

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

STATEMENT OF BASIS

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
PERMIT MODIFICATION

NPDES PERMIT NO.: MA0102369

NAME AND ADDRESS OF PERMITTEE:

**Upper Blackstone Water Pollution Abatement District ("UBWPAD")
50 Route 20
Millbury, Massachusetts 01527**

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

**Upper Blackstone Water Pollution Abatement District ("UBWPAD")
50 Route 20
Millbury, Massachusetts 01527**

RECEIVING WATER: Blackstone River (Blackstone Basin - USGS Code #01090003)

WATER QUALITY CLASSIFICATION: **B**

PUBLIC NOTICE DATE: **SEP 13 2001**

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

This action is a proposed modification to the NPDES permit issued to UBWPAD on September 30, 1999. UBWPAD owns and operates a wastewater treatment facility with a design flow of 56 million gallons per day. The facility serves Worcester and portions of Auburn, West Boylston, Holden, Rutland, Oxford and Shrewsbury. There are currently more than 200 industrial users contributing wastewater to this facility. There is one Combined Sewer Overflow (CSO) in this system which is in the City of Worcester and under Worcester's jurisdiction.

The Permit authorizes the discharge of treated sanitary and industrial wastewater from the facility to the Blackstone River subject to effluent limitations and other requirements.

II. Limitations and Conditions

This modification includes changes to the following conditions of the Permit:

- Average monthly flow of 56 million gallons per day, *see* Permit at Part I.A.1;
- BOD (November to April) average monthly, weekly and daily limits, *id.*;
- TSS (June to October) average monthly, weekly and daily limits, *id.*;
- Total Ammonia Nitrogen, *id.*;
- Total Phosphorus, *id.*;
- Cadmium, Copper and Zinc, *id.*
- Infiltration/Inflow, *id.* at Part I.B.2.;
- The schedule for submission of the final local limits report, *id.* at Part I.C.2.;
- Combined Sewer Overflows, *id.* at Part I.E.;
- Sludge Conditions, *id.* at I.F.3.b, I.F.4.b, and I.F.7.g; and
- Chlorination System Report, *id.* at Attachment 1.

All other conditions of the existing Permit, including effluent limitations and monitoring requirements, will remain unchanged.

III. Modification Basis

EPA issued the original permit jointly with the Massachusetts Department of Environmental Protection ("MADEP"). UBWPAD filed administrative appeals with EPA and MADEP regarding certain conditions in the Permit. Following negotiations, the EPA and MADEP and UBWPAD have reached agreement resolving the issues raised in the appeals. Pursuant to that agreement, the EPA and MADEP are proposing to make certain changes to the Permit, as set forth in the draft Permit Modification attached and as discussed below. UBWPAD has agreed to withdraw its appeals if the draft Permit Modification becomes final.

As part of the modification procedure, EPA and MADEP are now taking public comment on the proposed changes. If no comments opposing the draft Permit Modification are submitted, or if the EPA and MADEP determine that any opposing comments do not warrant changes or warrant only minor changes, EPA and MADEP will issue the Permit Modification in final form. The Permit, as modified, will thereafter take effect. In the event EPA and MADEP determine to make any material changes to the draft Permit Modification in response to public comments, UBWPAD will have the right to withdraw from the settlement and to challenge any such changes.

EPA and MADEP anticipate that UBWPAD will not be able to immediately meet the effluent limits in the permit absent upgrades to its facility. Accordingly, concurrent with the issuance of the final permit modification, EPA and MADEP anticipate issuance of a separate administrative order incorporating a compliance schedule related to these upgrades. The order will include schedules for completion of design, construction and final operation and compliance of plant upgrades.

In Massachusetts, EPA operates the NPDES permitting program; EPA and MADEP issue joint permits that satisfy the requirements of federal and state law. EPA and MADEP will discuss any future water quality evaluations on the Blackstone River with the Massachusetts Executive Office of Environmental Affairs Blackstone River Basin Team. EPA and MADEP also would discuss any such efforts with the Rhode Island Department of Environmental Management.

Effluent Limitations

1. Flow

The Permit included a monthly average flow limitation of 56 million gallons per day (MGD). In the response to comments on the Permit, EPA and MADEP explained that they had included this limitation based on an understanding that this flow represented a projected peak monthly flow value. *See* Response to Comments at 5. In its appeal, UBWPAD pointed out that the 56 MGD flow represented a design flow based on an annual average figure. Accordingly, in the draft Permit Modification, EPA and MADEP are proposing to substitute the monthly average flow limitation with an annual average flow limitation of 56 MGD. The annual average flow limitation will allow UBWPAD to discharge more than 56 MGD in some months of the year, provided that the annual average does not exceed 56 MGD.

In order to control the mass of pollutants discharged during those months when UBWPAD discharges more than 56 MGD, EPA and MADEP have included monthly average mass based limits expressed in pounds per day for CBOD, TSS, ammonia and phosphorus. EPA and MADEP propose adding the mass-based limits in addition to concentration-based limits for these pollutants. EPA and MADEP used the following formula to calculate mass-based limits:

$$8.34 \times \frac{\text{flow in million gallons}}{\text{day}} \times \frac{\text{concentration in milligrams}}{\text{liter}}$$

8.34 is the conversion factor used to convert a concentration-based limit expressed in milligrams per liter to a mass-based limit expressed in pounds per day. For each monthly average concentration based limit for CBOD, TSS, ammonia and phosphorus, EPA and MADEP calculated a mass-based limit. An example of the calculation using the November monthly average limit of 25 mg/l CBOD is as follows:

$$8.34 \times \frac{56 \text{ million gallons}}{\text{day}} \times \frac{25 \text{ milligrams}}{\text{liter}} = 11,676 \text{ pounds/day.}$$

2. TSS Limits.

The September 1999 Permit contained separate TSS limits for June to October, May and November to April. UBWPAD objected to the basis for all of these limits. In settlement discussions, EPA and MADEP agreed to change the monthly average and daily maximum TSS limits for June to October. Specifically, EPA and MADEP propose to change the monthly average limit from 10 mg/l to 15 mg/l, and to relax the daily maximum limit from 17 mg/l to 22 mg/l. The 15 mg/l weekly average limit during the period of June to October will remain the same. In addition, all TSS limits in May, and November to April set forth in the Permit will remain unchanged.

Massachusetts water quality criteria related to TSS are narrative as opposed to numeric. See 310 C.M.R. 4.05(3)(b)5, 4.05(5)(a) and 4.05(5)(b). These criteria refer to minimizing the aesthetic impact of high solids concentrations as well as the potential for sediment deposition that could impair water quality and aquatic habitats. While there is no clear national guidance on acceptable TSS concentrations, it is generally understood that tertiary treatment levels (more stringent than the secondary treatment guidelines of 30 mg/l monthly average) are necessary in effluent dominated rivers. The proposed monthly average and daily maximum limits for TSS for the period June to October are slightly less stringent than the limits as previously proposed, but still represent tertiary treatment levels.

3. Ammonia.

Ammonia limits in the September 1999 Permit were based on the 1998 Update of Ambient Water Quality Criteria for Ammonia, August 1998 (EPA 822-R-98-008, August 1998). In the draft Permit Modification, EPA and MADEP have recalculated the limits using a December 1999 update of the ammonia criteria document. See 1999 Update of Ambient Water Quality Criteria for Ammonia, December 1999 (EPA 822-R-99-014, December 1999).

Use of the new criteria document results in a slight relaxation of ammonia limits, which are reflected in the draft Permit Modification. The 1999 criteria document includes two tables to be used for determination of chronic ammonia limits. The table on page 87 of the document provides values where there is a presence of early life stages of fish in the receiving water, while the table on page 88 provides values where there is an absence of such early life stages of fish during colder weather. For the month of May, EPA and MADEP assumed the presence of early life stages of fish and, accordingly, used the table on page 87 of the criteria document. For the months of November through April, EPA and MADEP assumed the absence of such early life stages and used the table on page 88 of the criteria document.

Use of the tables requires inputs of pH and temperature. EPA and MADEP assumed a pH of 7 S.U. in calculating all limits. With regard to temperature, EPA and MADEP used temperature data collected from a gauge at Millville, Massachusetts. [The temperature data used for each seasonal period is available on p. 22 of the Blackstone River Watershed Dissolved Oxygen Wasteload Allocation for Massachusetts and Rhode Island (November 1997)].

As with any other water quality-based effluent limit, EPA and MADEP then multiplied the instream criteria by the dilution factor to arrive at the limit. In calculating the limits, EPA and MADEP used the 30Q10 flow, consistent with the criteria document. Using USGS stream flow data, EPA and MADEP estimated the 30Q10 for the summer period at 1.4 times the nominal 7Q10 flow of 4.4 MGD. This results in a 30Q10 flow for the summer period of 6.2 MGD.

For the month of May, the ammonia limit changed from 3.0 mg/l to 5.0 mg/l. The new ambient toxicity criteria at a pH of 7.0 S.U. and temperature of 60° F (derived from the wasteload allocation) would have been 5.6 mg/l to protect early life stages of the aquatic community. Multiplication of the criteria by the dilution factor (based on the summer 30Q10 flow of 6.2 MGD) would have resulted in a standard of approximately 6.0 mg/l. Application of the dissolved oxygen wasteload allocation, however, indicated that a standard of 5.0 mg/l was necessary to achieve the dissolved oxygen criteria in the River. Since the standard based on the dissolved oxygen model (5.0 mg/l) is less than the toxicity-based standard, EPA and MADEP are proposing to impose a standard of 5.0 mg/l for the month of May.

For the month of November, the ammonia limit changed from 8.0 mg/l to 10.0 mg/l. The new ambient criteria at a pH of 7.0 and a temperature of 50° F is 7.9 mg/l based on the absence of early life stages resulting in a toxicity based limit of 10 mg/l. For the month of November, EPA and MADEP estimated that the winter 30Q10 flow was approximately two times the summer 30Q10 flow of 6.2 MGD. This resulted in a winter 30Q10 flow of 12.3 MGD. Multiplication of the toxicity criteria of 7.9 mg/l by the dilution factor (1.22) resulted in a limit of 9.6 mg/l, which was rounded to 10 mg/l. The calculation is further described in Attachment A.

For the period December to April, the limits changed from 10 mg/l to 12 mg/l. The new ambient criteria at pH of 7.0 and temperature of 40° F is 9.6 mg/l based on the absence of early life stages resulting in a toxicity based limit of 11.7 mg/l, which was rounded to 12 mg/l. EPA and MADEP also used the winter 30Q10 flow of 12.3 MGD in calculating the standard for this period. The calculation is further described in Attachment A. While the dissolved oxygen waste load allocation concludes that a limit of 12 mg/l will meet DO criteria during December to March, it concludes that there would be minor DO exceedances during April. However, further review of the critical low flow in April versus the critical low flow in December through March (Gazetteer of Hydrologic Characteristics of Streams in Massachusetts - USGS 1984) indicates that April low flows are significantly higher than December to March low flows. The higher flow in April should ensure that dissolved oxygen criteria will be achieved even with the slightly higher ammonia limit of 12 mg/l.

With regard to weekly limits, the ammonia criteria document provides that the highest 4 day average within a 30 day period should not exceed 2.5 times the chronic criteria. [page 83 of the criteria document]. As the permit includes a 7-day rather than a 4-day average limit, the proposed weekly limits are based on an assumption that the highest 7 day average within a 30 day period should not exceed 2 times the chronic criteria. This factor is derived from the 1998 ammonia criteria document noted earlier (EPA 822-R-98-008, August 1998).

4. BOD₅/CBOD₅.

The September 1999 Permit included limits for BOD₅ from November through April and for CBOD₅ from June to October and during May. UBWPAD requested that EPA and MADEP convert the limits for BOD₅ to CBOD₅ in light of nitrogenous pollutants. The regulation at 40 C.F.R. §133.102(a)(4) allows the permitting authority discretion to set effluent limits for CBOD₅ in lieu of BOD₅ to minimize false indications of poor facility performance as a result of nitrogenous pollutants. EPA and MADEP agree that CBOD₅ more accurately reflects the biochemical oxygen demand (carbonaceous component versus nitrogenous component) that is modeled in the wasteload allocation. The nitrogenous oxygen demand is modeled and controlled separately through the inclusion of an ammonia limit. Accordingly, EPA and MADEP have made such a change in the draft Modified Permit. The draft Modified Permit only contains limits for CBOD₅, and not for BOD₅. The limits are 25 mg/l and 40 mg/l and are consistent with the secondary treatment regulations at 40 CFR 133.102.

5. Metals Limits.

Both the September 1999 and the Modified Permit include effluent limitations and monitoring requirements for cadmium, copper and zinc. UBWPAD presented data to EPA and MADEP, a copy of which is attached as Attachment B, indicating that upstream hardness levels under low flow conditions are higher than the 50 mg/l previously used. EPA and MADEP reviewed the data and concluded that 65 mg/l is a more accurate reflection of instream hardness under low flow conditions. This change results in a slight modification to the metals limits. The calculations for the daily maximum limits are shown in Attachment C.

With regard to cadmium, EPA calculated a chronic limit of 1.8 ug/l and an acute limit of 2.8 ug/l. Copper had a chronic limit of 6.5 ug/l and an acute limit of 9.3 ug/l. Zinc had chronic and acute limits of 83 ug/l. EPA multiplied each of these limits by a dilution factor of 1.1 to arrive at the proposed limits set forth in the draft Permit Modification.

Monitoring of Total Residual Chlorine

The proposed Permit Modification updates a reference to Standard Methods for the Examination of Water and Wastewater in footnote 5 of the September 1999 Permit. The new reference is to the 20th Edition, rather than the 18th Edition.

CSOs

The proposed Permit Modification deletes the references to the Combined Sewer Overflow ("CSO") in Worcester that discharges to UBWPAD's facility. In its appeal, UBWPAD argued that, as phrased, this section of the September 1999 Permit suggested that the CSO was located in a portion of the collection system operated by UBWPAD. UBWPAD, however, owns and operates only the wastewater treatment facility at Millbury. The member communities own and operate the collection systems that discharge to UBWPAD's facility. In addition, the City of Worcester owns and operates the CSO wastewater treatment facility. Accordingly, EPA and MADEP propose to delete this section in the Permit Modification.

Inflow and Infiltration

The proposed Permit Modification contains more detailed requirements than the September 1999 Permit regarding efforts to eliminate excessive infiltration and inflow ("I/I") to the sewer systems in member communities that discharge to UBWPAD. These measures are appropriate because the reduction of I/I can abate sanitary sewer overflows ("SSOs"), as well as prevent violations of permit requirements at UBWPAD's facility.

In contrast to the September 1999 Permit, the proposed Permit Modification distinguishes to a greater extent between UBWPAD obligations and obligations of member communities. The Permit Modification directs UBWPAD to facilitate establishment of a working group to develop and implement strategies to eliminate excessive I/I. In addition, the proposed Permit Modification requires UBWPAD to submit to EPA and MADEP each year a summary of the progress of such effort during the prior year.

Although UBWPAD is responsible for submitting the annual report, EPA and MADEP anticipate that the information for the report will be provided by the member communities. Thus, UBWPAD is not responsible for generating information such as I/I quantities in member communities, a description of operation and maintenance programs implemented by member communities, and the amount of funding allocated by member communities to I/I evaluation, planning, design and construction.

EPA and MADEP hope that efforts to reduce excessive I/I will occur as a result of a cooperative effort among UBWPAD and its member communities. However, the proposed Permit Modification provides that if at any time EPA and MADEP are not satisfied with the progress of such cooperative efforts, they may reopen this permit to add more detailed I/I planning and remediation requirements, including adding the member communities as co-permittees directly regulated under the Permit. In addition, EPA and MADEP always retain their rights to respond to violations of legal requirements through enforcement. For example, EPA and/or MADEP may focus enforcement actions on communities which have illegal SSOs and yet have not implemented effective SSO control plans.

EPA may issue regulatory changes regarding SSOs which may address requirements for regulation of regional sewer system member communities. The reopener in the proposed Permit Modification, however, would allow EPA and MADEP to reopen the permit independent of any such regulatory changes. On the other hand, if good progress is made in this Permit, EPA and MADEP may hold off adding additional requirements to this Permit.

Development of Local Limits for Industrial Users

The September 1999 Permit requires UBWPAD to develop and enforce specific effluent limits (local limits). The 1999 Permit required UBWPAD to submit a local limits report within three months of the effective date of the permit and incorporate comments in a letter from EPA dated May 16, 1997. UBWPAD challenged this provision of the permit in its appeal.

EPA, MADEP and UBWPAD have continued to discuss the requirements of the local limits report. UBWPAD submitted a proposal for the report on September 6, 2000, and EPA commented on the proposal by letter dated October 10, 2000. UBWPAD then submitted a draft report on April 13, 2001.

EPA and MADEP are proposing to modify the requirements of the local limits report in the permit to incorporate these ongoing discussions. Specifically, the draft Permit Modification requires that UBWPAD submit the final local limits report no later than 45 days after receipt of comments on the draft local limits report. The draft Modified Permit also specifies other requirements for the final report, including that UBWPAD develop its final report based on comments received by EPA and in accordance with EPA's Guidance Manual for the Development and Implementation for Local Discharge Limitation Under the Pretreatment Program (December 1987).

Sludge Conditions

The draft Permit Modification corrects those requirements of sludge monitoring that include continuous monitoring of moisture. None of these provisions are needed as UBWPAD monitors dry carbon monoxide ("CO") in lieu of total hydrocarbons ("THC").

EPA's regulations at 40 C.F.R. §503.44 require monitoring of THC for incinerators. 40 C.F.R. §503.40(c) states that the requirement to monitor THC does not apply if the facility monitors CO continuously. 40 C.F.R. §503.45(c) requires the operator of an incinerator to install an instrument to allow determination of moisture content. As UBWPAD has an instrument which corrects for moisture, i.e., the dry CO monitor, it is meeting the standard. Accordingly, the Permit Modification corrects conditions related to moisture correction in paragraphs I.F.3.b, I.F.4.b. and I.F.7.g.

Residual Chlorine Report

The 1999 Permit required submission of a report documenting the effectiveness of the chlorination and dechlorination systems within six months of the effective date of the permit. By letter dated February 5, 2001, and in subsequent discussions, UBWPAD has provided EPA and MADEP with information regarding current practices with respect to chlorination and dechlorination. UBWPAD also plans to implement improvements to its disinfection system as part of current facilities planning efforts to provide for an automated, more reliable system.

Accordingly, EPA and MADEP propose deleting the requirement for submittal of the initial chlorine report. EPA and MADEP have retained, however, the requirement in the Permit that UBWPAD submit annually a report summarizing all exceedances of the TRC and fecal coliform effluent limits during the previous year, the estimated or measured fecal coliform and chlorine discharge levels during the exceedance, and measures to fix the problem and to prevent future occurrences.

In addition, EPA and MADEP intend to continue to evaluate effluent chlorine reporting to determine whether continuous monitoring may be required in the future. The permit currently requires a single grab sample each day for reporting purposes. EPA's regulations at 40 CFR 122.41(j)(1) require that effluent sampling for daily monitoring reports (DMRs) be representative of effluent quality. In addition, any more frequent sampling conducted by the permittee using EPA approved methodologies must be reported on the DMRs. EPA and MADEP may require continuous monitoring in the future if sample results do not adequately represent typical effluent chlorine levels.

IV. State Certification Requirements

EPA may not issue a permit or a permit modification unless the State Water Pollution Control Agency with jurisdiction over the receiving waters certifies that the effluent limitations and conditions contained in the permit or permit modification 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 Division of Watershed Management has reviewed the draft Permit Modification and advised EPA that the limitations and conditions are adequate to protect water quality. EPA has requested permit modification certification by the State and expects that the draft Permit Modification will be certified.

V. Public Comment Period and Procedure for Final Decision

The settling parties have agreed to the terms of the proposed Permit Modification. All other persons 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 the U.S. EPA, Office of Ecosystem Protection, One Congress Street, Suite 1100 (SPA), Boston, Massachusetts 02114-2023. EPA and MADEP are only taking public comment on the parts of the Permit proposed to be modified. Since the rest of the Permit is not being reopened at this time, we are not taking public comment on any other parts of the Permit.

Any person, prior to the close of the public comment period, may submit a request in writing for a public hearing to consider the draft Permit Modification to EPA and the state agency. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. No public hearing has been scheduled at this time. Although there was significant public interest in the Permit, this Permit Modification has been agreed to by UBWPAD, the only party who appealed the Permit. Thus, EPA and MADEP do not expect that there is a significant public interest in this Permit Modification mandating a hearing. In reaching a final decision on the 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 permittee and each person who has submitted written comments or requested notice. Within 30 days following the notice of the final permit decision, any interested party may file an appeal to contest the final decision. Procedures for filing an appeal will be explained when the final Permit Modification is issued.

VI. EPA Contacts

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:

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Date: September 7, 2001

Linda Murphy, Director
Office of Ecosystem Protection
Environmental Protection Agency

ATTACHMENT A

WATER QUALITY BASED EFFLUENT LIMIT DERIVATION

Parameter: Total Ammonia Nitrogen

Water Quality Criteria: Freshwater - Chronic

Instream 7Q10 flow: 4.4 MGD
(For unnamed brook, calculated in previous permit)

Summer Instream 30Q10 flow: 4.4 x 1.4 = 6.2 MGD

Winter Instream 30Q10 flow: 6.2 MGD x 2 = 12.3 MGD

Plant Design Flow: 56 MGD

Design Flow Dilution:

$$\frac{\text{Design flow} + \text{Winter 30Q10 flow}}{\text{Design flow}} = \frac{56 + 12.3}{56} = 1.22 : 1$$

Effluent Limitations:

Monthly Average:

December to April 1.22 x 9.6 = 11.7 mg/l

November 1.22 x 7.9 = 9.6 mg/l

ATTACHMENT B

Hardness data from WET testing

<u>Date</u>	<u>Plant Hardness</u>	<u>River Hardness</u>	<u>Plant Flow</u>
1/4/98	83.5	74.4	37.2
4/5/98	80	44	46.2
7/5/98	87	48	38
10/4/98	67	106	24.5
1/10/99	61	51	36.7
4/11/99	81.8	59	34.7
7/11/99	63.7	86.3	23.9
7/25/99	65.6	72.9	25.5
10/3/99	85.5	73.2	27.9
1/9/00	80.9	59.3	31.8
4/2/00	86.2	52.9	43
7/16/00	62.8	40.2	47.5
Average:	75	64	34.7

ATTACHMENT C

METALS LIMITS DERIVATION

Parameters: Cadmium, Copper, Zinc

Water Quality Criteria: Hardness dependent; See equation below

$$e^{(X [\ln(h)] + Y)}$$

(Acute, specific coefficients for cadmium, copper, and zinc)

<u>Cadmium</u>	<u>Copper</u>	<u>Zinc</u>
Where: X = 1.128 Y = -3.6867	X = 0.9422 Y = -1.70	X = 0.8473 Y = 0.884

h = Hardness = 65 mg/l as CaCO₃
ln = natural logarithm

Thus;

$$e^{(1.128 [\ln(65)] - 3.6867)} = e^{(.9422 [(\ln 65)] - 1.70)} = e^{(0.8473 [\ln(65)] + 0.884)} =$$

2.8 ug/l

9.3 ug/l

83 ug/l

Flow Dilution: 1.1 : 1

Daily Maximum Effluent Limitations:

1.1 (2.8) =

1.1 (9.3) =

1.1 (83) =

3.1 ug/l

10 ug/l

91 ug/l