

**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 Sturbridge**

is authorized to discharge from the facility located at

**New Boston Road Extension  
Sturbridge, MA 01566**

to receiving water named

**Quinebaug River  
(Quinebaug French Watershed)**

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein. This permit shall become effective (See \*\* below).

This permit shall become effective on December 1, 2006

This permit and the authorization to discharge expire at midnight, November 30, 2011.

This permit supersedes the permit issued on January 2, 2002.

This permit consists of 11 pages in Part I including effluent limitations, monitoring requirements, Attachments A and B and 27 pages in Part II including General Conditions and Definitions.

Signed this 28th day of SEPTEMBER, 2006

/s/ SIGNATURE ON FILE

\_\_\_\_\_  
Director  
Office of Ecosystem Protection  
Environmental Protection Agency  
Boston, MA

\_\_\_\_\_  
Director  
Division of Watershed Management  
Department of Environmental Protection  
Commonwealth of Massachusetts  
Boston, MA

**PART I**

**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS**

1. During the period beginning the effective date and lasting through expiration, the permittee is authorized to discharge from outfall serial number 001, treated effluent to the Quinebaug River. Such discharge shall be limited and monitored as specified below.

Effluent Characteristic	Units	Effluent Limits			Monitoring Requirements	
		Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type <sup>3</sup>
Flow <sup>2</sup>	MGD	0.75	----	Report	Continuous	Recorder
Flow <sup>2</sup>	MGD	Report	----	Report	Continuous	Recorder
CBOD <sub>5</sub> <sup>4</sup> (April 1 – September 30)	mg/l	10	10	15	3/Week	24-Hour Composite <sup>5</sup>
	lbs/day	63	63	94	3/Week	24-Hour Composite <sup>5</sup>
BOD <sub>5</sub> <sup>4</sup> (October 1 - March 31)	mg/l	20	20	30	2/Week	24-Hour Composite <sup>5</sup>
	lbs/day	125	125	188	2/Week	24-Hour Composite <sup>5</sup>
TSS <sup>4</sup> (April 1 – September 30)	mg/l	10	10	15	3/Week	24-Hour Composite <sup>5</sup>
	lbs/day	63	63	94	3/Week	24-Hour Composite <sup>5</sup>
TSS <sup>4</sup> (October 1 - March 31)	mg/l	20	20	30	3/Week	24-Hour Composite <sup>5</sup>
	lbs/day	125	125	188	3/Week	24-Hour Composite <sup>5</sup>
pH Range		(See Condition I.A.1.b. on Page 6)			1/Day	Grab
Dissolved Oxygen (April 1 – October 31)	mg/l	NOT LESS THAN 6 mg/l			1/Day	Grab
Fecal Coliform <sup>1,6</sup> (April 1- October 31)	cfu/100 ml	200	----	400	2/Week	Grab
Total Residual Chlorine <sup>6,7,8</sup> (April 1 – October 31)	ug/l	75	----	129	1/Day	Grab

1. During the period beginning the effective date and lasting through expiration, the permittee is authorized to discharge from outfall serial number 001, treated effluent to the Quinebaug River. Such discharge shall be limited and monitored as specified below.

<u>Effluent Characteristic</u>	<u>Units</u>	<u>Effluent Limits</u>			<u>Monitoring Requirements</u>	
		<u>Average Monthly</u>	<u>Average Weekly</u>	<u>Maximum Daily</u>	<u>Measurement Frequency</u>	<u>Sample Type<sup>3</sup></u>
Copper, Total <sup>9</sup>	ug/l	25	----	34	1/Month	24-Hour Composite <sup>5</sup>
Phosphorus, Total* (April 1 - October 31)	mg/l	0.2	----	----	2/Week	24-Hour Composite <sup>5</sup>
Phosphorus, Total* (November 1- March 31)	mg/l	1.0	----	1.5	2/Week	24-Hour Composite <sup>5</sup>
Ortho Phosphorus, Dissolved (November 1-March 31) <sup>10</sup>	mg/l	Report	----	Report	2/Week	24-Hour Composite <sup>5</sup>
	lbs/day	Report	----	Report	2/Week	24-Hour Composite <sup>5</sup>
Ammonia Nitrogen, (June 1-October 31)	mg/l	1.5	----	2.0	1/Week	24-Hour Composite <sup>5</sup>
	lbs/day	9.4	----	Report	1/Week	24-Hour Composite <sup>5</sup>
Ammonia Nitrogen, (November 1 - May 31))	mg/l	Report	----	Report	1/Month	24-Hour Composite <sup>5</sup>
Total Kjeldahl Nitrogen	mg/l	Report	----	Report	1/Month	24-Hour Composite <sup>5</sup>
Total Nitrate	mg/l	Report	----	Report	1/Month	24-Hour Composite <sup>5</sup>
Total Nitrite	mg/l	Report	----	Report	1/Month	24-Hour Composite <sup>5</sup>
Whole Effluent Toxicity <sup>12,13,14</sup>		Acute LC <sub>50</sub> ≥ 100% Chronic C-NOEC ≥ 15%			4/year <sup>11</sup>	24-Hour Composite <sup>5</sup>

All sampling shall be representative of the effluent that is discharged through outfall 001 to the Quinebaug River.

\* See Section E – Compliance Schedule.

**Footnotes:**

1. Required for State Certification.
2. Report annual average, monthly average, and the maximum daily flow. The limit is an annual average, which shall be reported as a rolling average. The value will be calculated as the arithmetic mean of the monthly average flow for the reporting month and the monthly average flows of the eleven previous months.
3. All required effluent samples shall be collected at the discharge point. 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 that is submitted to EPA.

All samples shall be tested using the analytical methods found in 40 CFR §136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR §136. All samples shall be 24 hour composites unless specified as a grab sample in 40 CFR §136.

4. Sampling required for influent and effluent.
5. A 24-hour composite sample will consist of at least twenty four (24) grab samples taken during one consecutive 24 hour period, either collected at equal intervals and combined proportional to flow or continuously collected proportionally to flow.
6. Fecal coliform and total residual monitoring will be conducted during the period April 1<sup>st</sup> through October 31 only, to reflect the seasonal chlorination period. Fecal coliform discharges shall not exceed a monthly geometric mean of 200 colony forming units per 100 ml, nor shall they exceed 400 cfu per 100 ml as a daily maximum. Fecal coliform samples shall be taken once per day and conducted concurrently with TRC sampling.

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 TRC limitations are in effect year-round.

7. The permittee shall collect at least one TRC grab sample per day. For every day that more than one grab sample is taken, the monthly DMR shall include an attachment documenting the individual grab sample results for that day, the date and time of each sample, the method used for analysis, and a summary of any operational modifications implemented in response to the sample results. All test results using EPA approved methods shall be used in the calculation and reporting of the monthly average and maximum daily data submitted on the DMR (see Part II, Section D.1.d (2)).

8. The minimum detection 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, or USEPA Manual of Methods of Analysis of Water and Wastes, Method 330.5. One of these methods must be used to determine total residual chlorine. For effluent limitations less than 20 ug/l, compliance/non-compliance will be determined based on the ML. Sample results of 20 ug/l or less shall be reported as zero on the discharge monitoring report.

Chlorination and dechlorination systems shall include an alarm system for indicating system interruption or malfunction. 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 dechlorinating chemicals occurred.

9. The minimum detection level (ML) for copper is defined as 3.0 ug/l. This value is the minimum detection level for copper using the Furnace Atomic Absorption analytical method (EPA Method 220.2). For effluent limitations less than 3.0 ug/l, compliance/non-compliance 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 3.0 ug/l or less shall be reported as zero on the discharge monitoring report.
10. The maximum daily concentration and loading values reported for dissolved orthophosphorus shall be values from the same day that the maximum daily total phosphorus concentration and loading values were measured.
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 LC<sub>50</sub> at the 48 hour exposure interval. The permittee shall test the fathead minnow, Pimephales promelas, only. Toxicity test samples shall be collected during the second week of the months of February, May, August and November. The test results shall be submitted by the last day of the month following the completion of the test. The results are due March 31, June 30, September 30 and, December 31 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 <sub>50</sub>	Chronic Limit C-NOEC
February	March 31	<u>Pimephales promelas</u>	100%	>15%
May	June 30	(fathead minnow)		
August	September 30			
November	December 31	SEE ATTACHMENT A		

12. The LC<sub>50</sub> 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 at a specific time of observation as determined from hypothesis testing where the test results exhibit a linear dose-response relationship. However, where the test results do not exhibit a linear dose-response relationship, the permittee must report the lowest concentration where there is no observable effect. The “15% or greater” limit is defined as a sample which is composed of 15% (or greater) effluent, the remainder being dilution water. This is a maximum daily limit derived as a percentage of the inverse of the dilution factor of 6.9.
14. If toxicity test(s) using receiving water as diluent show the receiving water to be toxic or unreliable, the permittee shall follow procedures outlined in **Attachment A Section IV., DILUTION WATER** in order to obtain permission to use an alternate dilution water. In lieu of individual approvals for alternate dilution water required in **Attachment A**, EPA-New England has developed a Self-Implementing Alternative Dilution Water Guidance document (called “Guidance Document”) which may be used to obtain automatic approval of an alternate dilution water, including the appropriate species for use with that water. If this Guidance document is revoked, the permittee shall revert to obtaining approval as outlined in **Attachment A**. The “Guidance Document” has been sent to all permittees with their annual set of DMRs and Revised Updated Instructions for Completing EPA’s Pre-Printed NPDES Discharge Monitoring Report (DMR) Form 3320-1 and is not intended as a direct attachment to this permit. Any modification or revocation to this “Guidance Document” will be transmitted to the permittees as part of the annual DMR instruction package. However, at any time, the permittee may choose to contact EPA-New England directly using the approach outlined in **Attachment A**.

**Part I.A.1. (Continued)**

- a. The discharge shall not cause a violation of the water quality standards of the receiving waters.
- b. The pH of the effluent shall not be less than 6.5 nor greater than 8.3 at any time.
- c. The discharge shall not cause objectionable discoloration of the receiving waters.
- d. The effluent shall contain neither a visible oil sheen, foam, nor floating solids at any time.
- e. The permittee’s treatment facility shall maintain a minimum of 85 percent removal of 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 above its required frequency must also be reported.
2. All POTWs must provide adequate notice to the Director of the following:
- a. any new introduction of pollutants into that POTW from an indirect discharger in a primary industry category discharging process water; 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:

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**

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

Notification of SSOs to MassDEP shall be made on its SSO Reporting Form (which includes DEP regional Office telephone numbers). The reporting form and instruction for its completion may be found on-line at <http://www.mass.gov/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:

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.

2. Preventative Maintenance Program

The permittee shall maintain an ongoing preventative maintenance program to prevent overflows and bypasses caused by malfunctions or failures of the sewer systems infrastructure. The program shall include an inspection program designed to identify all potential and actual unauthorized discharges.

3. Infiltration/Inflow Control Plan:

The permittee shall develop and implement a plan to control infiltration and inflow (I/I) to the separate sewer system. The plan shall be submitted to EPA and MassDEP **within six months of the effective date of this permit** (see page 1 of this permit for the effective date) and shall describe the permittee's program for preventing infiltration/inflow related effluent limit violations, and all unauthorized discharges of wastewater, including overflows and by-passes due to excessive infiltration/inflow.

The plan shall include:

- An ongoing program to identify and remove sources of infiltration and inflow. The program shall include the necessary funding level and the source(s) of funding.
- An inflow identification and control program that focuses on the disconnection and redirection of illegal sump pumps and roof down spouts. Priority should be given to removal of public and private inflow sources that are upstream from, and potentially contribute to, known areas of sewer system backups and/or overflows.
- Identification and prioritization of areas that will provide increased aquifer recharge as the result of reduction/elimination of infiltration and inflow to the system.
- An educational public outreach program for all aspects of I/I control, particularly private inflow.

Reporting Requirements:

A summary report of all actions taken to minimize I/I during the previous calendar year shall be submitted to EPA and the MassDEP annually, **by the anniversary date of the effective date of this permit**. The summary report shall, at a minimum, include:

- A map and a description of inspection and maintenance activities conducted and corrective actions taken during the previous year.
- Expenditures for any infiltration/inflow related maintenance activities and corrective actions taken during the previous year.
- A map with areas identified for I/I-related investigation/action in the coming year.
- A calculation of the annual average I/I, the maximum month I/I for the reporting year.
- A report of any infiltration/inflow related corrective actions taken as a result of unauthorized discharges reported pursuant to 314 CMR 3.19(20) and reported pursuant to the Unauthorized Discharges section of this permit.

**D. ALTERNATE POWER SOURCE**

In order to maintain compliance with the terms and conditions of this permit, the permittee shall continue to provide an alternative power source with which to sufficiently operate its treatment works (as defined at 40 CFR §403.3).

**E. SCHEDULE OF COMPLIANCE**

No later than 4 years from the effective date of the permit, the permittee shall achieve compliance with the phosphorus limit of 0.2 mg/l between April 1 and October 31. The limits shall be achieved in accordance with the following schedule:

1. Complete conceptual design of necessary upgrades no later than 18 months after the effective date of the permit.
2. Complete plans and specifications for necessary upgrades no later than 30 months after the effective date of the permit.
3. Complete construction of necessary upgrades and attain compliance with the final effluent limits for total phosphorus and total aluminum no later than 48 months after the effective date of the permit.

During the interim period, the permittee shall achieve an April 1 – October 31 monthly average total phosphorus limit of 1.0 mg/l and a maximum daily limit of 1.5 mg/l. Monitoring of the discharge shall be done in accordance with the requirements of Part I A.1. of the permit.

**F. 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 and with the CWA Section 405(d) technical standards.
2. The permittee shall comply with the more stringent of either the state or federal (40 CFR Part 503), requirements.
3. The requirements and technical standards of 40 CFR Part 503 apply to facilities which perform one or more of the following use or disposal practices:
  - a. Land application - the use of sewage sludge to condition or fertilize the soil
  - b. Surface disposal - the placement of sewage sludge in a sludge only landfill
  - c. Sewage sludge incineration in a sludge only incinerator
4. The 40 CFR Part 503 conditions do not apply to facilities which place sludge within a municipal solid waste landfill. These conditions also do not apply to facilities which do not 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 permittee shall use and comply with the attached compliance guidance document to determine appropriate conditions. See Attachment B. Appropriate conditions contain the following elements:
  - General requirements
  - Pollutant limitations
  - Operational Standards (pathogen reduction requirements and vector attraction reduction requirements)
  - Management practices
  - Record keeping
  - Monitoring
  - Reporting

Depending upon the quality of material produced by a facility, all conditions may not apply to the facility.
6. The permittee shall monitor the pollutant concentrations, pathogen reduction and vector attraction reduction 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 1500	1 /quarter
1500 to less than 15000	6 /year
15000 +	1 /month
7. The permittee shall sample the sewage sludge using the procedures detailed in 40 CFR 503.8.

8. The permittee shall submit an annual report containing the information specified in the guidance by February 19. Reports shall be submitted to the address contained in the reporting section of the permit. Sludge monitoring is not required by the permittee when the permittee is not responsible for the ultimate sludge disposal. The permittee must be assured that any third party contractor is in compliance with appropriate regulatory requirements. In such case, the permittee is required only to submit an annual report by February 19 containing the following information:  
Name and address of contractor responsible for sludge disposal  
Quantity of sludge in dry metric tons removed from the facility by the sludge contractor

**G. MONITORING AND REPORTING**

1. Reporting

Monitoring results obtained during the previous month shall be summarized for each month and reported on separate Discharge Monitoring Report Form(s) postmarked no later than the 15<sup>th</sup> day of the following month.

Signed and dated originals of these, and all other reports required herein, shall be submitted to the Director and the State at the following addresses:

Environmental Protection Agency  
Water Technical Unit (SEW)  
P.O. Box 8127  
Boston, Massachusetts 02114

The State Agency is:

Massachusetts Department of Environmental Protection  
Bureau of Resource Protection  
627 Main Street, 2<sup>nd</sup> Floor  
Worcester, Massachusetts 01608

Signed and dated Discharge Monitoring Report Forms and toxicity test reports required by this permit shall also be submitted to the State at:

Massachusetts Department of Environmental Protection  
Division of Watershed Management  
Surface Water Discharge Permit Program  
627 Main Street, 2<sup>nd</sup> Floor  
Worcester, Massachusetts 01608

**H. STATE PERMIT CONDITIONS**

This Discharge Permit is issued jointly by the U. S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) under Federal and State law, respectively. As such, all the terms and conditions of this permit are hereby incorporated into and constitute a discharge permit issued by the Commissioner of the MassDEP pursuant to M.G.L. Chapter 21, §43.

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 an NPDES Permit issued by the U.S. Environmental Protection Agency. In the event this Permit is declared invalid, illegal or otherwise issued in violation of Federal law, this Permit shall remain in full force and effect under State law as a Permit issued by the Commonwealth of Massachusetts.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
NEW ENGLAND  
ONE CONGRESS STREET  
BOSTON, MASSACHUSETTS 02114-2023

FACT SHEET

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

NPDES PERMIT NO.: MA0100421

NAME AND ADDRESS OF APPLICANT:

**Town of Sturbridge  
Department of Public Works  
P.O. Box 975  
Sturbridge, MA 01550**

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

**Sturbridge Pollution Control Facility  
New Boston Road Extension  
Sturbridge, MA 01550**

RECEIVING WATER: **Quinebaug River (Quinebaug French Watershed)**

CLASSIFICATION: **B**

**I. Proposed Action**

The above named applicant has requested that the U.S. Environmental Protection Agency (EPA) reissue its National Pollutant Discharge Elimination System (NPDES) permit to discharge into the designated receiving water, the Quinebaug River. The facility is engaged in the collection and treatment of municipal wastewater.

The existing NPDES permit was issued on January 2, 2002 and will expire on July 31, 2006. The applicant submitted a complete application for permit reissuance on January 6, 2006 therefore, the existing permit will be administratively extended and be in effect until the new permit is issued. The draft permit has been written to reflect the current operations and conditions at the facility and authorizes a discharge from Outfall 001.

**II. Description of Discharge**

A quantitative description of the facility's discharge in terms of significant effluent parameters based on recent monitoring data between January 1, 2005 and March 1, 2006, is shown in Table 1 of this fact sheet. Figure 1 of the fact sheet is a map showing the geographic location of the facility and Figure 2 is a diagram of the facility's flow process.

### **III. Limitations and Conditions**

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

### **IV. Permit Basis and Explanation of Effluent Limitation Derivation**

The Town of Sturbridge operates a 0.75 million gallons per day (MGD) wastewater treatment facility which serves approximately 4,100 people. The collection system is 100 percent separate sanitary sewers. The Town is under a 15 year term contract with Veolia Water to manage the collection system and the treatment facility.

The Sturbridge Water Pollution Control Facility is an advanced treatment facility with seasonal nitrification and phosphorus removal. The wastewater enters the plant and flows through a distribution tank where grit is settled out after which the flow is divided into three separate individual treatment trains operating in parallel. The treatment process consists of aeration, settling, sand filtration, chlorine contact, and dechlorination before being discharged into the Quinebaug River. Solids are digested aerobically, processed through a belt filter where the sludge is dewatered and stabilized with lime, and then trucked off-site for incineration. On average, 71,000 gallons of leachate and 20,500 gallons of septage are delivered to the facility each month.

There are thirteen pump stations in Sturbridge, nine are operated and maintained by the Town and four are managed and maintained by a private owner.

### **POTW Discharges**

#### **Overview of Federal and State Regulations**

##### **General Requirements**

EPA is required to consider technology and water quality requirements when developing permit effluent limits. Technology based treatment requirements represent the minimum level of control that must be imposed under Sections 402 and 301(b) of the Clean Water Act (CWA), see 40 CFR 125 Subpart A. For publicly owned treatment works (POTWs), technology based requirements are effluent limitations based on secondary treatment as defined in 40 CFR Part 133.

EPA regulations require NPDES permits to contain effluent limits more stringent than technology-based limits where more stringent limits are necessary to maintain or achieve federal or state water quality standards.

Under Section 301(b)(1)(C) of the CWA, discharges are subject to effluent limitations based on water quality standards. The Massachusetts Surface Water Quality Standards include 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 criterion is established. The state will limit or prohibit discharges of pollutants to surface waters to assure that surface water quality standards of the receiving waters are protected and maintained, or attained.

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

In determining reasonable potential, EPA considers: (1) existing controls on point and non-point sources of pollution; (2) pollutant concentration and variability in the effluent and receiving water as determined from the permittee's most recent permit application, discharge monitoring reports and State and Water

Quality reports, (3) sensitivity of the species to toxicity testing, (4) statistical approach outlined in Technical Support Document for Water Quality-based Toxics Controls, (USEPA ,1991) in Section 3 and, where appropriate, (5) dilution of the effluent in the receiving water.

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 requirement of the CWA. EPA's anti-backsliding provisions found in Section 402(o) of the CWA and 40 CFR 122.44(1) prohibit the relaxation of permit limits, standards, and conditions. Therefore, the technology-based effluent limits in the reissued permit must be at least as stringent as those of the previous permit. Effluent limits based on water quality and state certification requirements must also meet the anti-backsliding provisions, found under Section 402(o) and 303(d) (4) of the CWA.

### **Water body Classification and Usage**

The Quinebaug River at the point of the facility's discharge is classified as a Class B water body by the Massachusetts Department of Environmental Protection (MassDEP). It is designated as habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation. Where designated, they shall be suitable as a source of public water supply with appropriate treatment. They shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. These waters shall have consistently good aesthetic value.

The effluent is discharged into a cold water fisheries. A cold water fishery is defined in the Massachusetts Surface Water Quality Standards (314 CMR 4.02) as water in which the maximum mean monthly temperature generally does not exceed 20°Celsius and, when other ecological factors are favorable (such as habitat), are capable of supporting a year-round population of cold water stenothermal aquatic life such as trout (salmonidae).

### **Flow**

The annual average flow limit will remain the same as in the existing permit, 0.75 MGD. The annual monthly average flow recorded for the period of January 2005 through March 2006 was between 0.572 MGD and 0.66 MGD.

### **Available Dilution**

The 7Q10 flow, and the design flow of the facility were used to calculate the dilution factor. The 7Q10 is the lowest observed mean river flow for seven consecutive days recorded over a ten year recurrence interval. For rivers and streams, Title 314 CMR 4.03(3)(a) requires that 7Q10 be used to represent the critical hydrologic conditions at which water quality must be met.

A 7Q10 flow was recalculated for the reissuance of this permit. It is based on a thirty year period of record for US gage station 1123360, the drainage area at the gage station and, the point of discharge.

7Q10 at the outfall is 6.77 cfs

Treatment Plant Design flow is 0.75 MGD or 1.16 cfs

Dilution Factor

$$(6.77 + 1.16)/1.16 = 6.83 = 6.8$$

### **Biochemical Oxygen Demand (BOD)<sub>5</sub> and Total Suspended Solids (TSS)**

The BOD<sub>5</sub>, and TSS effluent limits shall remain the same as in the existing permit. The limits are seasonal and more stringent than secondary requirements found at 40 CFR Part 133. They are based on a waste-

load allocation completed by the MassDEP in 1989 and will updated when information from a TMDL becomes available.

A review of BOD<sub>5</sub> and TSS data submitted on the monthly discharge monitoring showed no exceedances for either parameter between January 2005 and March 2006. However, on occasion, prior to January 2005 there have been exceedances of BOD<sub>5</sub> and TSS which precludes a reduction in sample frequency for either parameter for this permit reissuance. The permittee reported meeting the 85% removal requirement for BOD<sub>5</sub> and TSS for the last several years.

### **Dissolved Oxygen (DO)**

A dissolved oxygen limitation required by Massachusetts Surface Water Quality Standards, 314 CMR 4.05 (4)(b)(1) in the draft permit shall be carried over from the current permit. Dissolved oxygen shall not be less than 6.0 mg/l in cold water fisheries unless background conditions are lower. A monitoring frequency of once per day is in the draft permit. Data submitted in monthly DMRs from April 2005 through March 2006 have been above 6.0 mg/l.

### **pH**

The draft permit requires pH limitations required by state water quality standards, and are at least as stringent as pH limitations set forth in 40 C.F.R. 133.102. In accordance with 314 CMR 4.05(3)(b)(3), the pH for Class B waters shall be in the range of 6.5 through 8.3 standard units and not more than 0.5 standard units outside the background range. There shall be no change from background conditions that would impair any use assigned to this Class. The frequency of monitoring is once per day. The maximum and minimum pH limits have been within the range stipulated in the State Water Quality Standards for the past several years.

### **Bacterial Limitations**

The draft permit includes seasonal limits for fecal coliform bacteria in accordance with Massachusetts Surface Water Quality Standards, 314 CMR 4.05 (4)(b). The Standards specify bacteria levels shall not exceed a geometric mean of 200 organisms per 100 ml in any representative set of samples nor shall more than 10% of the samples exceed 400 organisms per 100 ml. The permit contains a monthly geometric mean limit of 200 organisms/100 ml and a maximum daily limit of 400 organisms/100 ml. The seasonal sampling period for fecal coliform has been carried over from the current permit and is April 1 through October 31 with a monitoring frequency of twice per week.

The permittee reported one exceedance in August 2005 for fecal coliform between January 2005 and March 2006.

### **Disinfection**

Chlorine and chlorine compounds produced by the chlorination of wastewater can be extremely toxic to aquatic life. The effluent limits for monthly average and maximum daily Total Residual Chlorine (TRC) were developed using the chronic and acute criterion defined in the National Recommended Water Quality Criteria, 2000 as adopted by the MassDEP into the State Water Quality Standards.

The criterion is multiplied by the available receiving water dilution for the appropriate flow scenario to obtain the TRC limit found in the draft permit. The criterion states that the average total residual chlorine in the receiving water should not exceed 11ug/l for chronic toxicity protection and, 19 ug/l for acute toxicity protection. The dilution factor is multiplied by the acute criterion to obtain a maximum daily TRC limit and the dilution factor is multiplied by the chronic criteria to obtain the monthly average TRC limit.

Chlorine calculation:

Acute chlorine water quality criteria is 19 ug/l.

Chronic chlorine water quality criteria is 11 ug/l.

Design flow dilution factor is 6.8

Average Monthly Total Residual Chlorine Limit =  $6.8 \times 0.011 \text{ mg/l} = 0.0748 \text{ mg/l} = 75 \text{ ug/l}$

Maximum Daily Total Residual Chlorine Limit =  $6.8 \times 0.019 \text{ mg/l} = 0.129 \text{ mg/l} = 129 \text{ ug/l}$

The TRC limit in the draft permit is slightly less than the TRC limit in the existing permit. The average monthly TRC limit in the current permit is 80 ug/l, while the limit in the draft permit is 75 ug/l. This is due to a change in the dilution factor that has been recalculated as explained under the section titled, Available Dilution on page three of this fact sheet as well as a rounding error found in the existing permit.

The monitoring frequency will remain the same in the draft permit as in the current permit, which is one grab sample per day.

The effluent chlorination and dechlorination systems were upgraded in 2004. The system consists of two chlorine contact chambers with a capacity of 12,500 each, new storage tanks for sodium hypochlorite and sodium bisulfite, new chemical transfer pumps and chemical feed pumps. The detention time at peak flow is 18 minutes for one tank and 36 minutes when 2 both tanks are in service. Sodium hypochlorite is added prior to flow entering the contact chamber and can also be added to the sandfilter process unit. Prior to final discharge the effluent is dechlorinated with sodium bisulfite at the end of the chlorine contact chambers.

For the period from April 2004 through October 2005, the permittee reported no effluent exceedances for the monthly average or maximum daily TRC concentrations.

### **Metals**

Certain metals in waters can be toxic to aquatic life. There is a need to limit toxic metal concentrations where the discharge has the reasonable potential to cause or contribute to an exceedance of water quality standards. The current permit contains effluent limits for copper.

The EPA-recommended approach to set and measure compliance with water quality standards is to use dissolved metals rather than total recoverable metals. Dissolved metals more closely approximate the bioavailable fraction of metal in the water column than total recoverable metal. Most toxicity to aquatic organisms is by adsorption or uptake across the gills which would require the metal to be in dissolved form. When toxicity tests were originally conducted to develop EPA's Section 304(a) metals criteria, the concentrations were expressed as total, and subsequent testing on some metals, including copper, determined the percent of the total metal that is dissolved. The calculations that follow use the freshwater copper conversion factor to calculate the dissolved acute and chronic water quality criteria for copper.

Section 40 CFR 122.45(c) requires that the permit limits be based on total recoverable metals and not dissolved metals. The chemical differences between the effluent and the receiving water may cause changes in the partitioning between dissolved and particulate forms of copper. As the effluent mixes with the receiving water, adsorbed copper from the discharge may dissolve in the water column. In this case, measuring dissolved copper would underestimate the impact on the receiving water, and an additional calculation, using a site-specific translator would determine total metal criteria. Based on EPA's *Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (EPA-823-B-96-007), the conversion factor is equivalent to the translator if site-specific studies have not

been conducted. The total recoverable effluent limit has been determined by dividing the dissolved criteria by the conversion factor in lieu of a translator.

EPA's Office of Water - Office of Science and Technology stated in a letter dated July 7, 2000 that: *The hardness of the water containing the discharged toxic metal should be used for determining the applicable criterion. Thus, the downstream hardness should be used.* The hardness of the Quinebaug River downstream of the plant's discharge was calculated based on the ambient and effluent hardness data submitted in the whole effluent toxicity tests.

In order to determine the hardness downstream of the treatment plant during the critical low flow periods, the ambient and effluent hardness values from the whole effluent toxicity tests conducted from April 2004 to May 2005 were calculated using the following mass balance equations:

$$C_r = \frac{Q_d C_d + Q_s C_s}{Q_r}$$

Where:

- $Q_d$  = Discharge flow from plant, 0.75 MGD (1.16 cfs)
- $Q_s$  = 7Q10 river flow upstream of plant, 6.82 cfs
- $Q_r$  = Combined river flow (7Q10 + plant flow),
- $C_s$  = Upstream hardness concentration
- $C_d$  = Plant discharge hardness concentration
- $C_r$  = Receiving water hardness concentration

WET Test Date	Effluent Hardness, mg/l	Ambient Hardness, mg/l	Calculated Downstream Hardness, mg/l
November 2005	120	19	34
August 2005	180	25	48
February 2005	120	20	43
November 2004	200	20	46

$$C_r = \frac{Q_d C_d + Q_s C_s}{Q_r} = \frac{(1.16 \text{ cfs})(120 \text{ mg/l}) + (6.82 \text{ cfs})(19 \text{ mg/l})}{7.98} = 34 \text{ mg/l}$$

The lowest downstream hardness from the above table, 34 mg/l, was selected to determine the permit limits, as this would be the most protective of aquatic life. Generally, as the hardness in the stream increases the toxicity to aquatic life decreases.

*Water Quality Criteria for hardness-dependent metals (see equations below):*

$$\text{Acute criteria (dissolved)} = \exp\{m_a [\ln(\text{hardness})] + b_a\} (\text{CF})$$

Where:  $m_a$  = pollutant-specific coefficient = 0.9422

$b_a$  = pollutant-specific coefficient = -1.700

$h$  = hardness of the receiving water = 34 mg/l as  $\text{CaCO}_3$

$\ln$  = natural logarithm

CF = pollutant specific conversion factor used to convert total recoverable to dissolved metal = 0.96

CMC = Acute copper criteria (dissolved) =  $\exp\{0.9422[\ln(34)] - 1.700\} (0.96) = 4.86 \text{ ug/l}$

Maximum Daily Effluent limitation:

(CMC) (dilution factor) =  $(4.86 \text{ ug/l}) (6.8) = 33.05 \text{ ug/l}$  (dissolved)

Maximum Daily limit =  $33.05 \text{ g/l} / 0.96 = 34.43 \text{ ug/l}$  (total recoverable)

Chronic criteria (dissolved) =  $\exp\{m_c [\ln(\text{hardness})] + b_c\}$  (CF)

Where:  $m_c$  = pollutant-specific coefficient = 0.8545

$b_c$  = pollutant-specific coefficient = - 1.702

h = hardness of the receiving water = 34 mg/l as  $\text{CaCO}_3$

ln = natural logarithm

CF = pollutant specific conversion factor used to convert total recoverable to dissolved metal = 0.96

CCC = Chronic copper criteria (dissolved) =  $\exp\{0.8545 [\ln(34)] - 1.702\} (0.96) = 3.56 \text{ ug/l}$

Average Monthly Effluent limitation:

(CCC)(dilution factor) =  $(3.56)(6.8) = 24.21 \text{ ug/l}$  (dissolved)

Average Monthly limit =  $24.21/0.96 = 25.22 \text{ ug/l}$  (total recoverable)

The draft permit includes average monthly and maximum daily limits of 25 ug/l and 34 ug/l for total recoverable copper. The sampling frequency of once per month will remain unchanged from the existing permit. For the period of January 2005 through March 2006, the monthly average concentration of copper in the effluent was between 4.8 and 38 ug/l.

The copper limits in the draft permit have increased because the method for determining the hardness factor changed.

The permit specifies the method of analysis and method reporting limit. Levels of copper reported on the facility's discharge monitoring reports have been at or below 10 ug/l from January 2005 through the April 2006.

MassDEP is currently developing site-specific criteria for copper and, if site-specific criteria would result in higher limits, the permit may be reopened for modification.

**Nutrients**

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

**Ammonia -Nitrogen**

The seasonal effluent limitations and reporting requirements for ammonia-nitrogen will remain unchanged from the limits in the existing permit. The seasonal limits are from June 1 through October 31 and monitoring and reporting are required for the remainder of the year. There were no exceedances reported for the monthly average ammonia-nitrogen limit in 2004 or 2005. There were two exceedances of the ammonia-nitrogen maximum daily limit in 2004 but no exceedances in 2005.

The existing permit's year round reporting requirement for the monthly average and maximum daily concentration of ammonia-nitrogen and concentration and mass levels of total nitrite, total nitrate and Total Kjeldahl Nitrogen will remain in the draft permit. See the Table 2 below for data on these parameters between January 2004 and December 2005.

The calculation to determine whether or not there is reasonable potential for ammonia levels in the effluent to exceed the instream criteria during the cold weather months is shown in Table 3. Based on this calculation there is not a reasonable potential to exceed the instream criteria. Therefore, the draft permit does not include a winter effluent limit for ammonia.

Table 2

Date	Total Nitrite		Total Nitrate		TKN		Ammonia Avg. Monthly		Ammonia Max. Daily
	lbs/day	mg/l	lbs/day	mg/l	lbs/day	mg/l	lbs/day	mg/l	mg/l
1/2004	2.2	0.4	36.5	6.64	8.1	1.47	1.8	0.33	
2/2004	0	0	35.3	8.04	22.2	5.04	13.2	3.0	
3/2004	0.7	0.16	4.5	0.98	33.8	7.28	31.3	6.74	
4/2004	0.4	0.07	23.2	4.55	7.1	1.4	2.0	0.39	
5/2004	0	0	23.9	3.91	0	0	1.6	0.26	
6/2004	3.0	0.5	28.7	4.72	20.5	3.36	6.3	1.1	2.5
7/2004	0	0	40.5	8.2	0	0	1.4	0.3	1.1
8/2004	0	0	67.8	15.2	0	0	3.8	0.7	2.1
9/2004	0	0	41.3	8.47	0	0	1.2	0.2	0.6
10/2004	0	0	11.1	2.2	0	0	0.6	0.12	0.25
11/2004	0	0	35.2	8.35	0	0	1.4	0.3	0.33
12/2004	0	0	27.9	5.4	24.8	4.8	12.9	0.2	2.5
1/2005	3.4	0.62	31	5.7	20.6	3.8	10.2	0.26	2.0
2/2005	2.6	0.55	39.5	8.3	19	4	0.5	<0.1	<0.1
3/2005	0	0.01	38.5	8.0	23.1	4.8	8.2	1.7	1.7
4/2005	<0.1	<0.1	34.6	5.1	14.9	2.2	3.8	0.56	0.56
5/2005	<0.1	<0.01	38	7.2	8.9	1.7	1.0	0.22	0.22
6/2005	<0.1	<0.1	29.7	6.3	4.7	0.99	1.2	0.3	0.5
7/2005	<0.1	<0.1	100.7	26	6.6	1.7	0.8	0.2	0.4
8/2005	1.5	0.38	73.7	19	4.7	1.2	1.4	0.4	0.8
9/2005	<0.1	<0.1	57	12	8.5	1.80	2.7	0.7	1.0
10/2005	<0.1	<0.01	32.7	8.1	3.5	0.9	1.9	0.3	0.5
11/2005	0	<0.01	34.9	6.6	4.5	0.85	1.4	0.26	0.26
12/2005	0	<0.01	64.8	14.0	<2.3	<0.5	1.3	8.29	0.29

Ammonia calculation for the Sturbridge Water Pollution Control Facility

Table 3

Month	pH	Instream – Celsius degrees	Instream criteria	dilution x criteria
February 2004	6.8	5	6.29	171.65
November 2004	6.9	5	6.12	167.01
February 2005	6.7	4	6.44	175.74
November 2005	6.8	5	6.29	171.65

Quinebaug River 30Q10 for period of November 1 through March 31.

Quinebaug River at 112360 gaging station

30Q10 = 27.5 cfs for winter period at USGS gage station 1123360

7Q10 at outfall 6.8

30Q10 at the point of discharge 30.5 cfs

Treatment Plant Design flow is 0.75 MGD or 1.16 cfs

Dilution Factor

$(30.5 + 1.16)/1.16 = 27.29$

### **Total Phosphorus (TP)**

EPA has produced several guidance documents which contain recommended total phosphorus criteria for receiving waters. The 1986 Quality Criteria of Water (also known as the Gold Book) recommends in-stream phosphorus concentrations of 0.05 mg/l in any stream entering a lake or reservoir, 0.1 mg/l for any stream not discharging directly to lakes or impoundments, and 0.025 mg/l within the lake or reservoir.

In December 2000, EPA has released “Ecoregional Nutrient Criteria”, (USEPA 2000) established as part of an effort to reduce problems associated with excess nutrients in water in specific areas of the country. The published criteria represent conditions in waters for an ecoregion minimally impacted by human activities, and thus representative of water without cultural eutrophication. Sturbridge is within Ecoregion XIV, Eastern Coastal Plains. The total phosphorus criteria for this ecoregion, found in Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion XIV is 24 ug/l (0.024 mg/l).

More recently, Mitchell, Liebman, Ramseyer, and Card (in draft 2004), in conjunction with the New England States, developed potential nutrient criteria for rivers and streams in New England. Using several river examples representative of typical conditions for New England streams and rivers, they investigated several approaches for the development of river and stream nutrient criteria that would be dually protective of designated uses in both upstream reaches and downstream impoundments. Based on this investigation an instream total phosphorus concentration of 0.020 - 0.022 mg/l was identified as protective of designated uses for New England rivers and streams. The development of this New England-wide total phosphorus concentration was based on more recent data than the National Ecoregional nutrient criteria, and have been subject to quality assurance measures. Additionally, the development of the New England-wide concentration included reference conditions for waters presumed to be protective of designated uses.

The Massachusetts Surface Water Quality Standards (314 CMR 4.00) do not contain numerical criteria for total phosphorus (TP). The criteria for nutrients are found at 314 CMR 4.05(5)(c), which states that nutrients “shall not exceed the site specific limits necessary to control accelerated or cultural eutrophication”. The Water Quality Standards also require that “any existing point source discharges containing nutrients in concentrations which encourage eutrophication or growth of weeds or algae shall be provided with the highest and best practicable treatment to remove such nutrients (314 CMR 4.04). MassDEP has established that a monthly average total phosphorus limit of 0.2 mg/l represents highest and best practical treatment for POTWs.

### Eutrophication and the Quinebaug River

The Sturbridge WWTP discharges to segment MA41-02 of the Quinebaug River. Segments of the River downstream from the facility are listed on the Massachusetts Integrated List of Waters as being impaired for nutrients. See Massachusetts Year 2004 Integrated List of Waters, Category 5, Waters requiring a TMDL.

The French and Quinebaug River Watersheds 2001 Water Quality Assessment Report, prepared by the Massachusetts Department of Environmental Protection acknowledges that a total maximum daily load (TMDL) for nutrients and organic enrichment/low dissolved oxygen for this segment of the Quinebaug River is necessary. See page 24 of the Assessment Report. The Report affirms this segment of the River does not meet all designated uses for Class B Waters as defined in the State Water Quality Standards due to considerable macrophyte and algal growth and identifies that a source of nutrient impairment contributing to water quality degradation could be effluent from municipal treatment plants. See page 90 of the The French and Quinebaug River Watersheds 2001 Water Quality Assessment Report.

Discharge monitoring results for monthly average total phosphorous (TP) concentration between April 2004 and September 2005 were between 0.7 mg/l to 0.9 mg/l and effluent results for the maximum daily TP for the same time period were between 0.8 mg/l and 1.2 mg/l. These reported levels exceed the recommended Gold Book, the Ecoregional Nutrient Criteria and the New England wide total phosphorus concentrations that were mentioned in above.

#### Total Phosphorous Effluent Sampling

The monthly average and maximum daily total phosphorous limits in the existing permit are 1 mg/l and 1.5 mg/l. These limits are seasonal and begin in April and extend through September each year.

In determining whether the existing limits were sufficiently stringent to be protective of water quality standards, EPA estimated the receiving water phosphorous concentration which would result from the discharge of phosphorus at the permitted design flow under 7Q10 conditions. This can be done by dividing the monthly average effluent limitation (1 mg/l) by the dilution factor (6.9), which equals an estimated instream concentration of 0.15 mg/l. The reported levels exceed the recommended criteria in the Gold Book, the Ecoregional Nutrient Criteria and the New England-wide total phosphorus concentrations published by the EPA. The total phosphorous value recommended in the Gold Book is 0.1 mg/l which is the least stringent of any of the three guidance documents and the estimated instream value is slightly greater than this value. To achieve 0.1 mg/l the effluent concentration would have to be 0.15 mg/l, and this analysis assumes that the background concentration of phosphorous in the receiving water is 0 mg/l, which is not the case.

Therefore, the draft permit includes a seasonal monthly average limit of 0.2 mg/l based on the highest and best practical treatment for POTWs as established by MassDEP. This limit shall be effective during the warm weather months, April 1 through October 31 when eutrophication typically occurs. In the future when MassDEP adopts nutrient criteria, the required TMDL is completed, or additional water quality information shows that the phosphorus limit is not stringent enough to meet water quality standards, a more stringent limit may be imposed.

A monthly average and maximum daily limit of 1.0 mg/l and 1.5 mg/l from November 1 through March 31 have been included in the draft permit to ensure that higher levels of phosphorous discharged during the cold weather months do not result in an accumulation of phosphorous in the sediment and subsequent release during the warm weather growing season.

#### **Whole Effluent Toxicity Testing**

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

All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife. Where the State determines that a specific pollutant not otherwise listed in 3.14 CMR 4.00 could reasonably be expected to adversely affect existing or designated uses, the State shall use the recommended limit published by EPA pursuant to 33 U.S.C. 1251 §304(a) as the allowable receiving water concentrations for the affected waters unless a site-specific limit is established. Site specific limits, human health risk levels and permit limits will be established in accordance with 314 CMR 4.05(5)(e)(1)(2)(3)(4).

National studies conducted by the EPA have demonstrated that domestic sources contribute toxic constituents to POTWs above those, which may be contributed from industrial users. These pollutants include metals, chlorinated solvents, aromatic hydrocarbons and other constituents.

As a result, EPA New England and the MassDEP have developed toxicity control policies. These policies require wastewater treatment facilities to perform toxicity bioassays on their effluent. Discharges having a dilution of less than 10:1 require acute and chronic toxicity limits and testing four times per year.

The principal advantages of biological techniques are: (1) the effects of complex discharges of many known and unknown constituents can be measured only by biological analysis; (2) bioavailability of pollutants after discharge is measured by toxicity testing including any synergistic effect of pollutants; and (3) pollutants for which there are inadequate analytical methods or criteria can be addressed. Therefore, toxicity testing is being used in connection with pollutant-specific control procedures to control the discharge of toxic pollutants.

The Chronic-No Observed Effect Concentration (C-NOEC) limitation of in the draft permit prohibits chronic adverse effects (e.g., on survival, growth, or reproduction) when aquatic organisms are exposed to the POTW discharge at the calculated available dilution.

This draft permit requires four toxicity tests per year for fathead minnows, (*Pimephales promelas*) only. Based on previous tests the fathead minnow appears to be the more sensitive species. Tests are to be conducted the second week in February, May, August and, November using the protocol in Attachment A of the draft permit. The results from several toxicity tests have not shown signs of toxicity over the last two years for either the daphnia or the fathead minnow.

The tables below show the results for 2004 and 2005 for chronic and modified acute toxicity tests conducted on the effluent.

Acute Toxicity Tests Results

Date	LC50– Acute Ceriodaphnia	LC50– Acute Pimephales	NOEC-Acute Ceriodaphnia	NOEC– Acute Pimphales
November 2005	100%	100%	100%	100%
August 2005	100%	100%	100%	100%
May 2005	100%	100%	100%	100%
February 2005	100%	100%	100%	100%
November 2004	100%	100%	100%	100%
August 2004	100%	100%	100%	100%
May 2004	100%	100%	100%	100%
February 2004	100%	100%	100%	100%

### Chronic Toxicity Test Results

Date	C-NOEC Ceriodaphnia	C-NOEC Pimphales	LOEC Ceriodaphnia	LOEC Pimphales
November 2005	100%	100%	100%	100%
August 2005	100%	100%	100%	100%
May 2005	100%	100%	100%	100%
February 2005	100%	100%	100%	100%
November 2004	100%	100%	100%	100%
August 2004	100%	100%	100%	100%
May 2004	100%	100%	100%	100%
February 2004	100%	100%	100%	100%

### V. Sludge Information and Requirements

Section 405(d) of the Clean Water Act requires that sludge conditions be included in all POTW permits. The sludge conditions in the draft permit satisfy this requirement and are taken from EPA's Standard for the disposal of sewage sludge (40 CFR 503). Attachment C of the permit is the Sludge Compliance Guidance and provides guidance on sewage sludge use and disposal practices.

The facility currently operates under extended air activated sludge. The waste activated sludge is thickened using aerobic digestion to a concentration of 2% solids. All sludge is stored in digester tanks, and the thickened sludge is transported offsite for incineration. The average monthly sludge generated at the facility is 18.7 tons. Approximately 160 dry metric tons per year of sewage sludge is incinerated.

### VII. Unauthorized Discharges

The permittee is not authorized to discharge wastewater from any pump station emergency overflow. Overflows, including sanitary sewer overflows (SSOs), must be reported in accordance with reporting requirements found in Part II, General Requirements, Section D.1.e. of the permit (24-hour reporting). If a discharge does occur, the permittee must notify the EPA, the MassDEP, and others, as appropriate (i.e. local Public Health Department), both orally and in writing as specified in the draft permit.

### VIII. Essential Fish Habitat (EFH)

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq. (1998)), EPA is required to consult with National Marine Fisheries Service (NMFS) if EPA's action or proposed actions that it funds, permits, or undertakes, "may adversely impact any essential fish habitat." 16 U.S.C. § 1855(b). The Amendments broadly define "essential fish habitat" as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. 16 U.S.C. § 1802(10). Adverse impact means any impact, which reduces the quality and/or quantity of EFH. 50 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. Id.

Essential fish habitat is only designated for fish species for which Federal Fisheries Management Plans exist. 16 U.S.C. § 1855(b)(1)(A). The U.S. Department of Commerce on March 3, 1999 approved EFH designations for New England.

A review of the relevant essential fish habitat information provided by NMFS indicated that Essential Fish Habitat does not exist in the vicinity of the proposed discharge.

EPA has determined that a formal EFH consultation with NMFS is not required because the proposed discharge will not adversely impact EFH.

#### **IX. 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 Services (USFWS) administers Section 7 consultations for fresh water species, where as the National Marine Fisheries Services (NMFS) administers Section (7) consultations for marine species and anadromous fish.

EPA believes the authorized discharge from this facility is not likely to adversely affect any federally-listed species, or their habitats. This preliminary determination is based on the location of the outfall, and the reasons provided in the EFH discussion (Section VIII of this fact sheet). EPA is seeking concurrence with this opinion from NOAA Fisheries and the USFWS through the informal ESA consultation process.

#### **X. State Certification Requirements**

The staff of the State Water Pollution Control Agency has reviewed the draft permit. EPA has requested permit certification by the State pursuant to 40 CFR.124.53 and expects that the draft permit will be certified.

#### **XI. Public Comment Period, Hearing Requests and Procedures for Final Decision**

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to U.S.EPA, Massachusetts Office of Ecosystem Protection (CMA), One Congress Street- Suite 1100, Boston, Massachusetts 02114-2023. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues proposed to be raised in the hearing. 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 a public hearing, if such hearing is held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice.



**Attachment A of the Fact Sheet  
Sturbridge Wastewater Treatment Plant  
Summary of NPDES Permit Reporting Requirements Dates**

<b>Permit Page</b>	<b>Requirement and Dates</b>	<b>Submit to:</b>
5	Whole Effluent Toxicity Tests results are due March 31, June 30, September 30 and December 31.	EPA/MassDEP
8	The permittee shall develop and implement a plan to control I/I to the separate sewer system. The plan shall be submitted to EPA and MassDEP six months from the effective date of the permit. See Part 1.C.3.	EPA/MassDEP
8	A summary report of all actions taken to minimize I/I during the previous calendar year shall be submitted to EPA and the MassDEP annually by the permittee by the anniversary date of the effective date of the permit	EPA/MassDEP
13	The permittee shall submit an annual report containing the information specified in the sludge section of the permit by February 19.	EPA/MassDEP
13	Monitoring results obtained during the previous month shall be summarized for each month and reported on separate Discharge Monitoring Report Form(s) postmarked no later than the 15 <sup>th</sup> day of the month following the effective date of the permit.	EPA/MassDEP

## RESPONSE TO PUBLIC COMMENT

From August 2, 2006 to September 2, 2006, the United States Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) solicited Public Comments on a draft NPDES permit. The draft permit was developed pursuant to a reapplication from the Town of Sturbridge for reissuance of the Town's NPDES permit to discharge wastewater to the Quinebaug River. After a review of the comments received, EPA has made a final decision to issue the permit authorizing the discharge. The following response to comment describes the changes and briefly describes and responds to the comments on the draft permit. A copy of the final permit may be obtained by writing or calling Betsy Davis, United States Environmental Protection Agency, 1 Congress Street, Suite 1100 (CMP), Boston, Massachusetts 02114-2023; Telephone (617) 918-1576.

Comments submitted by James Malloy, Director of Public Works, Town of Sturbridge, MA on September 1, 2006.

Comment #1: **Fact Sheet – Section IV. Permit Basis and Explanation of Effluent Limitation Derivation**

We ask that the EPA update the text of the second paragraph of this section to read as follows:

*“The Sturbridge Water Pollution Control Facility is an advanced treatment facility with seasonal nitrification and phosphorous removal. The wastewater enters the plant and flows through a distribution tank where grit is settled out after which flow is divided into three separate individual treatment trains operating in parallel. Following biological treatment and clarification, the three process trains combine and pass through a single sand filter. Filter effluent passes through a chlorine contact chamber and dechlorination before being discharged into the Quinebaug River. Sludge is currently trucked off-site for dewatering and disposal. On average, 123,500 gallons of leachate and septage are delivered to the facility each month.”*

Response: The updated facility description will be part of the NPDES permit file.

A fact sheet is prepared for every draft permit to briefly explain the rationale and assumptions used in preparing the draft permit. See 40 CFR §124.8. The fact sheet that accompanies the draft permit is not updated once it is issued. However, all comments received during the public comment period become part of the administrative record pursuant to 40 CFR 124.18.

Comment #2: **Draft Permit Part I A.1 – Page 2 of 11 – Effluent Limitations and Monitoring Requirements**

The sampling requirements for fecal coliform have been increased from once per week between April 1 and October 31, to twice per week over the same period. The plant has a consistent record of meeting the discharge limit for fecal coliform. The Fact Sheet developed by EPA for permit renewal does not discuss

the rationale for increasing the frequency of this test and the Town believes that an increase in sampling frequency is not warranted. The Town requests that EPA retain the measurement frequency of once per week as specified in the Town's previous permit.

Response: The fecal coliform levels reported on the Town's monthly discharge monitoring report have been relatively consistent. However, given the age of the facility and the fact that the Town reported a fecal coliform level of >1500 cfu's (colony forming units) on their August 2005 discharge monitoring report, we believe that a sample taken once a week may not sufficiently characterize the effluent over a variety of flow and capacity conditions at the facility. The sampling frequency for fecal coliform shall remain the same as in the draft permit.

**Comment #3: Draft Permit Part I A.1 – Page 3 of 11 – Effluent Limitations and Monitoring Requirements**

The Town takes exception to the basis for and timing of the proposed phosphorous limit of 0.2 mg/l (April 1 – October 31) and the associated Schedule of Compliance (page 9 of 11) which requires compliance with the new limit within a year of permit issuance. While portions of the Quinebaug River are listed on the Massachusetts Year 2004 Integrated List of Waters, the reach immediately downstream of the Sturbridge wastewater treatment plant remains unlisted. This statement is confirmed by analysis performed in support of the *French & Quinebaug River Watersheds 1999 Biological Assessment* prepared by DEP which states:

*“Based on comparisons to both the watershed reference station and the upstream reference station, then, it appears that community structure and function at QRO1B is influenced more by water quality effects resulting from upstream impoundments... and/or habitat quality impacts rather than suspected point source related perturbations from the Sturbridge WWTP.”*

The Town recognizes that future research may indicate the need for a lower phosphorous limit for the reach immediately downstream of the wastewater treatment plant, but the fact that it is not currently listed for nutrient impairment indicates that the need for a lower limit is not urgent.

The Town is currently developing a Comprehensive Wastewater Management Plan (CWMP) that is intended to identify system deficiencies and plan for future wastewater management needs. This process will take three to five years to complete and will likely result in substantial upgrades to the existing wastewater treatment plant.

It is unlikely that the existing treatment plant can consistently meet a 0.2 mg/l discharge limit due to the fact that existing effluent filtration equipment is a stand alone unit and is marginally sized to handle the existing solids loading. The additional solids load associated with increased phosphorous precipitation may negatively impact operations. EPA's *Phosphorous Removal Design Manual*, (EPA/625/1-87/001) indicates that the lower limit of phosphorous removal with

the use of metal salts is approximately 0.5 mg/l. Given the capacity constraints of the existing filtration process and limitations of the chemical addition process, it is not realistic to expect that the existing facility can achieve 0.2 mg/l simply by adding more alum or ferric chloride.

The existing wastewater treatment plant was not designed for and is not capable of meeting the “highest and best practical treatment for phosphorous removal”. As indicated above, the Town has started to prepare a CWMP on its own initiative which will likely lead to an expansion and upgrade of the existing facility. The Town believes a reasonable approach to attaining a reduction in phosphorous discharge is to establish an interim limit for the next permit of 1.0 mg/L monthly average and a daily maximum of 1.5 mg/L. This approach will allow time for the Town to properly plan compliance.

Since it is likely that most of the existing wastewater treatment plant will be replaced as a result of the CWMP, at an estimated cost between \$8-\$10 million, and given the operating constraints of the existing facility, a phased compliance program is the prudent course of action. Therefore, the Town of Sturbridge is requesting that the EPA include an Administrative Consent Order to be executed simultaneously with the issuance of a new permit that would provide seven years for compliance with new permit requirements that are unattainable with the existing plants permit application timeframes for USEPA and MADEP, and design and construction timelines, we believe this provides a realistic timeframe for compliance without putting the Town at risk for violating the new permit.

Response: The compliance schedule in the final permit has been extended to four years. It provides additional time for the Town to complete the Comprehensive Wastewater Management Plan, secure the necessary funding for plant upgrades, and design and construct the upgrades at the treatment plant to meet the lower phosphorus limits. We believe this is a reasonable schedule of compliance, but if in the course of completing the necessary upgrades the permittee believes that good cause exists for an extension of the schedule, it may request a modification of the permit pursuant to 40 CFR Part 122.62(a)(4).

Massachusetts Water Quality Standards, 314 CMR 4.04(5) require, “any existing point source discharge containing nutrients in concentrations which encourage eutrophication or growth of weeds or algae shall be provided with the highest and best practical treatment to remove such nutrients.” MassDEP has established the highest and best practicable treatment to be 0.2 mg/l. It is MassDEP and EPA’s responsibility to establish permit limits using the best information available that will achieve water quality standards with an appropriate margin of safety.

The segment of the River the facility discharges to is listed in Category 2, *Attaining some uses and other uses not assessed* in the Massachusetts Year 2004 Integrated List of Waters and the draft 2006 Integrated Lists of Waters.

The Use Assessment report for this segment of the River in the French and Quinebaug River Watersheds 2001 Water Quality Assessment Report states that this segment of the River has a relatively high percentage of aquatic vegetation and matted and filamentous algal cover were observed in the Quinebaug River at the and this contributes to eutrophication. See the Aesthetics Use Assessment

Summary for Rivers map for river segment MA41-02 on page xxi and pages 86 through 89 of the French and Quinebaug River 2001 Water Quality Assessment Report.

Also, Segment 41-03 of the Quinebaug River, from the Southbridge WWTP to the West Dudley Impoundment is listed as a Category 5 Water, requiring a TMDL for nutrients and organic enrichment/lowDO among other pollutants. EPA and MassDEP believe that phosphorus discharged from upstream POTWs, including Sturbridge, contribute to this impairment, further supporting the need for a “highest and best practical treatment” limit of 0.2 mg/l.

Comments submitted by Cindy Delpapa, Massachusetts Riverways Program on September 1, 2006.

Comment # 4: We wish to heartily support the seasonal change in the phosphorus limits. Given the currently impaired status of the Quinebaug River and its listing as a cold water fishery, it is imperative every effort is made to protect the water quality of this water way. We believe the 0.2 mg/l limitation is technologically achievable.

Response: The Agencies acknowledge your comment and it will be part of the administrative record for this facility.

Administrative Change to the Final Permit:

1. The permit requires the permittee to submit a report to MassDEP if its annual flow exceeds 80 percent of the facility design flow. The report shall address how the facility will remain in compliance with the limitations of the permit, especially influent flow. This is a standard condition for municipal permittees required by MassDEP. This change to the final permit may be found in Part I.A.1.h. (page 7 of 12)