

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 THE WATERS OF THE UNITED STATES

NPDES PERMIT NO.: MA0040185

NAME AND ADDRESS OF APPLICANT:

**Massachusetts Water Resources Authority  
266 Boston Road  
Southborough, MA 01772**

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

**Massachusetts Water Resources Authority  
UV Test Facility at Winsor Dam Powerhouse  
Quabbin Reservoir and Winsor Dam  
Belchertown, MA 01007**

RECEIVING WATER: **Swift River** (Chicopee River Watershed, MA-36)

CLASSIFICATION: **Class B - Cold Water Fishery**

I. PROPOSED ACTION

The above named applicant has applied to the U.S. Environmental Protection Agency to issue an NPDES permit to discharge into the designated receiving waters. This is a new discharge. This permit, after it becomes effective, will expire two (2) years from the effective date, concurrent with other facilities in the Chicopee River Watershed.

II. TYPE OF FACILITY AND DISCHARGE LOCATION

The Winsor Dam Power Station currently serves as the head of the Quabbin Reservoir water release to the Swift River and the head for the Chicopee Valley Aqueduct (Figure 1).

The UV Test Facility at Winsor Dam Powerhouse is intended to conduct testing of ultraviolet (UV) water disinfection systems using Quabbin Reservoir water. The test water will then be discharged to the Swift River.

<b>Outfall</b>	<b>Description of Discharge</b>	<b>Outfall Location</b>
001	UV treated and chlorinated/dechlorinated Reservoir water	Swift River, Chicopee River Watershed

III. DESCRIPTION OF THE DISCHARGE

A quantitative description of the discharges based on information submitted by the permittee in the permit application is shown on Attachment A of this fact sheet.

IV. LIMITATIONS AND CONDITIONS

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

V. PERMIT BASIS AND EXPLANATION OF EFFLUENT LIMITATION DERIVATION

A. PROCESS DESCRIPTION

The UV Test Facility at the Winsor Dam Powerhouse will test ultraviolet (UV) water disinfection systems using a portion of the flow to the Swift River from the Quabbin Reservoir. Information from the test project may be used to design a possible future UV disinfection system for the Chicopee Valley Aqueduct drinking water.

The test system will consist of a three-channel configuration, which will flow in parallel with the minimum untreated main channel flow of 13.7 MGD (See Figure 2). One test flow path will include a 6 MGD medium-pressure UV reactor. A second flow path will include a 0.144 MGD low pressure, high output (LPHO) UV reactor. The third flow path will include a chlorine injection point for 1.0-1.4 mg/l chlorine as 10% sodium hypochlorite, and a second 0.144 MGD low pressure, high output reactor. Downstream of the second LPHO reactor will be an injection point for an ascorbic acid solution for the removal of chlorine from the 0.144 MGD flow. All flow paths will be combined with the 13.7 MGD main channel flow prior to discharge to the Swift River.

Water releases from the Quabbin Reservoir to the Swift River are required by the 1927 Acts of Massachusetts and a 1929 War Department permit. The minimum required release into the Swift River at Winsor Dam varies between 16 MGD and 70 MGD. The 1927 Acts of Massachusetts require that sufficient water be discharged from Quabbin Reservoir to provide at least 20 MGD at the Village of Bondsville, located five miles downstream of the Winsor Dam. At least 16 MGD must be released at Quabbin to satisfy this requirement (Swift River base flow contributes approximately 4 MGD). A 1929 War Department permit ties Winsor Dam discharges to low flows in the Connecticut River. Typically, about one-third of the time between June and November, 70 MGD is released from Winsor Dam. For the test period covered by this permit, MWRA will exceed its required releases to provide even greater dilution for treated flows. MWRA will discharge at least 20 MGD at Winsor Dam, exceeding the 1927 Acts of Massachusetts requirement. Further, during periods when Quabbin Reservoir's operating range is not in a drought warning or drought emergency stage as defined in MWRA's approved Drought Management Plan, and/or there is no demand on MWRA from non-MWRA communities due to DEP declared state of emergencies, MWRA will discharge 22 MGD.

B. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. Overview of Federal and State Regulations

The CWA requires that dischargers satisfy both minimum technology and water quality requirements. The minimum technology requirements which are presently applicable are found in Section 301(b) of the CWA. Section 301 (b)(1)(A) of the CWA requires the application of Best Practicable Control Technology Currently Available (BPT) with the

statutory deadline for compliance being, July 1, 1977, unless otherwise authorized by the CWA. Section (301)(b)(2) of the CWA requires the application of Best Conventional Control Technology for conventional pollutants, and Best Available Technology Economically Achievable (BAT) for non-conventional and toxic pollutants. The compliance deadline for BCT and BAT is as expeditiously as practicable, but in no case later than three years after the date such limitations are promulgated and no later than March 31, 1989.

Under 301(b)(1)(c) of the CWA, discharges are subject to effluent limitations based on water quality standards and to the conditions of State certifications under Section 401 of the CWA. Receiving stream requirements are established according to numerical and narrative standards adopted under State and/or Federal law for each stream use classification. Furthermore the permit must conform to the conditions established pursuant to a State certification under Section 401 of the CWA that meet the requirements of 40 CFR §124.53 and §124.55. EPA regulations pertaining to permit limits based upon water quality standards and state requirements are contained in 40 CFR §122.44 (d).

Section 101(a)(3) of the CWA specifically prohibits the discharge of toxic pollutants in toxic amounts. The State of Massachusetts has a similar narrative criteria in their water quality regulations that prohibits such discharges, see Massachusetts 314 CMR 4.05(e). The draft permit does not allow for the addition of chemicals in amounts which would produce a toxic effect to aquatic life.

The general conditions of the permit are based on 40 CFR §122.41 and consist primarily of management requirements common to all permits. The effluent monitoring requirements have been established to yield data representative of the discharge under authority of Section 308(a) of the CWA in accordance with 40 CFR §122.41(j), §122.44(i), and §122.48.

## 2. Water Quality Standards: Designated Uses

The Swift River is classified as a Class B water, cold water fishery in the Massachusetts Surface Water Quality Standards (314 CMR 4.00). Class B waters are designated as a habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation. They shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. The waters should have consistently good aesthetic value.

A cold 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 does not exceed 20° Celsius and, when other ecological factors are favorable (such as habitat), are capable of supporting a year-round population of cold water stenothermal aquatic life such as trout (Salmonidae).

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 facility design flow is used to calculate available effluent dilution.

The facility design flow is 6.3 million gallons per day, however, the chlorinated/dechlorinated flow is 0.144 MGD. The known 7Q10 flow is for a point downstream of the McLaughlin State Trout Hatchery. The minimum required untreated flow release is 13.7 million gallons per day. Assuming worst case conditions, no base flow was attributed to the Swift River at the point of discharge, the dilution factor is 138.

$$\frac{\text{Daily average design effluent flow} + \text{River flow (7Q10)}}{\text{Daily average design effluent flow}} = \text{Dilution}$$
$$\frac{0.144 + 19.8}{0.144} = 138$$

OUTFALL 001 - NON-CONVENTIONAL POLLUTANTS

Total Residual Chlorine – The test facility will inject chlorine into one of the 0.144 MGD channels. Chlorine will be injected at 1.0-1.4 mg/l concentration as 10% sodium hypochlorite. Following the injection point will be a low pressure, high output UV reactor. Downstream of the reactor will be an injection point for an ascorbic acid solution for chlorine removal. The chlorinated/dechlorinated channel flow will then be combined with the UV treated 6 MGD and 0.144 MGD flows and the untreated 13.7 MGD flow prior to discharge into the Swift River.

As cited in the application no more than 1 percent of the minimum river flow will be treated with chlorine. At normal river flows this percentage will be even less. Based upon 90% dechlorination efficiency calculations, chlorine discharge levels of 1.4 ug/l from the test facility will be less than half the NOEC (no observed effect concentration) value for trout fry. The dechlorination system will be designed for 100% removal of chlorine from the discharge flow stream. Automatic notification systems will be incorporated into the test system design to advise both the McLaughlin State Trout Hatchery personnel and local MWRA supervisors in the event of a high chlorine discharge residual.

Numerous safeguards have been proposed by the applicant to prevent exposure of the Swift River to unanticipated high levels of chlorine. These safeguards include:

- Dechlorination chemical injection must begin before the injection of chlorine is enabled.
- An adequate supply of dechlorination chemical must be available before chlorine may be injected.

- The chlorine concentration of the dechlorinated water will be continuously monitored. High levels will immediately interrupt chlorine injection.
- Upon high levels of chlorine in the discharge, the McLaughlin State Trout Hatchery will be immediately notified by an automated telephone message system. Additionally, MWRA personnel at the Ware Disinfection Facility and the Cosgrove Control Center will be automatically notified to verify positive isolation of the chlorine injection system.
- Critical monitoring and alarm equipment will be provided with an uninterruptable electric power supply.

The acute water quality criteria for total chlorine residual found in the December 10, 1998 National Recommended Water Quality Criteria (FR Vol. 63 No.237) is 19 ug/l and the chronic criteria is 11 ug/l.

This criteria would be attained, even if the dechlorination system were to fail, since calculations show that a maximum daily final effluent concentration of 10 ug/l would result if the facility used the maximum chlorine concentration (1.4 mg/l) when all treatment trains and the required Swift River flow are combined. This does not represent the concentration when the dechlorination is operational.

Dilution of Chlorine to the Combined Discharge

$$\frac{(0.144 \text{ mgd})(1.4 \text{ mg/l}) + (19.8)(0 \text{ mg/l})}{20 \text{ mgd}} = 0.01 \text{ mg/l}$$

Full Stream Concentration with No Dechlorination

$$1.4 \text{ mg/l} / 138 \text{ dilution factor} = 0.01 \text{ mg/l}$$

Full Stream Concentration at 90% Dechlorination Efficiency

$$0.14 \text{ mg/l} / 138 \text{ dilution factor} = 0.001 \text{ mg/l}$$

Chlorine compounds produced by the chlorination of wastewater can be extremely toxic to aquatic life. Due to the sensitive nature of the receiving water as a trout stream, the draft maximum daily limit is 50 ug/l, which is attainable by the proposed facility and is also the minimum level for total chlorine residual, representing the lowest concentration which can be reliably quantified. This value is the minimum level for chlorine using EPA approved methods found in the most currently approved version of Standard Methods for the Examination of Water and Wastewater, Method 4500 CL-E and G, or UNITED STATES ENVIRONMENTAL PROTECTION AGENCY Manual of Methods of Analysis of Water and Wastes, Method 330.5. One of these methods must be used to determine total residual chlorine. Sample results of 50 ug/l or less shall be reported as zero on the discharge monitoring report. Sampling shall be conducted following dechlorination and prior to mixing with other flows. Monitoring shall be continuous as mentioned previously in this fact sheet.

VI. ANTI-BACKSLIDING

EPA's anti-backsliding provision at 40 CFR §122.44(l) prohibit the relaxation of permit limits, standards, and conditions unless the circumstances on which previous permit was based have materially and substantially changed since the time the permit was issued. Therefore, technology based effluent limitations in the draft permit must be as stringent as those in the current permit. Relaxation of these limits is only allowed when cause for permit modification is met, see 40 CFR §122.62. Effluent limits based on BPI, water quality, and State Certification requirements must also meet the anti-backsliding provisions found in Section 402(o) and 303(d)(4) of the CWA.

VII. ANTI-DEGRADATION

The Massachusetts Anti-degradation Policy is found at Title 314 CMR 4.04. All existing uses of the Swift River must be protected. This permit is being issued to a new discharge. The public is invited to participate in the anti-degradation finding through the permit public notice procedure.

- (1) Protection of Existing Uses. In all cases existing uses and level of water quality necessary to protect the existing uses shall be maintained and protected.
- (2) Protection of High Quality and Other Significant Resource Waters. Certain waters shall be designated for protection under this provision in 314 CMR 4.06(2) and 4.06(3). These include waters whose quality exceeds minimum levels necessary to support national goal uses, low flow waters and other waters whose character cannot be adequately described or protected by traditional criteria. These waters shall be protected and maintained for their existing level of quality unless limited degradation by a new or increased discharge is authorized by the Department. Limited degradation may be allowed by the Department where it determines that a new or increased discharge is insignificant because it does not have the potential to impair any existing or designated water use and cause any significant lowering of water quality; also limited degradation may be allowed as provided in 314 CMR 4.04(4).
- (3) Protection of Outstanding Resource Waters. Certain waters shall be designated for protection under this provision in 314 CMR 4.06(3) including Public Water Supplies (314 CMR 4.06(1)(d)1.). These waters constitute an outstanding resource as determined by their outstanding socio-economic, recreational, ecological and/or aesthetic values. The quality of these waters shall be protected and maintained.
  - (a) Any person having an existing discharge to these waters shall cease said discharge and connect to a publicly owned treatment works (POTW) unless it is shown by said person that such a connection is not reasonably available or feasible. Existing discharges not connected to a POTW shall be provided with the highest and best practical method of waste treatment determined by the Department as necessary to protect and maintain the outstanding resource.
  - (b) A new or increased discharge to an Outstanding Resource Water is prohibited unless:
    - (i) the discharge is determined by the Department to be for the express purpose and intent of maintaining or enhancing the resource for its

designated use and a variance from this regulation is granted as provided in 314 CMR 4.04(4). The Department's determination to allow a new or increased discharge shall be made in agreement with the federal, state, local or private entity recognized by the Department as having direct control of the water resource or governing water use; or

- (ii) the discharge is dredged or fill material for qualifying activities in limited circumstances, after an alternatives analysis which considers the Outstanding Resource Water designation and further minimization of any adverse impacts. Specifically, a discharge of dredged or fill material is allowed only to the limited extent specified in 314 CMR 9.00 and 314 CMR 4.06(1)(d). The Department retains the authority to deny discharges which meet the criteria of 314 CMR 9.00 but will result in substantial adverse impacts to the physical, chemical, or biological integrity of surface waters of the Commonwealth.
- (4) Authorizations.
- (a) An authorization to discharge to waters designated for protection under 314 CMR 4.04(2) may be allowed by the Department where the applicant demonstrates that:
    - (i) The discharge is necessary to accommodate important economic or social development in the area in which the waters are located;
    - (ii) No less environmentally damaging alternative site for the activity, source for the disposal, or method of elimination of the discharge is reasonably available or feasible;
    - (iii) To the maximum extent feasible, the discharge and activity are designed and conducted to minimize adverse impacts on water quality, including implementation of source reduction practices; and
    - (iv) The discharge will not impair existing water uses nor result in a level of water quality less than that specified for the Class.
  - (b) An authorization to discharge to the narrow extent allowed in 314 CMR 4.04(3) may be granted by the Department where the applicant demonstrates compliance with 314 CMR 4.04(4)(a)2. through 4.
  - (c) Where an authorization is at issue, the Department shall circulate a public notice in accordance with 314 CMR 2.06. Said notice shall state an authorization is under consideration by the Department, and indicate the Department's tentative determination. The applicant shall have the burden of justifying the authorization. Any authorization granted pursuant to 314 CMR 4.04 shall not extend beyond the expiration date of the permit.
  - (d) A discharge exempted from the permit requirement by 314 CMR 3.05(4) (discharge necessary to abate an imminent hazard) may be exempted from 314 CMR 4.04(4) by decision of the Department.

- (5) A new or increased discharge specifically required as part of an enforcement order issued by the Massachusetts Department of Environmental Protection in order to improve existing water quality or prevent existing water quality from deteriorating may be exempted from 314 CMR 4.04(4) by decision of the Department.
- (6) Control of Eutrophication. From and after the date 314 CMR 4.00 become effective there shall be no new or increased point source discharge of nutrients, primarily phosphorus and nitrogen, directly to lakes and ponds. There shall be no new or increased point source discharge to tributaries of lakes or ponds that would encourage cultural eutrophication or the growth of weeds or algae in these lakes or ponds. Any existing point source discharge containing nutrients in concentrations which encourage eutrophication or growth of weeds or algae shall be provided with the highest and best practical treatment to remove such nutrients. Activities which result in the nonpoint source discharge of nutrients to lakes and ponds shall be provided with all reasonable best management practices for nonpoint source control.
- (7) Discharge Criteria. In addition to the other provisions of 314 CMR 4.00, any authorized discharge shall be provided with a level of treatment equal to or exceeding the requirements of the Massachusetts Surface Water Discharge Permit Program (314 CMR 3.00). Before authorizing a discharge all appropriate public participation and intergovernmental coordination shall be conducted in accordance with Permit Procedures (314 CMR 2.00).

#### VIII. 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 and advised EPA that the limitations are adequate to protect water quality. EPA has requested permit certification by the State and expects that the draft permit will be certified.

#### IX. COMMENT PERIOD AND PROCEDURES FOR FINAL DECISIONS

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 the U.S. EPA, MA Office of Ecosystem Protection (CMA), 1 Congress Street, Suite 1100, Boston, Massachusetts 02113-2023. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public hearing may be held after at least thirty days public notice, whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston Office.

Following the close of the comment period, and after a public hearing, if such hearing is held, the Regional Administrator will issue a final permit decision and forward a copy of the final

decision to the applicant and each person who has submitted written comments or requested notice.

X. 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:

Michele Cobban Barden  
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(617)918-1539

Linda M. Murphy, Director  
Office of Ecosystem Protection  
U.S. Environmental Protection Agency

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Date

No attachments provided electronically