits. In this case the the criteria-based limits are more stringent. The draft permit therefore includes monthly limit and maximum daily limits based on the criteria, as follows:

Monthly average: 19.2 µg/l(tr)

Maximum daily: 27.3 µg/l(tr)

Other metals

EPA determined in previous permit reissuances that the Upton discharge has a reasonable potential to cause or contribute to exceedances of water quality standards for aluminum, cadmium, lead and zinc as well as copper. Permit limits for these metals are based on the 7Q10 dilution factor at a hardness of 58 mg/l for the metals with hardness-dependent criteria (cadmium, lead and zinc). The draft permit continues these effluent limitations.

In the five year term of the existing permit there have been no violations of the cadmium, lead or zinc limits. Therefore the monitoring frequency for cadmium and lead has been reduced to four (4) per year, consistent with the reduction in monitoring frequency for zinc in the current permit. The permittee may report the effluent analytical data generated in conjunction with the WET test to meet this reporting requirement.

With respect to the aluminum, there has been one violation of the monthly average permit limitation of 88.7 ug/l (180 ug/l in December 2010), and no violations of the 765 ug/l maximum daily limitation. Given this exceedance and the permittee's use of aluminum compounds in the treatment process, monitoring for aluminum is maintained at 2/month.

Toxicity Testing

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

Based on the potential for toxicity resulting from domestic and industrial contributions, the low level of dilution at the discharge location, water quality standards, and in accordance with EPA regulation and policy, the draft permit includes chronic and acute toxicity limitations and monitoring requirements. (See, e.g., "Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants", 50 Fed. Reg. 30,784 (July 24, 1985); see also, EPA's *Technical Support Document for Water Quality-Based Toxics Control*). EPA Region I has developed a toxicity control policy. The policy requires wastewater treatment facilities to perform toxicity bioassays on their effluents. The MassDEP requires bioassay toxicity testing for state certification.

The MassDEP's Division of Watershed Management has a current toxics policy which requires toxicity testing for all major dischargers such as the Upton WWTF (*Implementation Policy for*

the Control of Toxic Pollutants in Surface Waters, MassDEP 1990). In addition, EPA believes that toxicity testing is required to assure that the synergistic effect of the pollutants in the discharge does not cause toxicity, even though the pollutants may be at low concentrations in the effluent. The inclusion of whole effluent toxicity limitations in the draft permit will assure that the Upton WWTF does not discharge combinations of toxic compounds into the West River in amounts which would affect aquatic or human life.

Pursuant to EPA Region I Policy, and MassDEP's *Implementation Policy for the Control of Toxic Pollutants in Surface Waters* (February 1990), dischargers having a dilution factor less than 10 are required to conduct acute and chronic toxicity testing four times per year unless there are passing results over an extended period of time. A dilution factor of 1.02 was calculated for this facility in connection with the reissuance of the current permit based on a 7Q10 flow of 0.008 MGD. In accordance with the above guidance, the draft permit includes an acute toxicity limit (LC50 of > 100%) and a chronic toxicity limit (C-NOEC of > 98 %). The C-NOEC calculations are as follows: $(1/\text{dilution factor} * 100) = (1/1.02 * 100) = 98 \text{ percent}$.

Under the current permit the permittee has conducted WET tests using both the fathead minnow, *Pimephalas promelas*, and the daphnid, *Ceriodaphnia dubia*. The facility had two excursions from the permit limit for chronic toxicity in the period 2010 to 2012, both for the daphnid. As the facility's DMRs document that the daphnid has consistently been the more sensitive species since 2008, the draft permit reduces testing requirements to a single species, *Ceriodaphnia dubia*, only. Toxicity testing must be performed in accordance with the EPA Region I test procedures and protocols specified in **Attachment A** of the draft permit (Freshwater Chronic Toxicity Procedure and Protocol), and the tests will be conducted four times a year. EPA and MassDEP may use the results of the toxicity tests and chemical analyses conducted by the permittee, required by the permit, as well as national water quality criteria, state water quality criteria, and any other appropriate information or data, to develop numerical effluent limitations for any pollutants.

7. Collection System Operation and Maintenance

EPA regulations set forth a standard condition for "Proper Operation and Maintenance" that is included in all NPDES permits. *See* 40 CFR § 122.41(e). This condition is specified in Part II.B.1 (General Conditions) of the draft permit and it requires the proper operation and 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. MassDEP has stated that the inclusion in NPDES permits of I/I control conditions is a standard State Certification requirement under Section 401 of the CWA and 40 CFR § 124.55(b).

Therefore, specific permit conditions have been included in Part I.B. and I.C. of the draft permit. These requirements include mapping of the wastewater collection system, preparing and implementing a collection system operation and maintenance plan, reporting unauthorized discharges including SSOs, maintaining an adequate maintenance staff, performing preventative maintenance, controlling infiltration and inflow to the extent necessary to prevent SSOs and I/I related-effluent violations at the wastewater treatment plant, and maintaining alternate power where necessary. These requirements are intended to minimize the occurrence of permit violations that have a reasonable likelihood of adversely affecting human health or the environment. Several of the requirements in the draft permit are not included in the current permit, including collection system mapping, and preparation of a collection system operation and maintenance plan. EPA has determined that these additional requirements are necessary to ensure the proper operation and maintenance of the collection system and has included schedules for completing these requirements in the draft permit.

8. 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 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 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 unnamed stream and the West River are not covered by the EFH designation for riverine systems and thus EPA has determined that a formal EFH consultation with NMFS is not required.

9. Endangered Species Act

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) administers Section 7 consultations for freshwater species, whereas the National Marine Fisheries Service (NMFS) administers Section 7 consultations for marine species and anadromous fish.

EPA has determined that no federally-listed or proposed, threatened or endangered species or critical habitat are known to occur in the West River or vicinity of the Upton WWTF. Furthermore, the effluent limitations and other permit requirements identified in this Fact Sheet are designed to be protective of all aquatic species.

10. 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.

As noted on page 3 of the permit, a routine sampling program shall be developed in which samples are taken at the same location, same time and same day(s) of every month. Any deviations from the routine sampling program shall be documented in correspondence appended to the applicable discharge monitoring report that is submitted to EPA.

The Draft Permit includes new provisions related to Discharge Monitoring Report (DMR) submittals to EPA and the State. The Draft Permit requires that, no later than one year after the effective date of the permit, the permittee submit all monitoring data and other reports required by the permit to EPA using NetDMR, unless the permittee is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for submitting DMRs and reports (“opt-out request”).

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

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

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

The Draft Permit requires the permittee to report monitoring results obtained during each

calendar month using NetDMR, no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA and will no longer be required to submit hard copies of DMRs to MassDEP. However, permittees must continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP.

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

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

11. State Certification Requirements

EPA may not issue a permit unless the Massachusetts Department of Environmental Protection certifies that the effluent limitations included in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State Water Quality Standards. EPA has requested permit certification by the State pursuant to 40 CFR §124.53 and expects the draft permit will be certified.

12. Comment Period, Hearing Requests, and Procedures for Final Decisions

All persons, including applicants, who believe any condition of the permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period to Susan Murphy, U.S. Environmental Protection Agency, 5 Post Office Square, Suite 100 (OEP06-1), Boston, MA 02109. Any person prior to such date may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues to be raised in the hearing. A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA’s Boston office.

Following the close of the comment period, and after the public hearing, if held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and to each person who has submitted written comments or requested notice.

13. EPA Contact

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

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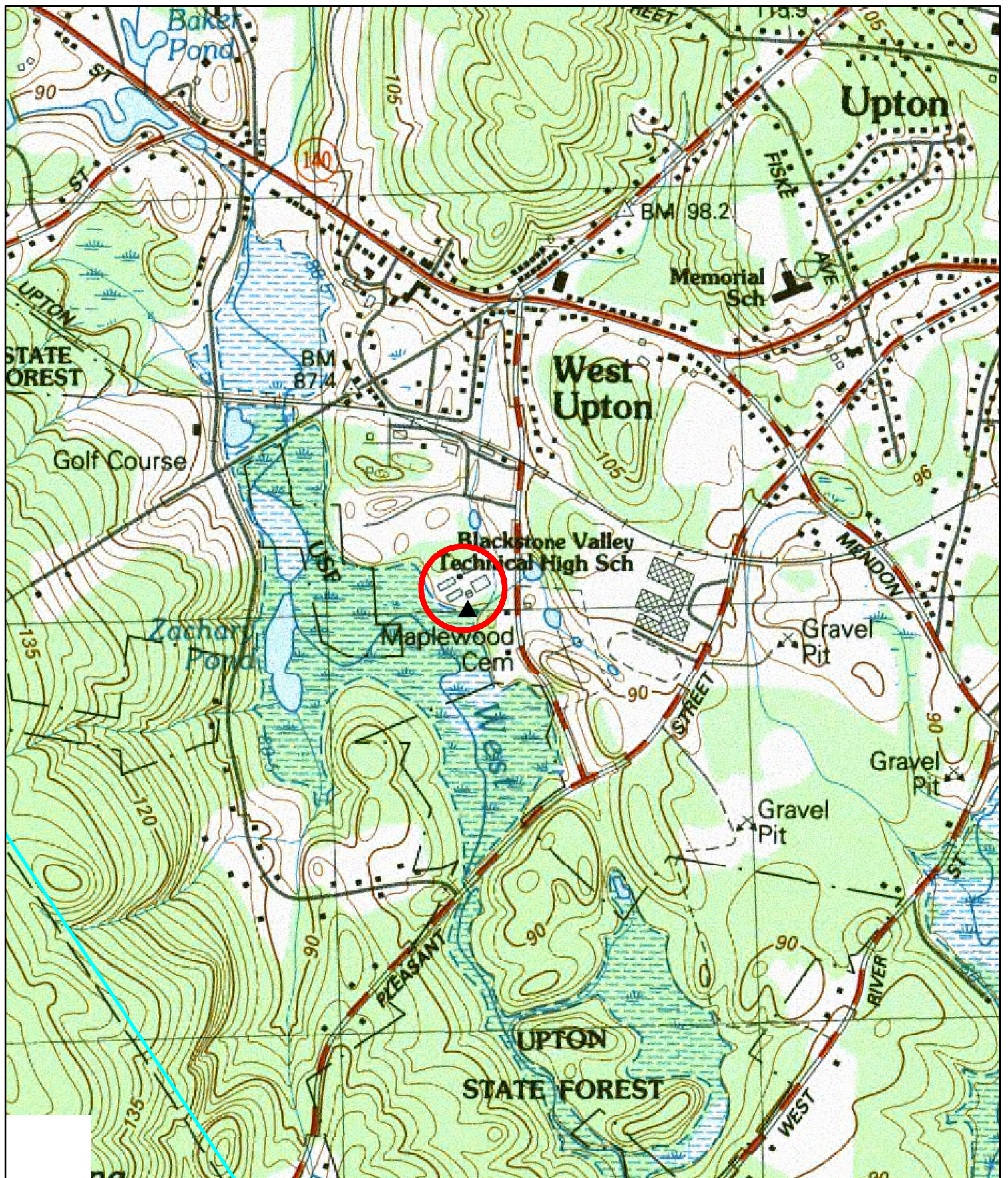


Figure 1. Location Map
 Upton WWTF
 NPDES No. MA0100196

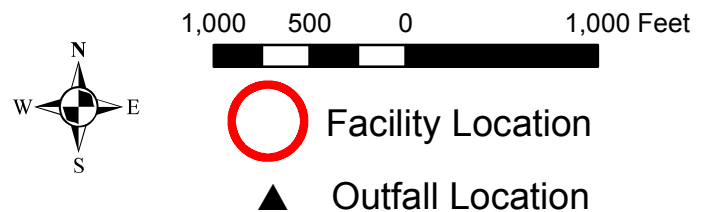
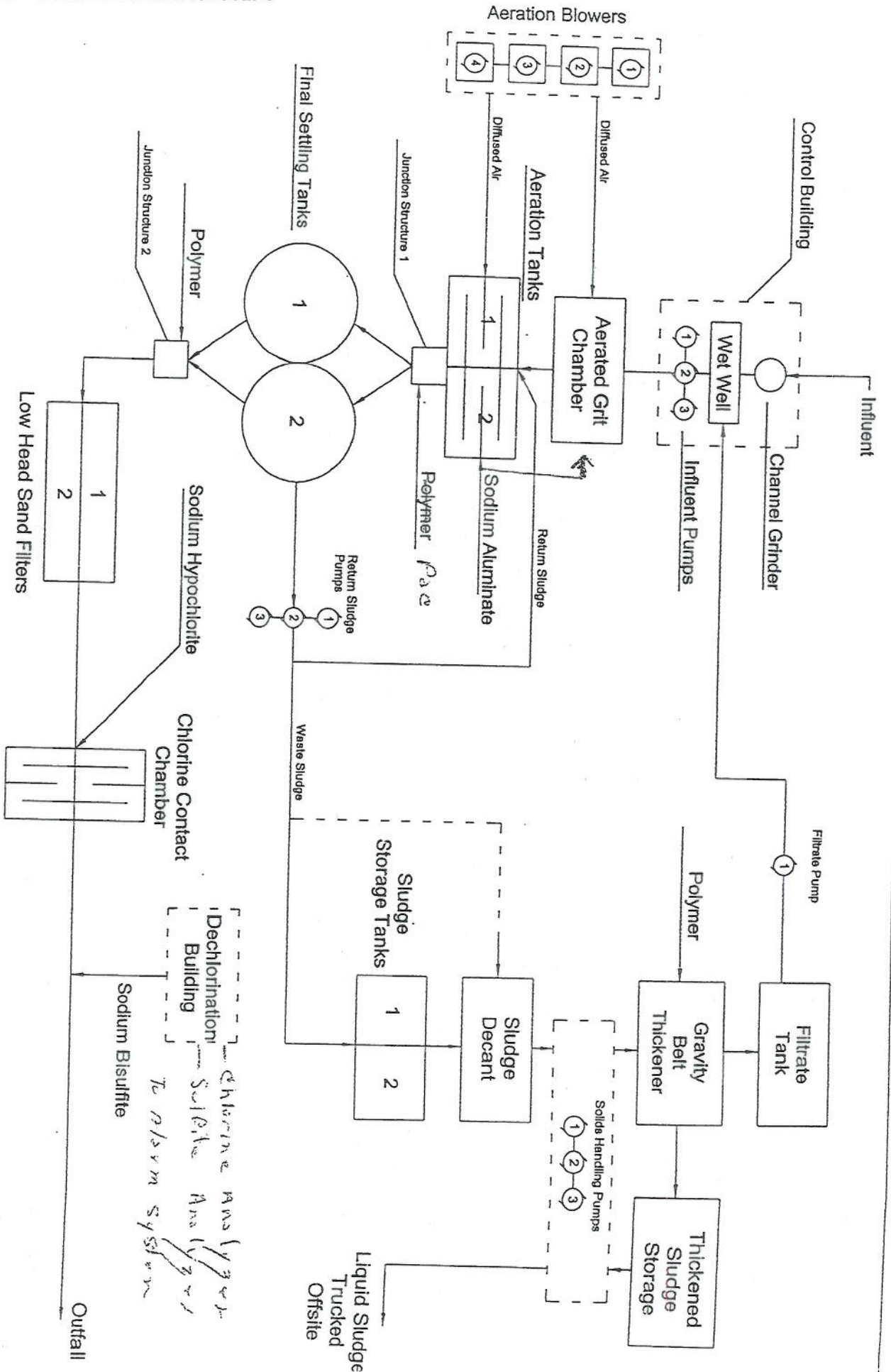


Figure 2. Process Flow Diagram
 Upton WWTF – NPDES No. MA0100196



TOWN OF UPTON WASTEWATER TREATMENT FACILITY PROCESS FLOW DIAGRAM

Table 1. Three year facility DMR Data

	Flow (MGD)		BOD (mg/l)		TSS (mg/l)		fecal coliform (cfu/100 ml)		TRC (mg/l)		pH		Whole Effluent Toxicity			
	12mo avg	daily max	mo avg	wkly avg	mo avg	wkly avg	mo avg	daily max	mo avg	daily max	min	max	<i>P. pimphales</i>		<i>C. dubia</i>	
													LC50	CNOEC	LC50	CNOEC
Effluent Limit:	Report		30	45	30	45	200	400	11.2	19.4	6.5	8.3	≥ 100%	≥ 98%	≥ 100%	≥ 98%
Sampling Frequency:	CONTINUOUS		1/week		1/week		2/week		3/day		1/day		4/year	4/year	4/year	4/year
January 2010	0.21	0.29	1.46	1.75	0.8	0.87					6.65	7.4	≥ 100%	≥ 100%	≥ 100%	≥ 100%
February	0.21	0.43	1.43	1.82	1.7	2.52					6.55	7.62				
March	0.22	0.94	2.33	2.87	1.9	5.2					6.53	7.44				
April	0.23	0.63	2.47	3.67	0.55	0.83	1.43	92	10.3	20	6.57	7.47	≥ 100%	≥ 100%	≥ 100%	≥ 100%
May	0.23	0.21	1.17	1.19	0.65	0.88	2.38	390	11.3	16.6	6.58	7.96				
June	0.23	0.18	1.69	1.82	0.45	0.73	204	990	11	20	6.56	7.89				
July	0.22	0.14	1.04	1.28	0.55	0.95	1.9	10	12	20	6.81	8.02	≥ 100%	≥ 98%	≥ 100%	≥ 100%
August	0.21	0.14	0.72	1.15	0.36	0.55	39	130	8.7	16	6.6	7.79				
September	0.21	0.14	0.89	0.84	0.43	1.1	50	440	10	16	6.58	8.03				
October	0.21	0.19	0.78	0.68	0.64	1.1	11	110	20	12	6.64	8.06	≥ 100%	≥ 100%	≥ 100%	≥ 100%
November	0.21	0.21	0.87	1.54	0.34	0.43					6.6	7.7				
December	0.2	0.29	1.08	1.36	0.51	0.68					6.6	7.27				
January 2010	0.2	0.21	0.92	1.27	0.72	0.84					6.56	7.92	100%	100%	100%	100%
February	0.2	0.35	1.17	1.7	0.62	0.78					6.6	8				
March	0.19	0.57	1.24	1.9	1.02	2.3					6.6	7.5				
April	0.19	0.37	1.36	1.85	0.55	0.63	7.2	130	14	33	6.7	7.6	100%	100%	100%	100%
May	0.19	0.24	0.8	1.36	0.48	0.57	1.3	28	15	20	6.6	8.2				
June	0.2	0.29	1.07	2.2	0.84	0.97	0.78	44	6	16	6.6	7.5				
July	0.2	0.2	1.02	1.51	0.85	1	2.6	440	9	16	6.6	7.5	100%	100%	100%	100%
August	0.2	0.5	0.86	1.87	1.13	1.28	0.91	100	9	13	6.6	7.6				
September	0.22	0.41	1.38	1.73	1.13	1.3	0.94	180	7	13	6.6	7.6				
October	0.22	0.33	1.73	3.23	1.16	1.15	139	450	7.6	13	6.7	7.3	100%	100%	100%	100%
November	0.24	0.34	0.74	1.15	1.12	1.25					6.5	7.5				
December	0.24	0.4	1.16	1.98	0.85	1.15					6.5	7.2				
January 2012	0.24	0.25	1.38	1.2	0.74	1.22					6.6	7.4	100%	100%	100%	100%
February	0.24	0.23	2.07	2.24	0.84	0.95					6.6	7.7				
March	0.23	0.2	1.17	1.7	1.08	1.29					6.5	7.8				
April	0.22	0.24	1.57	1.81	1.12	1.28	46	450	5.5	13	6.6	8	100%	100%	100%	100%
May	0.21	0.2	1.89	2.9	1.08	1.22	123	8300	4.6	13	6.6	7.7				
June	0.21	0.22	2.09	2.08	1.26	1.4	293	3200	3.4	13	6.6	7.4				
July	0.21	0.16	1.82	2.62	1.01	1.21	2.71	36	3	10	6.7	7.4	100%	100%	100%	6.25%
August	0.21	0.2	1.78	3.07	0.75	0.92	4.8	13	3.8	13.3	6.6	7.4				
September	0.2	0.2	1.59	2.29	0.76	0.94	0.63	11	2	6.6	6.7	7.3				
October	0.19	0.2	1.77	2.29	0.72	0.7	9.2	21	4.8	10	6.6	7	100%	100%	100%	25%
November	0.18	0.17	2.44	2.67	0.67	0.89					6.5	7.3				
December	0.17	0.23	2.25	3.26	1.23	2.1					6.6	7.3				
Average:	0.21		1.42	1.94	0.85	1.20	44.85	741.19	8.48	15.40	6.60	7.60	≥ 100%	≥ 100%	≥ 100%	≥ 100%
Maximum:		0.9	2.5	3.7	1.9	5.2	293.0	8,300.0	20.0	33.0	6.5 (min)	8.2				

	Aluminum (ug/l)		Cadmium (ug/l)		Copper (ug/l)		Lead (ug/l)		Zinc (ug/l)		Total Phosphorus (mg/l)		Orthophosphorus (mg/l)	NH3 (mg/l)	Nitrate (mg/l)	Nitrite (mg/l)	TKN (mg/l)	Total N
	mo avg	daily mx	mo avg	daily mx	mo avg	daily mx	mo avg	daily mx	mo avg	daily mx	mo avg	daily max	mo avg	mo avg	mo avg	mo avg	mo avg	mo avg
	88.7	765	0.19	1.3	20*		1.62	Report	77	77	0.2/1.0	Report	Report	Report	Report	Report	Report	Calculated)
Sampling Frequency:	2/month		2/month		2/month		2/month		4/year		1/week		1/week	1/week	1/month	1/month	1/month	Calculated)
January 2010	86	97	0	0	10	11	0	0	34	34	0.81	1.34	0.81	0.12	16	0	0	16
February	0	0	0	0	7	7.1	0	0			0.45	0.59	0.41	0.09	12	0	0	12
March	0	0	0	0	8.5	9.9	0	0			0.1	0.14	0.05	0.12	8.8	0	0	8.8
April	0	0	0	0	6.3	7.2	0	0	32	32	0.06	0.1		0.11	6.2	0	0	6.2
May	0	0	0	0	10.1	10.3	0	0			0.19	0.3		0.11	15	0	0	15
June	0	0	0	0	8.6	9.01	0	0			0.18	0.22		0.1	17	0	0	17
July	0	0	0	0	13.5	15	0	0	33	33	0.24	0.27		0.14	19	0	0	19
August	0	0	0	0	16.6	18	0	0			0.1	0.18		0.07	17	0	0	17
September	0	0	0	0	13.3	13.3	0	0			0.1	0.12		0.03	22	0	0	22
October	0	0	0	0	16.4	16.5	0	0	35	35	0.09	0.14		0.02	24	0.07	0	24.07
November	0	0	0	0	22	23	0	0			0.31	0.53	0.26	0.01	23	0.08	0	23.08
December	180	200	0	0	16.5	24	0	0			0.34	0.5	0.25	0.07	23	0	0	23
January 2011	65	81	0	0	12	12	0	0	49	49	0.23	0.33	0.16	0.06	18	0	0	18
February	40	80	0	0	14.3	14.7	0	0			0.33	0.4	0.25	0.08	20	0	0	20
March	81	87	0	0	7.8	10.6	0	0			0.08	0.14	0.05	0.15	12	0	0	12
April	0	0	0	0	10	10.6	0	0	50	50	0.16	0.18		0.08	13	0	0	13
May	0	0	0	0	6.2	7.4	0	0			0.07	0.13		0.16	18	0	0	18
June	0	0	0	0	5	5.1	0	0			0.03	0.08		0.06	16	0	0.52	16.52
July	63	90	0	0	7.5	8.7	0	0	44.7	44.7	0.08	0.11		0.18	17	0	0	17.3
August	0	0	0	0	18	25	0	0			0.1	0.17		0.26	15	0	0	15
September	0	0	0	0	11.4	17	0	0			0.04	0.05		0.04	9.3	0	0	9.3
October	0	0	0	0	13.7	18.1	0	0	27	27	0.04	0.06		0.27	12	0	0	12
November	0	0	0	0	9.9	11.1	0	0			0.04	0.05	0.02	0.19	10	0	0	10
December	0	0	0	0	6.35	6.5	0	0			0.07	0.1	0.05	0.66	14	0	0	14
January 2012	0	0	0	0	11.2	12.6	0	0			0.31	0.46	0.3	0.1	13	0	0.75	13.75
February	0	0	0	0	14.2	15.2	0	0			0.51	0.56	0.48	0.16	19	0	0	19
March	0	0	0	0	15.8	16.4	0	0			0.19	0.36	0.14	0.12	22	0	1.9	23.9
April	0	0	0	0	14.5	15.8	0	0			0.14	0.19		0.08	26	0	0	26
May	0	0	0	0	8.55	8.6	0	0			0.11	0.16		0.34	19	0.06	1.6	20.66
June	0	0	0	0	8.1	8.3	0	0			0.08	0.11		0.15	18	0	0	18
July	0	0	0	0	14.3	14.2	0	0			0.11	0.14		0.32	21	0.03	2.3	23.3
August	0	0	0	0	14.5	14.6	0	0			0.09	0.12		0.14	8.9	0	0.95	9.8
September	0	0	0	0	15.7	16.6	0	0			0.07	0.07		0.05	19	0	0	19
October	0	0	0	0	17.9	19.7	0	0			0.07	0.17		0.1	21	0	0	21
November	0	0	0	0	27.3	31.8	0	0			0.17	0.26	0.12	0.07	22	0	1.5	23.5
December	0	0	0	0	29.8	34.1	0	0			0.2	0.28	0.11	0.07	32	0.06	0	32.06
Average:	14.3	17.6	0.0	0.0	12.9	14.4	0.0	0.0	38.1	38.1	0.2	0.3	0.2	0.1	17.2	0.0	0.3	17.5
Maximum:	180.0	200.0	0.0	0.0	29.8	34.1	0.0	0.0	50.0	50.0	0.8	1.3	0.8	0.7	32.0	0.1	2.3	32.1

*interim limit

Daily Maximum Concentration - 99th percentile

u_y = Avg of Nat. Log of daily Discharge (lbs/day) =	2.43102
S_y = Std Dev. of Nat Log of daily discharge =	0.44407
$\sum (y_i - u_y)^2 =$	18.73350
k = number of daily samples =	96
S_y^2 = estimated variance = $(\sum (y_i - u_y)^2) / (k-1) =$	0.19719

RP analysis/Limit calculation:

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

$$\text{Daily Max Limit}^* = 31.9418 \text{ ug/L}$$

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

Average Monthly Concentration - 95th percentile

Number of samples per month, n =	2
$E(x)$ = Daily Avg = $\exp(u_y + 0.5 S_y^2) =$	12.54868
$V(x)$ = Daily Variance = $\exp(2u_y + S_y^2) * [\exp(S_y^2) - 1] =$	34.32533
S_n^2 = Monthly Average variance = $\ln\{V(x) / (n[E(x)]^2) + 1\} =$	0.10345
S_n = Monthly Average standard deviation = $S_n^2^{(0.5)} =$	0.32164
u_n = n-day monthly average = $\ln(E(x)) - 0.5 S_n^2 =$	2.47789

RP analysis/Limit calculation:

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

$$\text{Monthly Avg Limit}^* = 20.23 \text{ ug/L}$$

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