

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
1 CONGRESS STREET, SUITE 1100, (CMP)
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.: MA0101150

NAME AND ADDRESS OF APPLICANT:

Town of Merrimac
Board of Commissioners
50 Federal Way
Merrimac, MA 01860

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Merrimac Wastewater Treatment Facility
50 Federal Way
Merrimac, MA 01860

RECEIVING WATERS: Merrimack River in Merrimack Watershed, State Code 84.

CLASSIFICATION: SB

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

The above named applicant has applied to the U.S. Environmental Protection Agency ("EPA") for the reissuance of its NPDES permit to discharge into the designated receiving water. The facility is engaged in the collection and treatment of domestic wastewater. The wastewater treatment facility discharges to the Merrimack River. (see Attachment A).

The Merrimack River at the point of discharge is classified as a Class SB waterbody by the Massachusetts Department of Environmental Protection (MassDEP). Class SB waters are designated as a habitat for fish, other aquatic life and wildlife and for primary and secondary contact recreation. In approved areas they shall be suitable for shellfish harvesting with deperation. These waters shall have consistently good aesthetic value.

II. Description of Discharge.

A quantitative description of the wastewater treatment plant discharge in terms of significant effluent parameters based on recent discharge monitoring reports (DMRs) is shown on Attachment B.

III . Permit Limitations and Conditions.

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

IV. Permit Basis and Explanation of Effluent Limitation Derivation

A. Facility Description

The Merrimac Wastewater Treatment Facility (WTF) has a design flow capacity of 0.45 million gallon per day (mgd) and is located in Merrimac, Massachusetts. There are no industrial users discharging to the facility. The sewer system consists of separate sewers, with no known overflows. The facility's wastewater treatment processes include grit chambers, extended aeration (oxidation ditches), clarifiers and ultraviolet (UV) disinfection. Effluent is discharged to the Merrimack River through a 12 inch diameter pipe which travels approximately 3,700 feet from the WTF to the Merrimack River. The pipe extends approximately 100 feet into the river. The top of the pipe is submerged approximately four feet below the surface during low tide.

Sludge from the treatment plant is aerobically digested and dewatered by centrifuge. The total quantity of sludge generated by the facility is about 65 dry metric tons per year. Sludge is transported off-site by Agresource Inc, Amesbury, MA to the Ipswich compost facility.

B. Regulatory Background

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). Publicly owned treatment works (POTWs) are required to achieve limits based on secondary treatment [see Section 301(b)(1)(B) of the CWA]. The secondary treatment requirements are set forth at 40 CFR Part 133.

Section 301(b)(1)(C) of the CWA requires 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.

The Massachusetts Surface Water Quality Standards (314 CMR 4.00) include the 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 site specific criteria are 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 contributes 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 existing controls on point and non-point sources of pollution, variability of the pollutant in the effluent, sensitivity of the species to toxicity and, where appropriate, the 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 40 CFR 122.44(l) restrict the relaxation of permits, 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 BPJ, 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, as described in 40 CFR 122.44(1).

C. Conventional Pollutants

The effluent limitations for BOD and TSS are the same as those limits found in the previous permit. These limits are in accordance with the secondary treatment requirements at 40 CFR 133.102. The existing permit has a frequency of 2/month for BOD testing. The draft permit changes the frequency from 2/month to 1/week to match the frequency of TSS monitoring.

The numerical limitations for fecal coliform and pH are based on state certification requirements under Section 401(a)(1) of the CWA, as described in 40 CFR 124.53 and 124.55. The fecal coliform limits in the current permit are based on receiving water criteria for waters not designated for shellfishing. The actual receiving water quality standard is for restricted shellfishing [SB(R)], which has more stringent criteria. The effluent limits in the draft permit have therefore been set at the more stringent SB(R) criteria of 88 CFU/100 ml (monthly geometric mean) and 260 cfu/100 ml (maximum day). The limitations for pH are set at the SB water quality criteria of 6.5-8.5 standard units (SU) in accordance with the Massachusetts Surface Water Quality Standards.

In addition, EPA has established a monthly monitoring requirement for Enterococci to gather information for determining whether the discharge has the reasonable potential to cause or contribute to exceedances of recently promulgated federal water quality criteria established to protect primary contact recreational uses (see 40 CFR part 131 dated November 16, 2004). No limit is established at this time. EPA will review the results, and if necessary, reopen the permit and impose a limit.

D. Non Conventional Pollutants

Chlorine

During summer of 2005 the permittee installed a new ultraviolet disinfection system, replacing chlorine for effluent disinfection. Accordingly, effluent limitations and monitoring requirements for total residual chlorine are not included in the draft permit.

Metals

Certain metals like copper, nickel, cadmium and zinc can be toxic to aquatic life. EPA has evaluated the reasonable potential for the discharge of these metals to cause or contribute to violations of water quality standards (see below). Based on this evaluation, EPA has determined that there is no reasonable potential, and no need to limit or monitor these metals.

The calculation of reasonable potential for copper, lead, zinc and cadmium was done by calculating the allowable acute and chronic discharge concentration for each metal and comparing those values to the concentrations measured in the discharge. If the actual discharge

concentration exceeds the allowable discharge concentration, there is reasonable potential and the permit must contain an effluent limit for that pollutant. The effluent metals concentrations were taken from the Whole Effluent Toxicity Test Reports for the period from May 2001 to November 2005.

Allowable discharge concentrations were calculated using the following equation:

$$C = WQC \times DF$$

where C = allowable effluent concentration

WQC = water quality criteria for the metal, expressed as total recoverable metal

DF = the dilution factor,

The dilution factor was calculated using the 7Q10 flow for the Merrimack River, which was obtained from the USGS gaging station at Lowell, MA, and the design flow of the treatment plant using the following equation:

$$DF = \frac{Q_r + Q_d}{Q_d}$$

Where DF = the dilution factor

Q_r = 7Q10 flow of the receiving water(611 MGD, the same as in the existing permit)

Q_d = design flow of th treatment plant (0.45 MGD)

$$DF = (611 \text{ MGD} + 0.45 \text{ MGD}) / 0.45 \text{ MGD} = 1360$$

The water quality criteria for were obtained from National Recommended Water Quality Criteria: 2002 . Since the discharge is to a Class SB water, the criteria for salt water were used. Each metal has two criteria, one for acute exposure and the other for chronic exposure. Acute criteria are generally used to calculate maximum daily limits and chronic criteria are used to calculate monthly average limits. Therefore, for each metal an allowable chronic exposure concentration limit (C_c)is calculated using the chronic criteria and an allowable acute exposure concentration limit (C_a)is calculated using the acute criteria.

Total Recoverable Copper:

Chronic Criteria = 3.7 ug/l

Acute Criteria = 5.8 ug/l

$$\begin{aligned} C_c &= WQC \times DF \\ &= 3.7 \times 1360 = 5032 \text{ ug/l which is greater than the effluent concentration range of } 7 \\ &\quad - 109 \text{ ug/l. So, reasonable potential does not exist.} \end{aligned}$$

$$\begin{aligned} C_a &= WQC \times DF \\ &= 5.8 \times 1360 = 7888 \text{ ug/l which is greater than the maximum effluent concentration} \\ &\quad \text{of } 109 \text{ ug/l. So, reasonable potential does not exist.} \end{aligned}$$

Total Recoverable Lead :

Chronic Criteria = 8.5 ug/l

Acute Criteria = 221 ug/l

$$C_c = WQC \times DF \\ = 8.5 \times 1360 = 11560 \text{ ug/l which is greater than the effluent concentration range of } 1 - 4 \text{ ug/l. So, reasonable potential does not exist.}$$

$$C_a = 221 \times 1360 = 300560 \text{ ug/l which is greater than the maximum effluent concentration of } 4 \text{ ug/l. So, reasonable potential does not exist.}$$

Total Recoverable Zinc:

Chronic Criteria: 86ug/l

Acute Criteria: 95 ug/l

$$C_c = 86 \times 1360 = 116960 \text{ ug/l which is far greater than the effluent concentration range of } 30 - 204 \text{ ug/l. So, reasonable potential does not exist.}$$

$$C_a = 95 \times 1360 = 129200 \text{ ug/l which is far greater than the maximum effluent concentration of } 204 \text{ ug/l. So, reasonable potential does not exist.}$$

Total Recoverable Cadmium:

Chronic Criteria: 9.4 ug/l

Acute Criteria: 42.3 ug/l

$$C_c = 9.4 \times 1360 = 12784 \text{ ug/l which is far greater than the concentration of } 1 \text{ ug/l. So, reasonable potential does not exist.}$$

$$C_a = 42.3 \times 1360 = 57528 \text{ ug/l which is far greater than the maximum effluent concentration of } 1 \text{ ug/l. So, reasonable potential does not exist.}$$

Whole Effluent Toxicity

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

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

Pursuant to EPA Region 1 policy, discharges having a dilution ratio greater than 100:1 require acute toxicity testing two 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 analyses; (2) bio-availability of pollutants after discharge is best measured by toxicity testing including any synergistic effects of pollutants; and (3) pollutants for which there are inadequate chemical analytical methods or criteria can be addressed. Therefore, toxicity

testing is being used in conjunction with pollutant specific control procedures to control the discharge of toxic pollutants.

The existing permit requires that the Merrimac WTF conduct WET testing for the Outfall 001 effluent two times per year and that each test include the use of Mysisid shrimp and Inland silverside. A review of the toxicity test data from May 2001 to November 2005 reveals that test results of LC-50 are consistently equal to or greater than 100% for both species. The permit has a limit of equal to or greater than 50%. In a letter dated April 24, 2006, the permittee requested a reduction in the frequency of testing from two per year to one per year, and to reduce the species from two to one. Based on the above toxicity results, the frequency of sampling has been reduced from two per year to one per year, and number of species has been reduced from two to one. The draft permit therefore requires WET testing once per year, that the test include the use of Mysisid shrimp, and that the test follow the EPA Region I protocol found in **Permit Attachment A**.

V. Sludge

The Merrimac WTF generates about 65 dry metric tons per year. At the present time, sludge is aerobically digested, dewatered by centrifuge and disposed off-site at the Ipswich, MA Composting Facility.

Section 405(d) of the CWA requires that EPA develop technical standards regulating the use and disposal of sewage sludge. These regulations were signed on November 25, 1992, published in the Federal Register on February 19, 1993, and became effective on March 22, 1993. Domestic sludge which is land applied, disposed of in a surface disposal unit, or fired in a sewage sludge incinerator are subject to Part 503 technical standards. Part 503 regulations have a self implementing provision, however, the CWA requires implementation through permits. Domestic sludge which is disposed of in a municipal solid waste landfill is in compliance with Part 503 regulations provided that the sludge meets the quality criteria of the landfill and the landfill meets the requirements of 40 C.F.R. Part 258.

The draft permit requires that sewage sludge use and disposal practices meet Section 405(d) Technical Standards of the CWA. In addition, the EPA Region I – NPDES Permit Sludge Compliance Guidance document dated November 4, 1999 is available for use by the permittee in determining its appropriate sludge conditions for its chosen method of sludge disposal.

The draft permit requires 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.

VI. Industrial Users

The permittee is required to identify, in terms of character and volume of pollutants, any significant indirect dischargers into the POTW subject to pretreatment standards under Section 307(b) of the CWA and 40 CFR Part 403.

VII. Antidegradation

This draft permit is being reissued with an allowable wasteload identical to the current permit with no change in outfall location. The State of Massachusetts has indicated that there will be no lowering of water quality and no loss of existing water uses and that no additional antidegradation review is warranted.

VIII. Essential Fish Habitat Determination (EFH)

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. ' 1801 et seq.(1998)), EPA is required to consult with 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). Adversely impact means any impact which reduces the quality and/or quantity of EFH. 50 C.F.R. ' 600.910(a). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

Essential fish habitat is only designated for 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.

Only Atlantic salmon is believed to be present within the EFH Area, which encompasses the existing discharge site. No "habitat areas of particular concern", as defined under §600.815(a)(9) of the Magnuson-Stevens Act, have been designated for this site. Although EFH has been designated for this general location, EPA has concluded that this activity is not likely to adversely affect EFH or its associated species for the following reasons:

- This is a reissuance of an existing permit;
- The quantity of discharge from the WWTF is 0.45 mgd monthly average; Effluent receives minimum secondary treatment with extended aeration process;
- Effluent is discharged into the Merrimack River with a high dilution factor of 1360;
- Chlorine is no longer used for disinfection of the effluent ;
- Acute toxicity tests will be continued on Mysid shrimp once per year. Present toxicity test results are in compliance with the permit limits;
- The permit will prohibit any violation of state water quality standards.

Accordingly, EPA has determined that a formal EFH consultation with NMFS is not required. If adverse impacts to EFH are detected as a result of this permit action, NMFS will be notified and an EFH consultation will be promptly initiated.

IX. State Certification Requirements

EPA may not issue a permit unless the Massachusetts Department of Environmental Protection with jurisdiction over the receiving waters certifies that the effluent limitations contained in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State Water Quality Standards. The staff of the Massachusetts Department of Environmental Protection 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.

X. Public Comment Period, Public Hearing, and Procedures for Final Decision

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and a supporting material for their

arguments in full by the close of the public comment period, to the U.S. EPA, MA Office of Ecosystem Protection, 1 Congress Street, Suite 1100 (CMP) Boston, Massachusetts 02114-2023. Any person, prior to such date, may submit a request in writing to EPA and the State Agency for a public hearing to consider the draft permit. Such requests shall state the nature of the issues proposed to be raised in the hearing. 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. Within 30 days following the notice of the final permit decision, interested parties may petition the Environmental Appeals Board to review any condition of the permit decision. Regulations regarding the appeal of NPDES permits may be found at 40 CFR Part 124.19.

XI. EPA Contact

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

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Date

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