

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
NEW ENGLAND - REGION I  
ONE CONGRESS STREET, SUITE 1100  
BOSTON, MASSACHUSETTS 02114-2023**

**STATEMENT OF BASIS**

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

NPDES PERMIT NUMBER: **MA0100722**

NAME AND MAILING ADDRESS OF APPLICANT:

**Town of Northbridge  
Department of Public Works  
7 Main Street  
Whitinsville, MA 01588**

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

**Northbridge Wastewater Treatment Plant  
644 Providence Road  
Whitinsville, MA 01588**

RECEIVING WATER(S): **Unnamed tributary to the Blackstone River**  
(Blackstone River Basin) (USGS Hydrologic Code #01090003) **State Basin Code: 51**

RECEIVING WATER CLASSIFICATION(S): **Class B - warm water fishery**

**CURRENT PERMIT:**

<b>ISSUED:</b>	September 13, 2006
<b>APPEALED:</b>	October 16, 2006
<b>UNCONTESTED LIMITS IN EFFECT:</b>	December 17, 2006

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## **I. Proposed Action**

EPA is proposing a modification of the Town of Northbridge's NPDES permit which reflects limited changes in response to the Town's permit appeal, as described below.

On September 13, 2006, EPA Region 1 issued a final NPDES permit ("Final Permit") to the Town of Northbridge for its Wastewater Treatment Plant ("WTP"). However, the Final Permit did not immediately take effect, because on October 16, 2006, the Town petitioned EPA's Environmental Appeals Board ("EAB") in Washington, D.C. for review of the Final Permit. This action stayed the entire permit. In its appeal of the NPDES permit, the Town specifically asked the EAB to review the more stringent phosphorus limits and the imposition of year round bacteria limits, which were previously only required seasonally.

By letter of November 17, 2006 to the EAB and the Town's legal counsel, EPA noted that, with the exception of the appealed items stated above, all other permit conditions were uncontested and severable. As a result, on December 17, 2006, the uncontested and severable conditions went into effect. Pursuant to 40 C.F.R. § 124.16(a)(2)(i) and 124.60(b), the contested limits (phosphorus and winter fecal coliform limits) remain stayed (i.e., have not gone into effect) pending final agency action under 40 C.F.R. § 124.19(f).

After evaluating issues raised on appeal by the Town related to the year round bacteria limits, EPA has determined that an adjustment in the limits would be appropriate and consistent with federal and state regulations. Therefore, EPA has withdrawn the winter fecal coliform limits contained in the Final Permit pursuant to 40 C.F.R. § 124.19(d). EPA is proposing new winter bacteria limits and is requesting comment on only these proposed changes to the Final Permit. These changes are restricted to certain provisions of the Final Permit which are found in bold italics type on **Pages 2 and 4 of the permit in Part I.A.1**. The rationale for the proposed changes in the bacteria limits is presented below. These changes do not address the phosphorus limits that remain under appeal. EPA expects to resolve the phosphorus portion of the appeal in the near future; in the meantime, the phosphorus limits in the Final Permit remain stayed.

## **II. Permit Modification and Basis**

### **A. Basis for Bacteria Limits in the Final Permit**

In the draft NPDES permit issued for public comment on November 10, 2005, EPA required seasonal disinfection of the discharge, consistent with Massachusetts water quality standards, which allow seasonal disinfection of discharges to Class B waters. Thus, the draft permit established fecal coliform bacteria limits for the period of April 1 through October 31.

In its comments on the draft permit, the Rhode Island Department of Environmental Management (RIDEM) asserted that EPA is obligated to ensure that this discharge does not cause or contribute to violations of Rhode Island's water quality standards, and so must evaluate whether winter limits for bacteria are necessary for this discharge. The applicable (EPA-approved) Rhode Island water quality criteria for fecal coliform bacteria are a geometric mean value not to exceed 200 MPN/100 ml and that 20 % of values are not to exceed 500 MPN/100 ml. The Rhode Island criteria are in effect year-round. The analysis provided by RIDEM in its comments, which estimated a fecal coliform count of 20,000 colony forming units ("cfu")<sup>1</sup> at the Woonsocket gaging station (near the Massachusetts/Rhode Island border) due to the Northbridge WTP discharge, was based on a very conservative assumption regarding bacterial die-off.

To confirm whether water quality standards are in fact violated at the state line, EPA reviewed water quality data collected from the Blackstone River at the state line during months when the upstream publicly owned treatment works ("POTWs") in Massachusetts were not required to disinfect and were not believed to be disinfecting. Data from a monitoring station in Millville, MA, upstream of the Tupperware Dam (close to the Rhode Island border) between November 2005 through February 2006, showed fecal coliform counts of 1700, 1300, 700, and 1700 MPN/100 ml for the four samples that were analyzed.<sup>2</sup> The geometric mean of these samples is 1273 MPN/100 ml, and all of the samples exceed 500 MPN/100 ml, therefore violating Rhode Island's water quality standards. During dry weather, the only significant source of fecal coliform bacteria in the river is the upstream POTWs. Therefore, EPA determined that the discharge from the Massachusetts POTWs, including Northbridge, had the reasonable potential to cause or contribute to violations of Rhode Island's water quality standards, and winter bacteria limitations were necessary for these NPDES permits.

Based on this information, EPA established year-round effluent limitations for fecal coliform bacteria in the Final Permit. The effluent limits imposed during the months of November 1-March 31 were the same limits that had been included in the draft permit on the discharge during the summer months -- a monthly geometric mean of 200 cfu per 100 ml and a daily maximum of 400 cfu per 100 ml. These winter limits were not a requirement of the MassDEP state permit for the Northbridge discharge, only of EPA's NPDES permit, consistent with EPA's obligations to ensure that NPDES permit limits conform to the water quality requirements of all affected states, including downstream states.

In its EAB Petition, the Town argued that EPA failed to comply with 40 C.F.R. § 124.14 by issuing a final permit without reopening the public comment period when it, for the

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<sup>1</sup> The membrane filter test produces bacteria measurements in colony forming units ("CFU"). The most probable number test produces bacteria measurements as most probable numbers (MPN). Both test methods are included in 40 CFR Part 136 as EPA approved methods for NPDES monitoring, and the units are equivalent (i.e., 1 CFU equals 1 MPN).

<sup>2</sup> Blackstone River Data Provided by the Rhode Island Department of Environmental Management via e-mail, May 2006.

first time, included a year round disinfection requirement that was not contained in the draft permit.

### **B. Basis for Proposed Winter Bacteria Limits**

EPA believes that year round disinfection is required for this discharge in order to ensure that the discharge does not cause or contribute to a violation of Rhode Island's fecal coliform criteria at the state line. Therefore, pursuant to §§ 301(b)(1)(C) and 401(a)(2) of the Clean Water Act and implementing regulations at 40 C.F.R. § 122.4(d) and 40 C.F.R. § 122.44(d), EPA is proposing winter fecal coliform limits to protect Rhode Island's waters. However, in consideration of the distance that this discharge travels to the Rhode Island state line and the decay rate of fecal coliform during this travel time, EPA has determined that an increase in the limits from those included in the Final Permit is justified. Also, a further increase in the maximum daily limit is justified because EPA incorrectly based the maximum daily limit on the Massachusetts water quality criterion of 400 MPN/100 ml rather than the higher Rhode Island water quality criterion of 500 MPN/100ml.<sup>3</sup> EPA proposes to modify the winter fecal coliform limits as follows.

EPA has estimated the amount of fecal coliform die-off that is expected to occur between Northbridge and the state line in order to establish an appropriate winter bacteria limit. Fecal coliform die-off was estimated using a first order die-off equation as follows.<sup>4,5</sup>

$$N(t) = \{N(o)\}e^{-kt}$$

Where:

$N(t)$  = Predicted concentration of fecal coliform at travel time  $t$ , downstream, in #/100 ml

$N(o)$  = Fecal coliform concentration in the effluent of the source, in #/100 ml

$k$  = The first order die-off rate constant, in 1/day (this constant has no units)

$t$  = travel time to the point of interest below the source, in days

Although the value of  $N(o)$  would typically be the source, or effluent concentration of fecal coliform, we are assuming that this value is 1, so that the value that is solved for,

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<sup>3</sup> In 2006, Rhode Island adopted revisions to its water quality standards, which included changing the maximum fecal coliform criterion for Class B waters from 500 MPN/100 ml to 400 MPN/100 ml. EPA approved many of the revisions in 2007 but has not yet taken action on several changes, including the revised fecal coliform criteria. Therefore, pursuant to 40 C.F.R. § 131.21(c), the applicable maximum fecal coliform criterion remains 500 MPN/100 ml for Clean Water Act purposes.

<sup>4</sup> Crane, S.R., and Moore, J.A., "Modeling enteric bacterial die-off: a review", *Water, Air and Soil Pollution*, **27**, (1986), pp 411-439.

<sup>5</sup> Illinois state water quality standards "Title 35, Subtitle C: Water Pollution; Part 378 – Effluent Disinfection Exemptions."

$N(t)$ , will be a fraction of the fecal coliform discharged at the source. In this way, we will estimate the percentage of the effluent concentration that is present at the downstream point, that being the State line. Assuming a velocity of 1.0 feet per second<sup>6</sup> and a travel distance of 62,336 feet,<sup>6</sup> we get a travel time of 0.72 days. EPA selected a decay rate ( $k$ ) of 1.0/day from the literature.<sup>7</sup> This yields a percentage of the fecal coliform count at the state line, or  $N(t)$ , of 50% (0.5).

Using the die-off estimate of 50%, EPA has set the fecal coliform limits for the period of November 1 to March 31 at a monthly geometric mean of 400 cfu/100 ml and a daily maximum of 1000 cfu/100 ml. The proposed limits are protective of Rhode Island's water quality standards, considering that they are two times the criteria values, and with the estimated die-off of 50% will result in bacteria concentrations at criteria levels at the state line.

While the proposed permit limits take into consideration the die-off of fecal coliform in the Northbridge discharge during the travel time to the state line, they do not allow for dilution because of the multitude of other sources of bacteria in the river that effectively eliminate the dilution benefit of higher flows. Blackstone River data for fecal coliform indicate that concentrations of fecal coliform in the river exceed the Rhode Island criteria at various times of the year and under a variety of different flow conditions as described below. Consequently, allowing for dilution would not ensure that the discharge does not cause or contribute to a violation of the standards at the state line.

As noted earlier, all four dry weather samples taken recently at a point on the Blackstone River close to the Rhode Island State line showed values greater than the daily maximum Rhode Island fecal coliform criteria. Furthermore, as part of the Blackstone River Initiative, wet weather sampling<sup>8</sup> that was conducted during three fall storm events, (September 1992, November 1992, and October 1993) each showed event mean fecal coliform concentrations exceeding the MA and RI water quality criteria (geometric mean of 200 cfu/100 ml) at all river stations from Northbridge to the state line in Blackstone, Massachusetts, for all three storm events, with the exception of one station where the criteria was exceeded for two of the three storm events. During the September and October sampling events, the Massachusetts POTWs would have been disinfecting, indicating significant wet weather sources of bacteria. Data collected during the November storm, which was sampled during the period of November 2 -5 of 1992, when the Massachusetts POTWs would not have been disinfecting, showed a mean fecal coliform concentration of 764 colonies/100 ml at the state line.

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<sup>6</sup> From United States Geological Survey (USGS) HSPF model of the Blackstone River, provided by Camp, Dresser & McKee on behalf of the town of Northbridge [e-mail transmission from John Gall of CDM to David Pincumbe of EPA, 4/24/07].

<sup>7</sup> Mancini, J.L., "Numerical estimates of coliform mortality rates under various conditions", **Journal of Water Pollution Control Federation**, 50, (1978), pp 2477 – 2484.

<sup>8</sup> EPA-New England, "Blackstone River Initiative", May 2001, pp.7-16 to 7-18.

Because the available data show that undisinfected discharges from Massachusetts POTWs in the Blackstone River watershed have the reasonable potential to cause or contribute to exceedances of Rhode Island's water quality criteria for bacteria, EPA must include limits in the POTWs' permits to ensure compliance with Rhode Island water quality standards at the state line. EPA anticipates calculating those limits using the procedure described in this statement of basis, thereby ensuring compliance with Rhode Island's water quality standards at the state line.

### **III. 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 the National Marine Fisheries Services (NMFS) if EPA's action or proposed actions that it funds, permits, or undertakes, may adversely impact any EFH such as: waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. § 1802 (10)). Adversely impact means any impact which reduces the quality and/or quantity of EFH (50 C.F.R. § 600.910 (a)). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

EFH is only designated for species for which federal fisheries management plans exist (16 U.S.C. § 1855(b) (1) (A)). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999. The following is a list of the EFH species and applicable lifestage(s) for Narragansett Bay:

Species	Eggs	Larvae	Juveniles	Adults
Atlantic cod ( <i>Gadus morhua</i> )				
Haddock ( <i>Melanogrammus aeglefinus</i> )		X		
pollock ( <i>Pollachius virens</i> )				
whiting ( <i>Merluccius bilinearis</i> )				
Offshore hake ( <i>Merluccius albidus</i> )				
red hake ( <i>Urophycis chuss</i> )		X	X	X
white hake ( <i>Urophycis tenuis</i> )				
redfish ( <i>Sebastes fasciatus</i> )	n/a			
witch flounder ( <i>Glyptocephalus</i> )				

<i>cynoglossus</i> )				
winter flounder ( <i>Pleuronectes americanus</i> )	X	X	X	X
yellowtail flounder ( <i>Pleuronectes ferruginea</i> )				
windowpane flounder ( <i>Scophthalmus aquosus</i> )	X	X	X	X
American plaice ( <i>Hippoglossoides platessoides</i> )		X	X	X
ocean pout ( <i>Macrozoarces americanus</i> )				
Atlantic halibut ( <i>Hippoglossus hippoglossus</i> )				
Atlantic sea scallop ( <i>Placopecten magellanicus</i> )				
Atlantic sea herring ( <i>Clupea harengus</i> )		X	X	X
monkfish ( <i>Lophius americanus</i> )				
bluefish ( <i>Pomatomus saltatrix</i> )			X	X
long finned squid ( <i>Loligo pealei</i> )	n/a	n/a		
short finned squid ( <i>Illex illecebrosus</i> )	n/a	n/a		
Atlantic butterfish ( <i>Peprilus triacanthus</i> )				
Atlantic mackerel ( <i>Scomber scombrus</i> )	X	X	X	X
Summer flounder ( <i>Paralichthys dentatus</i> )		X	X	X
scup ( <i>Stenotomus chrysops</i> )	X	X	X	X
black sea bass ( <i>Centropristus striata</i> )	n/a		X	X
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		

tilefish ( <i>Lopholatilus chamaeleonticeps</i> )				
king mackerel ( <i>Scomberomorus cavalla</i> )	X	X	X	X
Spanish mackerel ( <i>Scomberomorus maculatus</i> )	X	X	X	X
cobia ( <i>Rachycentron canadum</i> )	X	X	X	X

A review of the relevant essential fish habitat information provided by NMFS indicates that EFH has been designated for 33 managed species within the NMFS boundaries encompassing Narragansett Bay, which the Blackstone River discharges to, via the Seekonk River and the Providence River. It is possible that a number of these species utilize the downstream Rhode Island waters for spawning, while others are present seasonally.

Based on the relevant information examined, EPA finds that adoption of the draft bacteria limits will satisfy EFH requirements. The effect of this modification will be slightly less stringent winter limits for bacteria than those included in the Final Permit, but much more stringent requirements than were included in the previous permit, which did not require disinfection in the winter. There will be no potential for increased toxicity during the winter due to disinfection because the discharge is disinfected with UV light, which does not create a toxic residual. During the public comment period, EPA has provided a copy of the Draft Permit Modification and Statement of Basis to NMFS for consultation with NMFS under Section 305(b)(2) of the Magnuson-Stevens Act for EFH.

**IV. Endangered Species Act**

Section 7(a) of the Endangered Species Act (ESA) of 1973, as amended 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 U.S. Fish and Wildlife Service (USFWS) typically administers Section 7 consultations for bird, terrestrial, and freshwater aquatic species. The National Marine Fisheries Service (NMFS) typically administers Section 7 consultations for marine species and anadromous fish.

EPA has reviewed the list of federal endangered or threatened species of fish, wildlife, and plants to see if any such listed species might potentially be impacted by the reissuance of this NPDES permit and has not found any such listed species in the vicinity of the discharge. Therefore, EPA does not need to formally consult with NMFS or USFWS in regard to the provisions of the ESA.

During the public comment period, EPA has provided a copy of the Draft Permit Modification and Statement of Basis to both NMFS and USFWS.

## **V. State Certification Requirements**

Under Section 401(a)(1) of the CWA, EPA is required to obtain certification from the state in which the discharge is located that all water quality standards or other applicable requirements of state law, are satisfied. EPA permits are to include any conditions required in the state's certification as being necessary to ensure compliance with state water quality standards or other applicable requirements of state law. See CWA Section 401(a)(1) and 40 C.F.R. § 124.53(e). In addition, CWA § 401(a)(2), 33 U.S.C. § 1341(a)(2), provides that NPDES permits must also include such conditions "as may be necessary to insure compliance with applicable water quality requirements" in a downstream state whose water quality will be affected, such as Rhode Island in this case.

Regulations governing state certification are set out at 40 C.F.R. Part 121 and 40 C.F.R. §§ 124.53 and 124.55. EPA regulations pertaining to permit limits based upon water quality standards and state requirements are contained in 40 C.F.R. § 122.4(d) and 40 C.F.R. § 122.44(d).

In this case, MassDEP is the certifying agency because the Town discharges into the Blackstone River within Massachusetts. However, the limits that are the subject of the draft permit modification are based solely on Rhode Island's water quality standards to protect the downstream waters in Rhode Island. Because Massachusetts does not require year round disinfection, we expect that Massachusetts will either waive or grant certification confirming that the draft limits are sufficient to protect Massachusetts water quality standards.

As described above, Rhode Island DEM commented on the 11/10/05 draft permit that year round bacteria limits are necessary to meet Rhode Islands water quality standards. EPA is proposing the limits in this draft permit modification pursuant to sections 401(a)(2) and 301(b)(1)(C) of the Clean Water Act, and 40 C.F.R. §§ 122.4(d) and 122.44(d)(4). EPA has discussed the draft limits with RIDEM and that agency has indicated that the limits are adequate to protect Rhode Island's waters.

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

All persons, including applicants, who believe any condition of the draft permit modification 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 George Papadopoulos, U.S. EPA, Massachusetts Office of Ecosystem Protection (CIP), 1 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. 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 modification 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, any person who filed comments on the draft permit modification or participated in the public hearing (if any) may petition the EAB to review any condition of the permit decision. See 40 C.F.R. § 124.19(a).

## **VII. EPA Contact**

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

George Papadopoulos, Office of Ecosystem Protection  
One Congress Street Suite 1100 - Mailcode CIP  
Boston, MA 02114-2023  
Telephone: (617) 918-1579 FAX: (617) 918-1505

January 16, 2008  
Date

Stephen S. Perkins, Director  
Office of Ecosystem Protection  
U.S. Environmental Protection Agency