

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
NEW ENGLAND  
1 CONGRESS STREET, SUITE 1100  
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.: **MA0101621**

NAME AND ADDRESS OF APPLICANT:

**City of Haverhill  
Wastewater Division  
40 South Porter Street  
Bradford, Massachusetts 01835**

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

**Haverhill Wastewater Treatment Facility  
40 South Porter Street  
Bradford, Massachusetts 01835  
and twenty combined sewer overflows (CSO)**

RECEIVING WATERS:     **Merrimack River**     (Merrimack River Basin - MA84A-05)  
                              **and Little River**     (Merrimack River Basin - MA84A-09)

CLASSIFICATION:       **Merrimack River – SB (Restricted Shellfishing, CSO)**  
                              **Little River – B (Warm Water Fishery)**

The Town of Groveland is a co-permittees for Part 1.E. Unauthorized Discharges, Part 1.F. Operation and Maintenance of the Sewer System, and Alternative Power Source, which include conditions regarding the operation and maintenance of the collection system owned and operated by the Town. The responsible Town authority is:

**Groveland Water Department  
183 Main Street  
Groveland, MA 01834**

## **I. PROPOSED ACTION, TYPE OF FACILITY, AND DISCHARGE LOCATION**

The above named applicant has applied to the U.S. Environmental Protection Agency for re-issuance of its National Pollutant Discharge Elimination System (NPDES) permit to discharge into the designated receiving waters. The current permit expired on September 30, 2006 and remains in effect. The facility is engaged in the collection and treatment of domestic and industrial wastewater. The discharge is from a secondary wastewater treatment facility to the Merrimack River, and from 20 combined sewer overflows (CSOs) to the Merrimack River and the Little River, as listed in Permit Attachment F.

## **II. DESCRIPTION OF THE DISCHARGE**

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

## **III. LIMITATIONS AND CONDITIONS**

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

## **IV. PERMIT BASIS AND EXPLANATION OF EFFLUENT LIMITATION DERIVATION**

### **A. FACILITY AND PROCESS DESCRIPTION**

The City of Haverhill's Wastewater Treatment Facility (WTF) is a 18.1 million gallon per day (MGD) secondary wastewater treatment facility located in the Bradford section of Haverhill, Massachusetts, serving a population of 61,142 in Haverhill, 6,518 in Groveland, and a shopping Mall in Plaistow, NH. There are currently 20 combined sewer overflows (CSOs) in the collection system. Ten industrial users contribute wastewater to the facility. The collection system consists of 92 miles of combined sewers and 143 miles of separate sewers.

The design flow of the plant is 18.1 million gallons per day (MGD). Influent flows up to 25 MGD receive full secondary treatment. With the recent completion of the central pumping station upgrade and new parallel force main, wet weather flows to the plant reach 60 MGD, with 25 MGD receiving secondary treatment and the remaining 35 MGD receiving primary treatment followed by chlorine disinfection. There is a new bypass chamber after the primary sedimentation tanks which in turn flow to a 66" bypass line to the new outfall bypass chamber.

The use of a CSO related bypass of treatment during wet weather may not be approved in the permit until a long term control plan has been approved by EPA and MassDEP and other conditions are met. Interim approval of a CSO related bypass may be accomplished through an administrative order which outlines the conditions under which the treatment bypass may be operated.

Flow enters the plant headworks through a force main to the aerated grit chambers and passes

through mechanically cleaned bar racks. Screenings are trucked away for disposal. A 28,000 gallon septage tank, which receives about four million gallons of septage annually, is also located in the headworks area. Septage is added to the influent wastewater flow upstream of the bar racks.

Influent flow is then measured by a Parshall flume and treated in three primary sedimentation tanks, followed by biological treatment in up to three aeration tanks and three secondary sedimentation tanks. Treated effluent is then chlorinated with a flow paced hypochlorite feed system. The contact time at 18.1 MGD is approximately 45 minutes. The extended contact time is achieved through a 1,143 ft long outfall pipe with a diffuser.

Primary sludge is pumped directly to the gravity thickeners. Secondary sludge is thickened in dissolved air floatation thickeners and sent to storage tanks. Thickened primary and secondary sludge is blended and dewatered by two centrifuges. Dewatered sludge is currently trucked to WeCare Environmental Soil Preparation Incorporated's facility in Plymouth, ME; this facility is owned and operated by Waste Stream Environmental.

See process diagram, Fact Sheet Attachment - Figure A.

As described earlier, the collection system includes 20 combined sewer overflows, which, according to the permit application, discharged from 0 – 39 times during the previous year (see Permit Attachment F). The City is abating its CSOs pursuant to an EPA Administrative Order issued to Haverhill on December 17, 2001. As required by the Order, Haverhill has completed the design and construction of the Phase I CSO abatement facilities to reduce the frequency and volume of untreated CSO discharges. The Phase I CSO abatement facilities included WWTF modifications to increase the wet-weather capacity to 60 MGD, and modifications to the five CSO regulators on the south side of the Merrimack River (outfall serial numbers 031, 033, 034, 035 and 036) to increase in-line storage capacity. Haverhill continues to monitor CSO activations using block-testing.

On February 15, 2007, EPA sent Haverhill an information request letter under the authority of Section 308 of the Clean Water Act. By May 17, 2007, Haverhill was required to provide information on: 1) any dry-weather discharges from locations in the City's collection system where CSO discharges are authorized under the NPDES permit; 2) any dry-weather and wet-weather discharges, spills or releases from locations not authorized by the City's NPDES permit; 3) collection system mapping and any collection system and WWTF evaluations, recommended projects and plans for projects implementation; and 4) the collection system and WWTF operation and maintenance. Haverhill has submitted an initial response package to EPA dated May 11, 2007. A response to EPA's questions concerning the City's Long-Term CSO Control Plan update for Phase II of the CSO abatement program was due August 16, 2007. EPA and the MassDEP will review the City's responses to determine necessary future steps. A discussion of the CSO requirements in the draft permit may be found in Section VI.

## B. OUTFALL 046 EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

### 1. Overview of Federal and State Regulations

Under Section 301(b)(1) of the Clean Water Act ("CWA"), publicly owned treatment works ("POTWs") were required to achieve effluent limitations based upon Secondary Treatment by July 1, 1977.

The secondary treatment requirements are set forth at 40 C.F.R. Part 133.102. In addition, Section 301(b)(1)(c) of the CWA requires that effluent limitations based on water quality considerations be established for point source discharges when such limitations are necessary to meet state or federal water quality standards that are applicable to the designated receiving water.

Pursuant to 40 C.F.R. § 122.44 (d)(1), permittees must achieve water quality standards established under Section 303 of the Clean Water Act (CWA), including state narrative criteria for water quality. Additionally, under 40 C.F.R. § 122.44 (d)(1)(i), "Limitations must control all pollutants or pollutant parameters which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard."

When determining whether a discharge causes, or has the reasonable potential to cause or contribute to an in-stream excursion above a narrative or numeric criterion, the permitting authority shall use procedures which account for existing controls on point and non-point sources of pollution, and where appropriate, consider the dilution of the effluent in the receiving water.

### 2. Water Quality Standards, Designated Use; Merrimack and Little Rivers

The Merrimack River has been classified as Class SB (R) (CSO) in Haverhill by the Massachusetts Department of Environmental Protection (MassDEP). The Massachusetts Surface Water Quality Standards, 314 Code of Massachusetts Regulations ("CMR") 4.05(4)(b) state that Class SB waters have the following designated uses: *These waters are designated as habitat for fish, other aquatic wildlife and wildlife and for primary and secondary contact recreation. In approved areas they shall be suitable for shellfish harvesting with depuration (Restricted Shellfish Areas). These waters shall have consistently good aesthetic value.*

The Merrimack River at the point of discharge is tidally influenced. The entire tidally influenced river reach for the Merrimack River is classified as SB water. The level of the river changes on the incoming tide at the location of Outfall 046. Incoming saltwater, however, does not reach to the point of Haverhill's discharge. Limits for whole effluent toxicity and total residual chlorine reflect freshwater criteria.

Restricted shellfishing areas are designated as "(R)". These waters are subject to more stringent regulation in accordance with the rules and regulations of the Massachusetts Division of Marine Fisheries pursuant to M.G.L. c. 130, § 75. These include applicable criteria of the National Shellfishing Sanitation Program. (314 CMR 4.06(4))

CSO - (314 CMR 4.06(10)) These waters are identified as impacted by the discharge of combined sewer overflows in the classification tables in 314 CMR 4.06(3). Overflow events may be allowed by the permitting authority without a variance or partial use designation provided that:

- a. an approved facilities plan under 310 CMR 41.25 provides justification for the overflows;
- b. the Department finds through a use attainability analysis, and EPA concurs, that achieving a greater level of CSO control is not feasible for one of the reasons specified at 314 CMR 4.03(4);
- c. existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected; and
- d. public notice is provided through procedures for permit issuance and facility planning under M.G.L. c. 21, §§ 26 through 53 and regulations promulgated pursuant to M.G.L.c. 30A. In addition, the Department will publish a notice in the *Environmental Monitor*. Other combined sewer overflows may be eligible for a variance granted through permit issuance procedures. When a variance is not appropriate, partial use may be designated for the segment after public notice and opportunity for a public hearing in accordance with M.G.L. c. 30A. There is currently no variance or partial use designation for the receiving waters.

The Little River has been classified as Class B – Warm Water Fishery in the Massachusetts Surface Water Quality Standards, 314 Code of Massachusetts Regulations ("CMR") 4.05(3)(b). The Massachusetts Surface Water Quality Standards describes Class B waters as having the following uses: *as a 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.*

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

The objective of the Federal Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. To meet this goal the CWA requires states to develop information on the quality of their water resources and report this information to the U.S. Environmental Protection Agency (EPA), the U.S. Congress, and the public.

To this end, EPA released guidance on November 19, 2001, for the preparation of an integrated "List of Waters" that could combine reporting elements of both § 305 (b) and 303(d) of the CWA. The integrated list format allows the states to provide the status of all their assessed waters in one list. States choosing this option must list each water body or segment in one of the following five categories:

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

The 2004, Integrated List of Waters report states that Merrimack River Segment MA84A-05, Confluence of Creek Brook, Haverhill to confluence Indian River, West Newbury (Miles 21.9-9.0), is not attaining water quality standards for unionized ammonia and pathogens. EPA and MassDEP may "delist" unionized ammonia in the 2008 Integrated List of Waters (See discussion regarding ammonia later in this fact sheet). The Little River (MA84A-09), New Hampshire State Line to the confluence with the Merrimack River, Miles 4.3-0.0, is listed for pathogens. The *Merrimack River Basin 1999 Water Quality Assessment Report*, Page 82, identifies bacteria samples below Haverhill CSOs as having very high counts. The report may be found at: <http://www.mass.gov/dep/water/resources/84wqar3.doc>

### Available Dilution

Water quality based limitations are established with the use of a calculated available dilution. Title 314 CMR 4.03(3)(a) requires that effluent dilution be calculated based on the receiving water 7Q10. The 7Q10 is the lowest observed mean river flow for 7 consecutive days, recorded over a 10 year recurrence interval. Additionally, the plant design flow is used to calculate available effluent dilution as required by 40 CFR §122.45(b).

The secondary plant design flow is 18.1 MGD or 28.1 Cubic Feet Per Second (CFS) as stated in Section A.6.a of the permit application. Attachment B of the current permit Fact Sheet lists the 7Q10 flow of the Merrimack River as 649 MGD or 1006 CFS at the point of discharge. The nearest United States Geological Survey (USGS) river gage station to the discharge is located upstream at Lowell, MA, below the Concord River (Station No. 01100000). The 7Q10 flow in the current permit fact sheet was adjusted to account for the additional drainage area and contributing streams between the river gage and the Haverhill Treatment Plant. A review of recent USGS gage data yields a 7Q10 flow of 930 CFS at the gage and does not indicate the need for a recalculation of the 7Q10 dilution established for the draft permit.

Design flow dilution:

$$\frac{\text{plant design flow} + 7\text{Q}10 \text{ river flow}}{\text{plant design flow}}$$

$$\frac{18.1 \text{ MGD} + 649 \text{ MGD}}{18.1 \text{ MGD}} = 36.8$$

## Flow

Federal regulations found at 40 CFR §122.45(b)(i) require that effluent limitations be calculated based on design flow (18.1 MGD) which is found in the Permit Application Form 2A, Part A, Section a.6. The flow limit is expressed as an annual average. The purpose of limiting flow as an annual rolling average is to allow some variation in POTW flows in response to wet weather, and in recognition that the flow rate used as the monthly average is in most cases presented in the treatment plant planning documents as an annual average.

MassDEP and EPA agreed that mass limitations for BOD and TSS should be included as permit conditions to ensure that existing controls on mass discharges of BOD and TSS are maintained, in order to prevent degradation of the receiving water.

## **OUTFALL 046 - CONVENTIONAL POLLUTANTS**

Biochemical Oxygen Demand (BOD<sub>5</sub>) and Total Suspended Solids (nonfilterable) (TSS) -  
The draft permit includes proposed average monthly and average weekly BOD<sub>5</sub> and TSS limitations which are based on the secondary treatment requirements set forth at 40 C.F.R. §133.102(a)(1), (2), (3), and 40 CFR § 122.45(f). The concentration limits have been carried forward from current permit, as well as the daily maximum reporting requirement.

### BOD<sub>5</sub> and TSS Mass Loading Calculations:

Calculations of maximum allowable loads for average monthly BOD<sub>5</sub> and TSS are based on the following equation.

- L = C x DF x 8.34 Where,
- L = Maximum allowable load in lbs/day
- C = Maximum allowable effluent concentration for reporting period in mg/l.  
Reporting periods are average monthly and weekly.
- DF = Design flow of facility in MGD.
- 8.34 = Factor to convert effluent concentration in mg/l and design flow in MGD to lbs/day.

$$(\text{Concentration limit}) [30] \times 8.34 (\text{Constant}) \times 18.1 (\text{design flow}) = 4529 \text{ lb/day}$$

### BOD<sub>5</sub> and TSS Mass Loading Average Weekly Limits

The recent modifications to the plant have effectively increased the secondary capacity from 18.1 mgd to approximately 25 mgd. The additional capacity allows the treatment plant to provide full secondary treatment to wet weather flows previously discharged untreated through CSOs. This results in a net improvement to the receiving waters. To encourage the maximum use of treatment plant capacity, the average weekly mass loading limits are discontinued in this draft permit. The average weekly concentration and both average monthly concentration and mass limits are retained. The average monthly limits based on 18.1 mgd will require the facility to maximize treatment efficiency.

Eighty-Five Percent (85%) BOD<sub>5</sub> and TSS Removal Requirement - the provisions of 40 CFR §133.102(a)(3) &(b)(3) require that the 30 day average percent removal for BOD<sub>5</sub> and TSS be not less than 85% as a monthly average. There are special considerations for combined sewer systems found at 40 CFR §133.103 which state: *(a) combined sewers. Treatment works subject to this part may not be capable of meeting the percentage removal requirements established under Secs. 133.102(a)(3) and 133.102(b)(3), or Secs. 133.105(a)(3) and 133.105(b)(3) during wet weather where the treatment works receive flows from combined sewers (i.e., sewers which are designed to transport both storm water and sanitary sewage).*

*For such treatment works, the decision must be made on a case-by-case basis as to whether any attainable percentage removal level can be defined, and if so, what the level should be.* Percent removal limitations are included in the draft permit. The limit has been established pursuant to 40 CFR 133.103(a). The limit applies only during dry weather and the average percent removal will be calculated each month, using only those samples collected on days with less than 0.1 inches of precipitation and no snow melt.

pH - The draft permit includes pH limitations which are required by state water quality standards, and are at least as stringent as pH limitations set forth at 40 C.F.R. §133.102(c). Title 314, Code of Massachusetts regulations, Part 4.05(b)(3) states that the pH for Class SB waters shall be in range of 6.5 to 8.5 standard units. The limit is carried forward from the current permit.

Fecal Coliform Bacteria - The draft permit includes fecal coliform bacteria limitations which are in accordance with the Massachusetts Surface Water Quality Standards 314 CMR 4.05(4)(b)(4). The proposed limits in the draft permit are 88 colony forming units (CFU)/100 ml for the average monthly limit and 260 colony forming units (cfu)/100 ml for the maximum daily limit. Colony forming units (CFU) or most probable number (MPN) units is determined by the method used for bacteria analysis. Both methods and their corresponding units are acceptable.

Enterococci Bacteria - On November 16, 2004, EPA promulgated water quality criteria for bacteria for the Great Lakes and marine coastal recreation waters in specific States and Territories, which included marine coastal waters in Massachusetts. These criteria are intended to protect human health due to recreational contact and are in addition to state criteria for fecal coliform bacteria which are intended to protect human health due to consumption of shellfish.

The EPA-promulgated bacteria criteria for marine waters are Enterococci, and include a geometric mean of 35/100 ml and single sample maximum from 104/100 ml to 501/100 ml based on the intensity of recreational use. The Commonwealth of Massachusetts adopted water quality criteria for Enterococci on December 29, 2006, which have not yet been approved by EPA. EPA anticipates approving the state criteria in the near future, at which time the federal criteria will be withdrawn.

Accordingly, the permit included effluent limitations for Enterococci based on the EPA-promulgated bacteria criteria. The limits include a geometric mean of 35/100ml and a maximum daily limit of 276/100 ml. The maximum daily limit is based on waters lightly used for full body contact recreation. The permit includes a one year schedule for attaining the new limit.

## OUTFALL 046 - TOXIC POLLUTANTS

A review of treatment facility effluent Discharge Monitoring Report data submitted to date was conducted to determine if there is a **reasonable potential** for the discharge of any pollutants to cause or contribute to an exceedance of State Water Quality Standards. Where such a “reasonable potential” or an actual exceedance exists, 40 CFR §122.44(d)(1)(i) requires that the pollutant be limited. The reasonable potential analysis is calculated using **EPA's Quality Criteria for Water**, and as revised in the Federal Register: December 27, 2002 (Volume 67, Number 249).

Additionally, EPA conducted a review of chemical specific effluent concentration data for toxic pollutants (including metals) submitted in the permit application, the pretreatment annual reports, and whole effluent toxicity reports. All effluent concentrations were below the “reasonable potential” threshold for which permit limits are required.

Total Residual Chlorine (TRC) - The draft permit includes total residual chlorine limitations which are based on state water quality standards. Chlorine compounds produced by the chlorination of wastewater can be extremely toxic to aquatic life. The water quality standards established for chlorine are 19 ug/l daily maximum (Criterion Maximum Concentration) and 11 ug/l (Criterion Continuous Concentration) monthly average in the receiving water. Given a dilution factor of 36.8, the total residual chlorine limitations have been calculated as 700 ug/l daily maximum and 405 ug/l monthly average.

Total Residual Chlorine Limitations:

(acute criteria x dilution factor) = Acute (Maximum Daily Limit)  
(19 ug/l x 36.8) = 700 ug/l = 0.7 mg/l

(chronic criteria x dilution) = Chronic (Monthly Average Limit)  
(11 ug/l x 36.8) = 405 ug/l = 0.4 mg/l

The draft permit allows TRC samples to be held in a dark environment for a period not to exceed 45 minutes when flows are at 18.1 MGD or less, in order to simulate the effluent's path through the outfall pipe, prior to discharge in the Merrimack, as the outfall pipe replaces the function of a chlorine contact chamber and end of pipe sampling is impractical.

These limits and conditions are carried forward from previous permits. The time the TRC sample may be held is reduced to 15 minutes when the plant flow is above 18.1 MGD. This is based on the estimated chlorine contact time in the outfall pipe during high flow (60 MGD) events of 14.6 minutes, as stated in Section 2.6 of the August 2002, Volume II Appendices to the Final Environmental Impact Report.

Compliance with the effluent limits will be based on the grab samples of the discharge. However, the permit also requires that continuous monitoring of the discharge be conducted and reported, and the results of the continuous monitoring be compared with the results of the grab samples. Because of fluctuations in chlorine demand, EPA strongly encourages the use of continuous chlorine analyzers. The requirement to report the results of the compliance grab samples for TRC and the effluent flow rate concurrent with automatic TRC analyzer results will permit EPA to establish an empirical relationship between the instantaneous samples and those held to simulate the time of travel through the outfall pipe. Eventually the automatic TRC analyzer may become the direct measure of compliance for the TRC limit.

Total Ammonia

The term ammonia refers to two chemical species which are in equilibrium in water ( $\text{NH}_3$ , un-ionized and  $\text{NH}_4^+$ , ionized). Tests for total ammonia measure both ( $\text{NH}_3$  plus  $\text{NH}_4^+$ ). The toxicity to ammonia is primarily attributable to the un-ionized form ( $\text{NH}_3$ ), as opposed to the ionized form ( $\text{NH}_4^+$ ). In general, more  $\text{NH}_3$  and greater toxicity exists at higher pH. However, limited data also indicate that less  $\text{NH}_3$  is needed at lower pH to produce its toxic effects.

When unionized ammonia was listed as an impairment to the segment of the Merrimack River into which Haverhill discharges in the 1998 305(b) report. The listing was made with a very small data set. MassDEP anticipated reviewing, and possibly delisting that segment for unionized ammonia when additional data became available. The listing was not removed in the 2004 305(b) Report or "Integrated List". The only additional data collected since the listing of unionized ammonia supports delisting it as an impairment. Dilution water used in Whole Effluent Toxicity (WET) testing is collected about half a mile up-stream of the Haverhill discharge. That up-stream water is tested for total ammonia.

Date	Total Ammonia as N	pH SU	Conservative Temperature Estimate	CC Criteria Freshwater	CC Criteria Saltwater
10/12/05	0.12 mg/l	7.10	20°C 68°F	3.98 mg/l	9.4 mg/l
01/11/06	0.32 mg/l	6.85	20°C 68°F	4.30 mg/l	9.4 mg/l
04/12/06	0.29 mg/l	6.88	20°C 68°F	4.30 mg/l	9.4 mg/l
07/11/06	0.16 mg/l	6.90	24°C/25°C 75°F/77°F	3.32 mg/l	6.6 mg/l
10/11/06	0.37 mg/l	7.11	20°C 68°F	3.98 mg/l	9.4 mg/l
01/09/07	0.16 mg/l	6.92	20°C 68°F	4.30 mg/l	9.4 mg/l

Notes

Specific conductance (an indirect measure of salinity) in all samples is low indicating predominately fresh water. The higher the salinity, the more relaxed the concentration is in the criteria table. A salinity of 10 parts per thousand is used in determining the criteria.

Ambient temperature data is not available so very conservative estimates are made.

The Chronic criteria (CCC) are used as they are lower or more conservative than the acute criteria.

The fresh water criteria are based on early life stages of salmonids present, again to use the most stringent or conservative criteria.

Total ammonia as measured in the dilution water is more conservative than unionized ammonia as it is a combination of both toxic unionized ammonia and the relatively non-toxic ammonium ion.

Criteria Continuous Concentration values for fresh water are from the 1999 Update of EPA Ambient Water Quality Criteria for Ammonia and the salt water criteria are from the EPA Ambient Criteria for Ammonia (Saltwater-1989).

The ambient ammonia values from the WET reports indicate that river water upstream of the Haverhill POTW has ammonia concentrations at least an order of magnitude below the criteria. The effluent data from the Haverhill POTW does not demonstrate a potential to cause or contribute to an exceedence of State Water Quality Standards for total ammonia.

Further, EPA and MassDEP anticipate that in 2008, unionized ammonia may be "delisted", thus the draft permit does not include ammonia limits.

#### OUTFALL 046 - Whole Effluent Toxicity (WET)

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 the following narrative statement and requires that EPA criteria established pursuant to Section 304(a)(1) of the CWA be used as guidance for interpretation of the following narrative criteria: All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife.

National studies conducted by the EPA have demonstrated that domestic sources, as well as industrial sources, contribute toxic constituents to POTWs. These constituents include metals, chlorinated solvents, aromatic hydrocarbons and others. Based on the potential for toxicity from domestic and industrial contributions, the state narrative water quality criterion, the level of dilution at the discharge location, and in accordance with EPA national and regional policy and 40 C.F.R. § 122.44(d), the draft permit includes a whole effluent acute toxicity (LC50) limitation. (See also "Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants", 49 Fed. Reg. 9016 March 9, 1984, and EPA's "Technical Support Document for Water Quality-Based Toxics Control", September, 1991.)

The Massachusetts Department of Environmental Protection's Division of Watershed Management has a current toxics policy which requires toxicity testing for all major dischargers such as the City of Haverhill POTW. In addition, EPA recognizes 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.

Thus, the draft permit includes a whole effluent toxicity limitation requirement for the 046 outfall, to assure that the facility does not discharge combinations of toxic compounds into the Merrimack River in amounts which would affect aquatic or human life.

The draft permit includes requirements for quarterly 48 hour acute toxicity tests using the species Pimphales promelas (fathead minnow). The tests must be performed in accordance with the test procedures and protocols specified in **Permit Attachment B**. The tests will be conducted four times a year. The LC<sub>50</sub> of  $\geq 100\%$  is established by EPA/MassDEP policy for facilities with greater than 20:1 and less than 100:1 dilution.

The September 26, 1990 NPDES permit required WET testing of two aquatic species, Ceriodaphnia and Fathead Minnow. The number of species required for WET testing was reduced to one during the April 14, 1998 permit reissuance. Testing requirements for Ceriodaphnia were discontinued based on the WET compliance record. The reduction in species for testing is again carried forward in this draft permit. See Fact Sheet Attachment A for recent WET test results. The freshwater toxicity protocol is used for this facility based on the absence of salinity at the point of discharge.

## **V. INDUSTRIAL PRETREATMENT PROGRAM**

The City of Haverhill has 10 industrial users, 4 non-categorical significant industrial users (SIUs) and 6 categorical industrial users (CIUs). The permittee is required to administer a pretreatment program based on the authority granted under 40 CFR §122.44(j), 40 CFR Part 403 and section 307 of the Act. The Permittee's pretreatment program received EPA approval on September 31, 1982 and, as a result, appropriate pretreatment program requirements were incorporated into the previous permit which were consistent with that approval and federal pretreatment regulations in effect when the permit was issued.

The Federal Pretreatment Regulations in 40 CFR Part 403 were amended in October 1988, and again in July 1990. Those amendments established new requirements for implementation of pretreatment programs. Upon reissuance of this NPDES permit, the permittee is obligated to modify its pretreatment program to be consistent with current Federal Regulations. Those activities that the permittee must address include, but are not limited to, the following: (1) develop and enforce EPA approved specific effluent limits (technically-based local limits); (2) revise the local sewer-use ordinance or regulation, as appropriate, to be consistent with Federal Regulations; (3) develop an enforcement response plan; (4) implement a slug control evaluation program; (5) track significant noncompliance for industrial users; and (6) establish a definition of and track significant industrial users.

These requirements are necessary to ensure continued compliance with the POTW's NPDES permit and its sludge use or disposal practices.

In addition to the requirements described above, the draft permit requires the permittee to submit to EPA in writing, within 180 days of the permit's effective date, a description of proposed changes to permittee's pretreatment program deemed necessary to assure conformity with current federal pretreatment regulations.

These requirements are included in the draft permit to ensure that the pretreatment program is consistent and up-to-date with all pretreatment requirements in effect.

On October 14, 2005, EPA published in the Federal Register final changes to the General Pretreatment Regulations. The final "Pretreatment Streamlining Rule" is designed to reduce the burden to industrial users and provide regulatory flexibility in technical and administrative requirements of its industrial users and POTW's. Within 120 days of the effective date of this permit, the permittee must submit to EPA all required modifications of the Streamlining Rule in order to be consistent with the provisions for the newly promulgated Rule. To the extent that the POTW legal authority is not consistent with the required changes, they must be revised and submitted to EPA for review.

Lastly, the permittee must continue to submit, annually by March 1, a pretreatment report detailing the activities of the program for the twelve month period ending 60 days prior to the due date.

## **VI. COMBINED SEWER OVERFLOWS (CSOs)**

### **1. Background**

Combined Sewer Overflows (CSOs) are overflows from a combined sewer system that are discharged into a receiving water without going to the headworks of a publicly owned treatment works (POTWs). CSOs occur when the flow in the combined sewer system exceeds interceptor or regulator capacity. CSOs are distinguished from bypasses which are "intentional diversions of waste streams from any portion of a treatment facility" (40 CFR §122.41(m)).

Flows in combined sewers can be classified into two categories: wet weather flow and dry weather flow. Wet weather flow is a combination of domestic, commercial, and industrial sewage, infiltration from groundwater, and storm water flow including snow melt. Dry weather flow is the flow in a combined sewer that results from domestic sewage, groundwater infiltration and commercial industrial wastes with no contribution from storm water runoff or storm water induced infiltration.

Dry weather overflows from CSOs are illegal. They must be reported immediately to EPA and the MassDEP and eliminated as expeditiously as possible.

The objectives of the National CSO Control Policy are:

- 1) To ensure that if the CSO discharges occur, they are only as a result of wet weather,
- 2) To bring all wet weather CSO discharge points into compliance with the technology based requirements of the CWA and applicable federal and state water quality standards, and

- 3) To minimize water quality, aquatic biota, and human health impacts from wet weather flows.

## 2. Effluent Standards

CSOs are point sources subject to NPDES permit requirements for both water quality based and technology based requirements, but are not subject to secondary treatment regulations applicable to publicly owned treatment works.

Section 301(b)(1)(C) of the Clean Water Act (CWA) of 1977 mandated compliance with water quality standards by July 1, 1977. Technology based permit limits must be established for best conventional pollutant control technology (BCT) and best available technology economically achievable (BAT) based on best professional judgment (BPJ) in accordance with Section 301(b) and Section 402(a) of the Water Quality Act Amendments of 1987 (WQA).

## 3. Conditions for Discharge

The draft permit prohibits dry weather discharges from the CSOs listed in Attachment F. During wet weather, the discharges must not cause any exceedance of water quality standards. Dry weather discharges must be reported immediately to EPA and the MassDEP. Wet weather discharges must be monitored and reported as specified in the permit.

## 4. Nine Minimum Controls (NMC)

The permittee must comply with BPJ derived BCT/BAT controls, which at a minimum include the following: (1) proper operation and maintenance of the sewer system and outfalls; (2) maximum use of the collection systems for storage; (3) review pretreatment programs to assure CSO impacts are minimized; (4) maximization of flow to the POTW for treatment; (5) prohibition of dry weather overflows; (6) control of solid and floatable materials in the discharge; (7) pollution prevention programs which focus on contaminant reduction activities; (8) public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts; and (9) monitoring to effectively characterize CSO impacts and the efficacy of CSO controls.

## 5. Nine Minimum Controls Documentation

In September of 1996, the permittee submitted documentation for the Nine Minimum Controls.

## 6. Reopener/Additional CSO Control Measures

The permit is conditioned to require an annual certification, **no later than January 15th of each year** that states that all discharges from combined sewer outfalls were recorded, and other appropriate records and reports maintained for the previous calendar year.

The permit may be modified or reissued upon the completion of a long-term CSO control plan. Such modification may include performance standards for the selected controls, a post construction water quality assessment program, monitoring for compliance with water quality standards, and a reopener clause to be used in the event that the selected CSO controls fail to meet water quality standards. Section 301(b)(1)(C) requires that a permit include limits that may be necessary to protect water quality standards.

## 7. Required Treatment

EPA's national CSO policy ("CSO policy"), which was published in the Federal Register on April 19, 1994 (59 FR 18688), states: ***Permittees with CSOs are responsible for developing and implementing long-term CSO control plans that will ultimately result in compliance with the requirements of the CWA. The long-term plans should consider the site-specific nature of CSOs and evaluate the cost effectiveness of a range of control options/strategies. The development of a long-term CSO control plan and its subsequent implementation should also be coordinated with the NPDES authority and state authority responsible for reviewing and revising the State's WQS [Water Quality Standards].***

*The selected controls should be designed to allow cost effective expansion or cost effective retrofitting if additional controls are subsequently determined necessary to meet WQS, including designated uses.*

## VII. UNAUTHORIZED DISCHARGES; BYPASSES

The draft permit prohibits bypasses unless all of the following conditions occur: (1) bypass was unavoidable to prevent loss of life, severe injury, or severe property damage; (2) there were no feasible alternatives to the bypass (e.g., adequate backup equipment, auxiliary treatment facilities, maintenance, etc.); and (3) the permittee submitted notice of the need for an anticipated bypass at least 10 days prior to the bypass, within 24 hours from the time the permittee became aware of the discharges to be followed by a written submission within 5 days of discovery.

The draft permit makes it clear that even wet weather bypasses can be unlawful: discharges from any point source, regardless of ownership, which result from past, present, or future failure to properly design, operate, or maintain the permittee's POTW, or appurtenant facilities, or to adequately control or limit incoming flows to the permittee's POTW will be considered unauthorized discharges by the Haverhill WWTP. Thus bypasses will be considered unlawful if, for example, they could be avoided through CSO abatement to achieve CWA compliance.

Pursuant to 40 C.F.R. § 122.41(e), the draft permit also requires the permittee in cooperation with its member communities to operate and improve its POTW and total sewer system to minimize the discharge of pollutants from bypasses or CSOs. The draft permit requires that the Haverhill WWTP minimize infiltration/inflow.

## **VIII. SLUDGE CONDITIONS**

Section 405(d) of the CWA requires that EPA develop technical regulations regarding the use and disposal of sewage sludge. These regulations are found at 40 CFR Part 503 and apply to any facility engaged in the treatment of domestic sewage. The CWA further requires that these conditions be implemented through permits. The sludge conditions in the draft permit are intended to implement these regulations.

The City of Haverhill disposes sludge at the Waste Stream Environmental's Soil Preparation facility in Plymouth, Maine. The City generates approximately 2675 dry tons of sludge annually (Section B.8, Application Form 2-S).

The draft permit has been conditioned to ensure that sewage sludge use and disposal practices meet the CWA Section 405(d) Technical Standards. In addition, EPA New England has included with the draft permit a 72-page Sludge Compliance Guidance document for use by the permittee in determining their appropriate sludge conditions for their chosen method of sludge disposal.

The permittee is also required to submit to EPA an annual report containing the information specified in the Sludge Compliance Guidance Document for the permittee's chosen method of sludge disposal.

## **IX. ANTIBACKSLIDING**

Anti-backsliding as defined at 40 CFR §122.44(l)(1) requires reissued permits to contain limitations as stringent or more stringent than those of the previous permit unless the circumstances allow application of one of the defined exceptions to this regulation. Anti-backsliding does not apply when changes to limits are based on new information not available at the time of the previous permit reissuance (40 CFR §122.44(l)(2)(i)(B)(1)) or when limits are changed as a result of material and substantial additions or alterations to the permitted facility which occurred after permit issuance which justify the application of less stringent limitations, as defined at 40 CFR § 122.44(l)(2)(i)(A). The permit is being reissued with limits that are as stringent as those in the current permit with the exception of the discontinuance of the weekly mass loadings for BOD and TSS based on material and substantial additions or alterations to the permitted facility.

## **X. ANTIDegradation**

The Massachusetts Antidegradation Policy is found at Title 314 CMR 4.04. All existing uses of the Merrimack and Little Rivers must be protected. This draft permit is being reissued with similar parameter coverage and no change in outfall location. The permit is being reissued with limits that are as stringent as those in the current permit with the exception of the discontinuance of the weekly mass loadings for BOD and TSS which will result in a net improvement to the receiving water by treating previously untreated CSO discharges. The public is invited to participate in the antidegradation finding through the permit public notice procedures.

## **XI. 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. The National Marine Fisheries Service (NMFS) administers Section 7 consultations for marine species and anadromous fish. The National Marine Fisheries Service (NMFS) which is within the National Oceanic and Atmospheric Administration (NOAA) is now known as the NOAA Fisheries Service.

EPA has reviewed the list of federal endangered or threatened species of fish, wildlife, or plants to see if any such listed species might potentially be impacted by the re-issuance of this NPDES permit. The Shortnose Sturgeon (*Acipenser brevirostrum*) was listed as endangered throughout its range on March 11, 1967. The range of the sturgeon includes the lower reaches of the Merrimack River.

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 following essential fish habitat discussion of this Fact Sheet. EPA is seeking concurrence with this opinion from the NOAA Fisheries Service through the informal ESA consultation process. A copy of the draft permit has been provided to the NOAA Fisheries Service for review and comment as part of an informal Section 7 consultation.

## **XII. 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 NOAA Fisheries Service if EPA's action or proposed actions that it funds, permits, or undertakes, "may adversely impact any essential fish habitat," 16 U.S.C. § 1855(b). The Amendments broadly define "essential fish habitat" (EFH) as: "waters and substrate necessary to fish for spawning, breeding, 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). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999.

The Merrimack and Little Rivers in the vicinity of Haverhill are designated essential fish habitat (EFH) for the following listed species of finfish and mollusks.

**Summary of Essential Fish Habitat (EFH) Designations for the Merrimack River**

10' x 10' latitude and longitude squares included in this bay or estuary or river (southeast corner boundaries): 4250/7040; 4250/7050; 4240/7040; 4240/7050; 4240/7100; 4240/7110

Species	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Atlantic salmon ( <i>Salmo salar</i> )			F,M	F,M	
pollock ( <i>Pollachius virens</i> )	M	M	M		
whiting ( <i>Merluccius bilinearis</i> )	M				
white hake ( <i>Urophycis tenuis</i> )	M				
redfish ( <i>Sebastes fasciatus</i> )	n/a				
winter flounder ( <i>Pleuronectes americanus</i> )	M	M	M	M	M
yellowtail flounder ( <i>Pleuronectes</i> )	S	S			
Atlantic halibut ( <i>Hippoglossus hippoglossus</i> )	S	S	S	S	S
Atlantic sea herring ( <i>Clupea harengus</i> )		M	M		
long finned squid ( <i>Loligo pealei</i> )	n/a	n/a			
short finned squid ( <i>Illex illecebrosus</i> )	n/a	n/a			
Atlantic mackerel ( <i>Scomber scombrus</i> )	M	M			
surf clam ( <i>Spisula solidissima</i> )	n/a	n/a			
ocean quahog ( <i>Artica islandica</i> )	n/a	n/a			
spiny dogfish ( <i>Squalus acanthias</i> )	n/a	n/a			

### ESA and EFH Discussion

All parameters in this draft permit are as stringent as those found in the current permit. Improvements to the treatment plant will now allow previously untreated, raw effluent discharged from CSOs to receive secondary treatment (up to 25 mgd) and primary treatment up to 60 mgd. This will result in a net improvement to both the Merrimack and Little Rivers. The permittee must continue with CSO long term control planning which will further improve water quality in both rivers.

Effluent limitations and other permit requirements are designed to be protective of all aquatic species, including those designated with EFH. EPA has determined that a formal EFH consultation with NOAA Fisheries Service is not required because the proposed discharge will not adversely impact EFH.

### **XIII. COASTAL ZONE MANAGEMENT (CZM) CONSISTENCY REVIEW**

*40CFR §122.49 (d) states: The Coastal Zone Management Act, 16 U.S.C. 1451 et seq. section 307(c) of the Act and implementing regulations (15 CFR part 930) prohibit EPA from issuing a permit for an activity affecting land or water use in the coastal zone until the applicant certifies that the proposed activity complies with the State Coastal Zone Management program, and the State or its designated agency concurs with the certification (or the Secretary of Commerce overrides the State's non-concurrence).*

CZM has notified EPA that the discharge is not within the defined CZM boundaries and is not subject to CZM contingency review

### **XIV. MONITORING AND REPORTING**

The permittee is obligated to monitor and report sampling results to EPA and the MassDEP within the time specified within the permit. The effluent monitoring requirements have been established to yield data representative of the discharge by the authority under Section 308(a) of the CWA in accordance with 40 CFR 122.41(j), 122.44, and 122.48.

The remaining general and special conditions of the permit are based on the NPDES regulations 40 CFR Parts §122 through §125 and consist primarily of management requirements common to all permits.

### **XV. STATE PERMIT CONDITIONS**

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

## **XVI. GENERAL CONDITIONS**

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

## **XVII. STATE CERTIFICATION REQUIREMENTS**

The staff of the Massachusetts Department of Environmental Protection ("MassDEP") has reviewed the draft permit. EPA has requested permit certification by the State pursuant to 40 C.F.R. § 124.53 and expects that the draft permit will be certified.

## **XVIII. PUBLIC COMMENT PERIOD AND PROCEDURES FOR FINAL DECISION**

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period to: Mr. Doug Corb, NPDES Permit Program, U.S. Environmental Protection Agency, One Congress Street, Suite 1100 (Mail Code: CMP), 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-New England 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 (30) days public notice whenever the Director 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 New England's Boston office.

Following the close of the comment period, and after a public hearing, if such hearing is held, the Director 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.

## **XIX. EPA and MassDEP CONTACTS**

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

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Date: August 23, 2007  
Stephen S. Perkins, Director\*  
Office of Ecosystem Protection  
U.S. Environmental Protection Agency

\* Please address all comments to Doug Corb and Paul Hogan at the addresses above