

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
ONE CONGRESS STREET, SUITE 1100 (CMP)
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. MA0102148

NAME AND ADDRESS OF APPLICANT:

**Town of Belchertown Department of Public Works
290 Jackson Street, P.O. Box 670
Belchertown, Massachusetts 01007 - 0670**

NAME AND ADDRESS OF THE FACILITY WHERE THE DISCHARGE OCCURS:

**Belchertown Water Reclamation Facility
175 George Hannum Road
Belchertown, Massachusetts 01007**

RECEIVING WATERS: Lampson Brook - CODE 34/CONN

CLASSIFICATION: B

I. Proposed Action, Type of Facility.

The Town of Belchertown, Department of Public Works, has requested that the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MADEP) reissue its National Pollutant Discharge Elimination System (NPDES) permit to discharge into the designated waters. The Town owns and operates an advanced wastewater treatment facility with a design flow of one million gallons per day (MGD). A facility upgrade, expanding the treatment plant capacity and improving the level of treatment, was completed in late 2000. Figure 1, showing the site location is attached.

Receiving Water

The discharge is to Lampson Brook, which has been classified as a Class B waterway by the state. The designated uses for a Class B water include: habitat for fish, other aquatic life, and wildlife, and primary and secondary contact recreation. Where designated, it shall be suitable as a source of public water supply with appropriate treatment. It shall be suitable for irrigation and other agricultural uses and other compatible industrial cooling and process uses. These waters shall have consistently good aesthetic value. Lampson Brook is listed on the 1998

Massachusetts 303(d) list of waters not attaining surface water quality standards. The 303(d) list identifies the pollutants/stressors as unionized ammonia, chlorine, nutrients, and organic enrichment/low dissolved oxygen. Lampson Brook discharges to Weston Brook, which discharges to Forge Pond. Both of these water bodies are also on the 1998 303(d) list. Weston Brook's pollutant/stressors are the same as those listed for Lampson Brook with the addition of pathogens. The pollutants/stressors for Forge Pond are listed as nutrients and noxious aquatic plants. It is expected that the water quality violations have been reduced or eliminated with the completion of the upgraded treatment plant. However there have been no stream surveys conducted to verify this assumption.

Permit History

The existing permit was issued on July 11, 1997 and expired on August 10, 2000, but has remained in effect under the Administrative Procedures Act as the permittee made a timely application for renewal. EPA reissued the permit on December 28, 2000, but the Town appealed certain conditions of the permit, which stayed its effective date. EPA subsequently withdrew the 2000 permit (the "withdrawn permit") on January 10, 2001, pursuant to 40 CFR Section 124.19(d), so that the withdrawn permit was never in effect. The appealed conditions included the flow limit, the mass limits for BOD and TSS, the mass limits for total phosphorus, the copper limits, and the freshwater chronic toxicity procedure and protocol.

This draft permit contains essentially the same effluent limitations as were contained in the December 28, 2000 permit. EPA has included additional information in the fact sheet to support the contested limits, and MADEP has required that several of the contested limits be included as conditions for state certification pursuant to Section 401 of the Clean Water Act.

II. Description of Discharge

The effluent limitations of the draft permit and the monitoring requirements are found on the draft NPDES permit pages.

III. Permit Basis and Explanation of Effluent Limitation Derivation

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). Under Section 301(b)(1)(B) of the CWA, POTWs must have achieved effluent limitations based upon secondary treatment by July 1, 1977. The secondary treatment requirements are set forth at 40 CFR Part 133, and include effluent limitations for BOD, TSS, and pH.

Section 301(b)(1)(B) of the CWA requires discharges to achieve any more stringent limitations, including those necessary to meet water quality standards, by July 1, 1977. The Massachusetts Surface Water Quality Standards (314 CMR 4.00) include requirements for the regulation and control of toxic constituents and also require the EPA criteria, established pursuant to Section 304 (a) of the CWA, shall be used unless a site specific criteria is 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, and toxic) 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.

Anti-backsliding: 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 requirements of the CWA. The anti-backsliding provisions found in 40 CFR 122.44(l) prohibit the relaxation of permit limits, standards, and conditions. Therefore, the technology-based effluent limits in a reissued permit must be at least as stringent as those in the previous permit. Conditions for relaxing permit limits or exceptions to anti-backsliding, are found in Section 402 (o) of the CWA and 40 CFR §122.44(l). Effluent limits based on 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(l). Anti-backsliding does not apply to changes in settleable solids limits and maximum daily BOD and TSS limits based on new information not available at the time of the previous permit reissuance (40 CFR §122.44(l)(2)(i)(B)).

Anti-degradation: The Massachusetts Anti-degradation Policy is found at Title 314 CMR 4.04. All existing uses of Lampson Brook must be protected. This draft permit is being reissued with allowable discharge limits as or more stringent than the current permit with the exception of the limitations for settleable solids and maximum daily BOD and TSS. There is no change in outfall location. EPA anticipates that the MADEP will find that there is no significant degradation as a result of the relaxation of these limits and that all existing uses of the receiving water shall be protected. The public is invited to participate in the anti-degradation finding through the permit public notice process.

Limits Derivation

Flow

The flow limit is based on the design flow of the treatment plant, which is one MGD. The flow limit is now expressed as an annual average, rather than a monthly average as in the current permit. This change is being made to all POTW permits in MA at the request of MADEP. The purpose of this change was to allow some variation in POTW flows in response to wet weather, and in recognition that the flow rate used as the monthly average is in most cases presented in the treatment plant planning documents as an annual average. As part of this change in how flow limits are written, DEP and EPA agreed that mass limitations for BOD and TSS should be included as permit conditions to ensure that existing controls on mass discharges of BOD and TSS were maintained, in order to prevent degradation of the receiving water.

In its appeal of the withdrawn permit, the Town objected to EPA not stating that the change of the flow limit from a monthly average to an annual average was a correction rather than a change. The Town believed that an acknowledgment that the change in the flow limit was a correction would impact the antidegradation and antibacksliding arguments used as the basis for the monthly average and weekly average BOD and TSS mass limitations, “since the antibacksliding and antidegradation regulations allow for administrative corrections to NPDES Permits without impacting antidegradation or antibacksliding concerns¹”.

To provide some background, a treatment plant designer can establish a design flow for any time period, including yearly, monthly, daily, and hourly. A design flow is simply the flow rate which the designer establishes can be adequately treated over a given time period. Typically, a treatment facility can provide adequate treatment for higher flow rates for short periods than it can for long periods, meaning that design flow increases as the time period decreases. The annual average design flow is almost always provided in the planning documents for POTWs. Other design flow rates are not as consistently calculated or provided in planning documents. The Belchertown facilities plan estimates the annual average at 1 MGD. Belchertown has not presented a maximum monthly design flow.

Therefore, the previous use of an annual average flow as a monthly average limit provided some conservatism to the permit by not allowing the facility to operate at its maximum monthly hydraulic capacity. We believe that this was the intention of EPA and MADEP in limiting the flow in this manner, and was not an error, as the permittee has characterized it. We have now decided to loosen the flow limit somewhat, but have sought to balance this action by imposing mass limitations on the discharge of BOD and TSS to ensure that the easing of the flow restriction does not result in a significant increase of pollutants during months when the monthly average discharge flow exceeds the limit established in the current permit. We have also strengthened the I/I requirements of the permit to ensure that the permittee maintain efforts to minimize extraneous flows to the collection system.

BOD and TSS

Concentration limits

The BOD and TSS monthly average and weekly average concentration limits are the same as in the existing permit and are necessary to meet water quality standards. These limits were originally included in the permit issued on September 26, 1991 based on a March 28, 1991 wasteload allocation performed by the Massachusetts DEP. The maximum daily concentration limits have been removed, because MADEP no longer requires them as conditions of obtaining

¹ Quote is from the Town's February 7, 2001 permit appeal. While it is our position that the monthly average flow limit in the current permit is not an error, federal regulations found at 40 CFR Section 122.44(1)(2)(i)(B)(2) do provide an exception to antibacksliding regulations where the Administrator determines that technical mistakes or mistaken interpretations of law were made in issuing a permit. There is no such specific exception for mistakes in federal antidegradation regulations or in the state antidegradation policy.

state certification.

Mass Limits

The current permit does not contain an explicit condition establishing a mass limit for TSS or BOD. However, the current permit implicitly limits mass by establishing concentration limits for these pollutants and a flow limit. The current permit includes a monthly average flow limit of 1 MGD and monthly, weekly and maximum daily maximum concentration limits for BOD and TSS (the maximum daily concentration limits have been removed from the draft permit since the state no longer requires them as a condition for obtaining state certification). The mass limits in the withdrawn permit, and in this draft permit, were established using the monthly average flow limit of the current permit and the concentration limits for the corresponding period (i.e. the monthly average concentration limit was used to calculate the monthly average mass limit). As described in the *Flow* section, the mass limitations are included to maintain existing constraints on the mass discharge, which will ensure that there is no degradation of the receiving water during period when the treatment facility exceeds the flow limit in the current permit.

For example, the winter (November 30- April 30) monthly average limits for BOD and TSS in the current permit are 30 mg/l and the monthly average flow limit in the current permit is 1 MGD. The mass discharge, if the permittee is discharging at the monthly average limits is 250 lbs/day. This is the monthly average limit for this period in the draft permit. The mass limits for the other months were calculated in the same manner, using the same method.

pH

The pH range of 6.5 - 8.3 s.u. is based on state water quality standards and certification requirements under Section 401(a)(1) of the CWA, as described in 40 CFR 124.53 and 124.55.

Ammonia

The draft permit contains seasonal ammonia limits. These are;

	monthly average	weekly average	maximum daily
June through October	1 mg/l	1mg/l	1.5 mg/l
November through April	10 mg/l	10 mg/l	15 mg/l
May	7 mg/l	7 mg/l	10 mg/l

These limits are the same as the limits in the current permit, with a slightly changed end date for the summer period. (in the current permit, the summer period ends on October 15)

The seasonal limit of 1 mg/l comes from a MADEP March 18, 1991 wasteload allocation, and was initially incorporated into the September 26, 1991 permit for the period of April through October 15 along with winter (October 16 to March 31) limits of 3mg/l, 3 mg/l, and 4.5 mg/l for monthly average, weekly average and maximum daily. The change to the current limits was made based on MADEP recommendations that the limits in the 1991 permit were more stringent than necessary to meet water quality standards.

Fecal Coliform

The average monthly and maximum daily requirements for fecal coliform are based on state water quality standards and certification requirements under Section 401(a)(1) of the CWA, as described in 40 CFR 124.53 and 124.55.

Total Nitrogen

It has been determined that excessive nitrogen loadings are causing significant water quality problems in Long Island Sound, including low dissolved oxygen. The State of Connecticut has begun to impose nitrogen limitations on Connecticut discharges to Long Island Sound and its tributaries. EPA believes there is a need to determine the loadings of nitrogen from sources in Massachusetts which are tributary to Long Island Sound, to determine whether these loadings are impacting the water quality in Long Island Sound, and to help determine what limits, if any, should ultimately be imposed on discharges in Massachusetts. Therefore, EPA has included once per month monitoring for ammonia, nitrite and nitrate, and TKN in the draft permit. The information submitted by the permittee will help to establish a database of nitrogen loadings, which can be used to quantitatively assess the impact of loading and transport of nitrogen to Long Island Sound. The data will provide a more sound decision making basis in the future decisions relating to nitrogen loadings to the Sound. No numerical limitations for these pollutants are established in the draft permit at this time.

Total Copper

The limits for total copper are based on the dissolved fraction as required by the Massachusetts Water Quality Standards but are converted to total recoverable limits in accordance with EPA regulations at 40 CFR Section 122.45(c). In the absence of a site specific conversion factor for determining how metals in the discharge partition between the particulate and dissolved phases in the receiving water, EPA guidance recommends using either a generic conversion factor, or assuming that the metals are all in the dissolved phase. The generic conversion factor was used in establishing the limits in the permit. If the metals were assumed to be all in the dissolved phase, the limit would have been more stringent since the dissolved criteria are more stringent than the total metals criteria.

While all of the dissolved metals may not be bio-available, a site specific criteria would have to be developed and adopted into the Massachusetts Water Quality Standards before permit limits could be modified. National guidance is available to any permittee that wants to pursue a criteria adjustment. In the proceedings for the withdrawn permit, the Town requested that EPA and MADEP include a statement in the permit that would clarify that the permit would be modified if there is sufficient data to indicate that the levels of copper in the discharge will not cause or contribute to any water quality standards violations. EPA and MADEP acknowledge that if site specific water quality criteria which would support a less stringent effluent limit are developed by the State and approved by EPA during the term of the permit, that this would constitute new information pursuant to 40 CFR Section 122.62(a)(2) and would be sufficient to support a request to modify the permit. Any modified limit must be consistent with anti-degradation

requirements.

Address WET

The limits for total recoverable copper were calculated by multiplying the available dilution by the chronic and acute criteria for each metal. These water quality criteria are found in December 10, 1998 National Recommended Water Quality Criteria (FR Vol. 63, No.237), which is the MA state-adopted water quality criteria. The limits for these metals, in addition to other limits found in the draft NPDES permit, are necessary to maintain current water quality standards established pursuant to Massachusetts State regulations. See **Attachment B** for these metal calculations.

Address feasibility (crib from a brief) e.g Ample precedent under the Clean Water Act establish that technological feasibility

Furnace AA is specified in the permit as the appropriate test method for measuring copper because the ML that this method provides is lower than the actual average monthly and maximum daily permit limits for copper (the ML for copper using Furnace AA is 3 ug/l). As previously stated, EPA has defined the ML as “the level at which the entire analytical system shall give recognizable signal and acceptable calibration points”. Certain MLs were established by EPA’s Region 1 Environmental Services Division for the purposes of NPDES permits. These MLs are usually higher than the minimum detection levels (MDLs) of test methods.

Phosphorus

To prevent the development of biological nuisances and to control accelerated or cultural eutrophication, total phosphates as P should not exceed 50 ug/l in any stream at the point it enters any lake or reservoir (EPA Water Quality Criteria for Water 1986). EPA and MADEP developed a phosphorous limit for the Belchertown WWTP NPDES permit to control eutrophication of Forge Pond . Information contained in the document entitled "Diagnostic/Feasibility Study for the Management of Forge Pond" published in February 1989, was used to develop the limit. See Attachment B for development of permit limit.

The appealed permit contained a monthly average effluent limitation on the mass discharge of phosphorus which is not in the current permit. This limit is retained in the draft permit. The Town appealed the mass limit on the basis that it is based on a monthly flow of 1 MGD rather than “adjusted to reflect the design maximum monthly flow conditions for the facility”. The Town did not state what it believes this flow rate should be. Given that the existing concentration limit of 0.25 was calculated from a mass loading of 2.08 lbs/day using a monthly average flow of 1 MGD (see Attachment B) we believe that the mass limit based on this flow limit is appropriate to ensure that there is no degradation of the downstream impoundment.

The phosphorus limit is a year-round limit in the current permit and we have retained that requirement in the draft permit. Limits are imposed on a year round basis in order to ensure normal seasonal improvements in water quality consistent with requirements of the Clean Water Act. Where it is demonstrated that cold temperatures result in an inability to achieve the limits in the winter period, relaxed limits are allowed during the winter period, provided that water

quality standards will still be achieved. Due to eutrophication concerns in the downstream lake and the potential for higher winter phosphorus loadings to accumulate in the sediments and contribute to the eutrophication problem, the limits will remain as year round, as recommended by MADEP in its March 28, 1991 wasteload allocation.

Whole Effluent Toxicity

Under Section 301(b)(1)(C) of the CWA, discharges are subject to effluent limitations based on water quality standards. The State Surface Water Quality Standards, include the following narrative statements and also require that EPA criteria established pursuant to Section 304(a)(1) of the CWA be used as guidance for interpretation of the following narrative criteria:

Waters shall be free from pollutants in concentrations or combinations that:

- (a) Exceed the recommended limits on the most sensitive receiving water use;
- (b) Injure, are toxic to, or produce adverse physiological or behavioral responses in humans or aquatic life; or
- (c) Exceed site-specific safe exposure levels determined by bioassay using sensitive species.

National studies conducted by the EPA have demonstrated that domestic sources contribute both metal and organic toxic constituents to POTWs. These constituents include metals, chlorinated solvents, aromatic hydrocarbons and other constituents.

EPA's Technical Support Document (TSD) for water quality-based pollutants control provides guidance concerning the control of toxicity and generally provides for a tiered approach to toxicity control for moderate and high factors of dilution. However, in considering uncertainty factors of specie sensitivity and effluent variability, the TSD recommends direct application of definitive toxicity testing. Therefore, based on the potential for toxicity from domestic contributions, the level of dilution at the discharge location, water quality standards and in accordance with EPA regulation and policy, the draft permit includes chronic and acute effluent toxicity limitations and monitoring requirements. **(See "Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants", 49 Fed. Reg. 9016 (Mar. 9, 1984); see also, EPA's Technical Support Document for Water Quality-Based Pollutants Control).** 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; and (3) pollutants for which there are inadequate chemical analytical methods or criteria can be addressed.

The dilution factor for the discharge at 7Q10 is 1.065. The MADEP Implementation Policy for the Control of Toxic Pollutants to Surface Waters requires that an acute toxicity limitation of $LC50 \geq 100\%$ be established for a discharger with this dilution factor, and that a chronic toxicity limit greater than or equal to the receiving water concentration (1/dilution factor) be established for a discharge with this dilution factor. A C-NOEC of 94%, which is 1/dilution factor has

therefore been included in the draft permit. See Attachment B for the calculation of this limit and Attachment A of the draft permit for the acute and chronic toxicity testing protocols.

The permittee shall conduct chronic and (modified acute) whole effluent toxicity testing four times per year in accordance with Part I.A.I. Footnote 8 of the permit. Typically, permittees are required to perform tests on two species, *Ceriodaphnia dubia* and *Pimephales promelas*. However, the existing permit issued three years ago did not include *Pimephales promelas* because toxicity data from the previous years revealed no violations of the acute and chronic toxicity limit for *Pimephales promelas*. Therefore, the proposed permit, consistent with the existing permit, does not require toxicity testing be performed on *Pimephales promelas*. The permittee is required to use only the specie *Ceriodaphnia dubia*.

Eliminated and Reduced Sampling

Total Residual Chlorine

The facility began using Ultraviolet (UV) light for disinfection during September 2000. Since chlorine is no longer used at the facility, effluent limits and monitoring requirements for total residual chlorine are not included in the draft permit.

Settleable Solids

Monitoring requirements and effluent limits for settleable solids are not included in the draft permit because the state no longer requires them as a condition for obtaining state certification.

BOD and TSS

The maximum daily limits for BOD and TSS are not included in the draft permit because they are no longer required as a condition for obtaining state certification.

Metals

Past monitoring data for aluminum, cadmium, chromium, lead, silver and zinc has shown that concentrations of these pollutants in the discharge are low enough that there is no reasonable potential to violate water quality standards for these pollutants. Therefore, monitoring requirements for these metals are not included in the draft permit.

IV. Essential Fish Habitat Determination (EFH):

Under the 1996 Amendments (PL 104-267) to the Magunson-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 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 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.

EPA and MA DEP have determined that a formal EFH consultation with NMFS is not required because the proposed discharge is meeting Gold Book Criteria and State Water Quality Standards and will not adversely impact EFH.

V. SLUDGE CONDITIONS

The permittee has reported that the sludge which is generated at the plant it is trucked off site for treatment at another facility that provides treatment. The receiving facility's name is Fitchburg WWTP located at 3 Lancaster Street, Fitchburg, MA 01420.

The draft permit requires the permittee to comply with all existing federal & state laws and regulations that apply to sewage sludge use and disposal practices and with the CWA Section 405(d) technical standards. However, with the current method of disposal, there are no applicable federal pollutant limitations applicable to this facility on sludge disposal. See Sludge Compliance Guidance to determine if any section is applicable to your sludge disposal method.

VI. STATE CERTIFICATION REQUIREMENTS

The staff of the State of 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.

VII. PUBLIC COMMENT PERIOD, AND PROCEDURES FOR FINAL DECISION

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to the U.S. EPA, Office of Ecosystem Protection, One Congress St., Suite 1100 (CPE), 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 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.

VIII. 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:

Victor Alvarez
Massachusetts Office of Ecosystem Protection- CPE
One Congress St., Suite 1100
Boston, Massachusetts 02114-2023.
Telephone: (617) 918-1572

September 5, 2003
Date

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

ATTACHMENT B
NPDES Permit No. MA0102148
BELCHERTOWN MASSACHUSETTS

Reclamation Facility; Design Flow: 1.MGD (1.547 CFS)
Receiving Water - LAMPSON BROOK
7 day/10 year low flow (7Q10) = 0.0646317 MGD (0.1 CFS)

Dilution (factor)¹ at outfall001 = (7Q10 stream flow + effluent design flow) ÷ effluent design flow
= (0.1cfs + 1.547 cfs) ÷ 1.547 = 1.065

METALS:

Total Recoverable Copper:

The limits for copper were calculated based on National Recommended Water Quality Criteria published in the Federal Register on December 10, 1998, with a hardness of 60 mg/l and a dilution factor of 1.065. The instream of 60 mg/l is from Whole Effluent Toxicity Reports conducted from 1/26/98 thru 2/22/01.

Water Quality Criteria for hardness-dependent metals (see equations below):

Acute Criteria (dissolved) = $\exp\{m_a [\ln(\text{hardness})] + b_a\}$ (CF)

Where: m_a = pollutant-specific coefficient
 b_a = pollutant-specific coefficient
 h = hardness of the receiving water = 58 mg/l as CaCO₃
 \ln = natural logarithm
CF = pollutant-specific conversion factor
(CF is used to convert total recoverable to dissolved metal)

Chronic Criteria (dissolved) = $\exp\{m_c [\ln(\text{hardness})] + b_c\}$ (CF)

Where: m_c = pollutant-specific coefficient
 b_c = pollutant-specific coefficient
 h = hardness of the receiving water = 58 mg/l as CaCO₃
 \ln = natural logarithm
CF = pollutant-specific conversion factor
(CF is used to convert total recoverable to dissolved metal)

Calculation - acute limit for copper :

$$m_a = 0.9422 \quad b_a = -1.7 \quad CF = 0.96$$

Acute criteria (dissolved) = $\exp\{0.9422 [\ln(60)] - 1.7\} (0.96) = 8.31 \text{ ug/l}$

Dilution Factor = 1.065

Effluent Limitation: = (8.31 ug/l x 1.065) = 8.85 ug/l (dissolved)

Total recoverable = 8.85 / CF = 8.85 / 0.96 = 9.2 ug/l *

* An inverse conversion factor is used to determine total recoverable metal. The EPA Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion (EPA- 823-B-96-007) is used as the basis for using the criteria conversion factor. National guidance requires that permit limits be based on total recoverable metals and not dissolved metals. Consequently, it is necessary to apply a translator in order to develop a total recoverable permit limit from a dissolved criteria. The translator reflects how a discharge partitions between the particulate and dissolved phases after mixing with the receiving water. In the absence of site specific data on how a particular discharge partitions in the receiving water, a default assumption that the translator is equivalent to the criteria conversion factor is used in accordance with the Translator Guidance.

Therefore the acute (maximum daily) water quality based limitation for Total Recoverable Copper is 9.2 ug/l.

Calculation - chronic limit for copper:

$$m_c = 0.8545 \quad b_c = -1.702 \quad CF = 0.96$$

Chronic criteria (dissolved) = $\exp\{0.8545 [\ln(58)] - 1.702\} (0.96) = 5.79 \text{ ug/l}$

Dilution Factor = 1.065

Effluent Limitation: = (5.79 ug/l x 1.065) = 6.17 ug/l (dissolved)

Total Recoverable = 6.17 / CF = 6.17 / 0.96 = 6.4 ug/l *

Therefore the chronic (monthly average) water quality based limitation for Total Recoverable Copper is 6.4 ug/l.

PHOSPHOROUS LIMIT

Major Forge Pond Inputs (1986 May - September average)

Mean Total Phosphorous

	<u>Mean Flow</u>	<u>ug/l</u>	<u>lb/day</u>
Bachelor Brook	6.5 cfs	13.6	0.48
Forge Pond Brook	2.6 cfs	35.3	0.49
Weston Brook	<u>3.7 cfs</u>	294.0	5.9
	12.8 cfs (8.3MGD)		

Allowable load to Forge Pond = 8.3 MGD (8.34 lbs/gallon) 0.05 mg/l P¹ = 3.46 lbs/d

Weston Brook NPS load = 2.0 MGD* (8.34) 0.024** mg/l P = 0.40 lbs/d

Allowable WWT P load = 3.46 lbs /d - 0.48 lbs/d - 0.49 lbs /d - 0.40 lbs /d = 2.08 lbs/d

Allowable WWTP P concentration = 2.08 lbs /d ÷ (8.34) 1.0 MGD = 0.25 mg/l

¹ Quality Criteria for Water 1986 (Gold Book)

* 2.0 MGD = Weston Brook flow - Belchertown WWTP flow (0.35 MGD)

** 0.024 mg/l = average of Bachelor Brook and Forge Pond Brook

CHRONIC WHOLE EFFLUENT TOXICITY LIMIT:

Chronic - No Observed Effect Concentration (C- NOEC) %

= effluent design flow ÷ (7Q10 flow + effluent design flow)

= 1.547 ÷ (0.1 + 1.547) = 0.939 = **94%**

**NPDES Permit No. MA0102148
ATTACHMENT C - DMR DATA
BELCHERTOWN MASSACHUSETTS**

MVDT NODI DMRR MVIO REXC MQAV MQMX RUNT MCMN MCAV MCMX RCUN PLFN
RFRQ RSAM

MA0102148 BELCHERTOWN WWTP

M LAMPSON BROOK

001A TREATMENT PLANT EFFLUENT

00300 OXYGEN, DISSOLVED (D) 6.0
MO AVG Daily MX

03/31/01 07/15/03 E00 00 9.7 12.5

MO AVG WKLY AVG DAILY MX

00310 BOD, 5-DAY (20 D) 5.0 7.5 7.5 MO AVG WKLY

AVG DAILY MX

06/30/01 - 07/15/03 E00 00 2.3 2.3 5.2

00310 BOD, 5-DAY (20 D) 15 15 20 MO AVG WKLY

AVG DAILY MX

05/31/01 - 07/15/03 E90 00 2.0 2.15 22

00310 BOD, 5-DAY (20 D) 30 30 45 01/31/01 02/15/01 E00 00 1.4 1.4

2.4 02/28/01 03/15/01 E00 00 0.86 0.86 1.6 03/31/01 04/16/03 E00 00

3.38 2.18 4 04/30/01 9 05/15/01 E00

04/30/02 05/16/02 E00 02 2.6 2.6 2.7 04/30/03 05/19/03 E00 1.7 2.4

2.4

00400 PH 6.5 8.3

MINIMUM MAXIMUM

03/31/01 - 07/15/03 E00 00 6.5 8.5

00530 SOLIDS,TOTAL SUSPENDED 30 30 45 MO AVG

WKLY AVG DAILY MX 03/31/01 04/17/01 E00 00 22 22 25 11/30/01 12/18/01

E00 00 5.1 5.1 7.6 12/31/01 06/07/02 E00 00 7 7 8 01/31/02

02/15/02 E00 00 7.4 7.4 12 02/28/02 03/18/02 E00 00 3.1 3.1 4.0

03/31/02 04/25/02 E00 00 6.9 6.9 7.2 04/30/02 05/16/02 E00 00 9.2 9.2

12 11/30/02 12/16/02 E00 00 10.5 10.5 19 12/31/02 01/14/03 E00

11 14.2 14.2

01/31/03 02/19/03 E00 00 8.9 17 17 02/28/03 03/17/03 E00 19.6 29

29

03/31/03 04/16/03 E00 17.8 19.9 19.9

04/30/03 05/19/03 E00 11 17.1 17.1

00530 SOLIDS,TOTAL SUSPENDED 15 15 20 MO AVG

WKLY AVG DAILY MX 06/30/01 07/16/01 E00 00 6 6 10 07/31/01 08/20/01

E00 00 3 3 3.5 09/30/01 10/17/01 E00 00 5.3 5.3 5.9 10/31/01

11/19/01 E00 00 4.2 4.2 8.2

08/31/01 09/15/01 E00 00 3.9 3.9 5.5 06/30/02 07/16/02 E00 00 5.6 5.6

8.3 07/31/02 08/19/02 E00 00 4.6 4.6 8.6 08/31/02 09/16/02 E00 00

3.4 3.4 8.6 09/30/02 10/17/02 E00 00 7.7 7.7 11.6 10/31/02 11/15/02 E00 00

11.0 11.0 13.1 06/30/03 07/15/03 E00 6.5 9.9 9.9

00530 SOLIDS,TOTAL SUSPENDED 20 20 30 MO AVG

WKLY AVG DAILY MX 05/31/01 06/18/01 E00 00 10.2 10.2 20 05/31/02 06/17/02

E00 00 6.3 6.3 9.7 05/31/03 06/16/03 E00 00 7.9 10.1 10.1 04/30/01

8 05/15/01 E00

05/31/01 8 06/18/01 E00

12/31/02 01/14/03 E00
 02/28/03 03/17/03 E00
 03/31/03 04/16/03 E00
 04/30/03 05/19/03 E00
 06/30/03 9 07/15/03 E00

00610 NITROGEN, AMMONIA TOTAL (AS 1 1 1.5 MO
 AVG WKLY AVG DAILY MX 06/30/01 07/15/01 E00 00 0.27 0.27 0.30 07/31/01
 08/20/01 E00 00 0.28 0.28 0.55 08/31/01 09/15/01 E00 00 0.2 0.2 0.22
 09/30/01 10/17/01 E00 00 0.21 0.21 0.25 10/31/01 11/19/01 E00 00 0.2
 0.2 0.2 06/30/02 07/16/02 E00 00 0.20 0.20 0.21 07/31/02 08/19/02 E00 00
 0.29 0.29 0.37 08/31/02 09/16/02 E00 00 0.2 0.2 0.2 09/30/02 10/17/02 E00
 00 <0.2 <0.2 <0.2 10/31/02 11/15/02 E00 00 <0.2 <0.2 <0.2 06/30/03
 07/15/03 E00 <0.2 <0.2 <0.2

00610 NITROGEN, AMMONIA TOTAL (AS 7 7 10 MO
 MO AVG WKLY AVG DAILY MX
 05/31/01 06/18/01 E00 00 0.2 0.2 0.2 05/31/02 06/17/02 E00 00 0.23
 0.23 0.33 05/31/03 06/16/03 E00 00 0.2 0.2 0.22 11/30/01 12/18/01 E00 00
 0.26 0.26 0.45 12/31/01 01/17/02 E00 00 0.2 0.2 0.2 12/31/02 01/17/02 E00
 00 0.2 0.2 0.2 04/30/01 05/18/01 E00 00 0.36 0.36 0.40 01/31/02
 02/15/02 E00 00 1.3 1.3 3.4 02/28/02 03/18/02 E00 00 0.325 0.325 0.63
 03/31/02 04/25/02 E00 00 0.24 0.24 0.29 04/30/02 05/16/02 E00 00 0.21
 0.2 0.26 11/30/02 12/16/02 E00 00 0.26 0.26 0.43 01/31/03 02/19/03 E00 00
 0.26 0.48 0.48 02/28/03 03/17/03 E00 0.21 0.24 0.24
 03/31/03 04/16/03 E00 0.20 0.20 0.20
 04/30/03 05/19/03 E00 0.20 0.20 0.20

34726 NITROGEN, AMMONIA, TOTAL (AS 10 10 15 MO
 AVG WKLY AVG DAILY
 01/31/01 02/15/01 E00 00 0.00 0.20 0.20 02/28/01 03/15/01 E00 00 0.34
 0.34 0.76

00620 NITROGEN, NITRATE TOTAL (AS

12/31/02 01/17/02 E00
 02/28/03 03/17/03 E00
 03/31/03 04/16/03 E00
 04/30/03 05/19/03 E00
 06/30/03 9 07/15/03 E00

0630 NITRITEPLUS NITRATE TOTAL 1 D

09/30/01 10/17/01 E00
 12/31/02 01/17/02 E00
 02/28/03 03/17/03 E00
 03/31/03 04/16/03 E00
 04/30/03 05/19/03 E00
 06/30/03 9 07/15/03 E00

00665 PHOSPHORUS, TOTAL (A 0.25 DELMON DELMON MO AVG
 01/31/01 02/15/01 E00 00 0.07 02/28/01 03/15/01 E00 00 0.14
 03/31/01 04/17/01 E90 01 0.35 04/30/01 05/18/01 E00 00 0.18
 05/31/01 06/18/01 E00 00 0.12 06/30/01 07/16/01 E00 00
 0.18 07/31/01 08/20/01 E00 00 0.16 08/31/01 09/17/01 E90 01
 0.54 09/30/01 10/17/01 E90 01 0.34 10/31/01 11/19/01 E00 00
 0.07 11/30/01 12/18/01 E00 00 0.07 12/31/01 01/17/02
 E00 00 0.06 01/31/02 02/15/02 E00 00 0.06 02/28/02
 03/18/02 E00 00 0.12 03/31/02 04/25/02 E00 00 0.24
 04/30/02 05/16/02 E00 00 0.13 05/31/02 06/17/02 E00 00 0.08

06/30/02	07/16/02	E00 00		0.15		07/31/02	08/19/02	E90 01		0.61
	08/31/02	09/16/02	E90 01		0.675		09/30/02	10/17/02	E90 01	
0.58		10/31/02	11/15/02	E00 00		0.196		11/30/02	12/16/02	E00 00
	0.07		12/31/02	01/17/02	E00		0.23			
01/31/03	02/19/03	E00 00		0.07		02/28/03	03/17/03	E00		0.18
03/31/03	04/16/03	E00		0.21						
04/30/03	05/19/03	E00		0.196						
05/31/03	06/16/03	E90 01		0.35		06/30/03	07/15/03	E00		0.23

01042 COPPER,TOTAL (AS CU) 8.1 DELMON 12.0

						MO AVG				DAILY MX	
01/31/01	02/15/01		41.1	41.1		02/28/01	03/15/01		38	38	
	03/31/01	04/17/01		35.2	35.2		06/30/01	07/16/01		12.4	12.4
	05/31/01	06/15/01		25.4	25.4		08/31/01	09/15/01		34.2	34.2
	09/30/01	10/15/01		17.7	17.7		10/31/01	11/19/01		15.4	

15.4

01042 COPPER,TOTAL (AS CU) 8.1 DELMON 12.0

						MO AVG				DAILY MX	
11/30/01	12/18/01		9.9	9.9		12/31/01	01/17/02		15.2	15.2	
	04/30/01	05/18/01		15.3	15.3		01/31/02	02/15/02		7.6	7.6
	02/28/02	03/18/02		16.4	16.4		03/31/02	04/25/02		18.2	18.2
	04/30/02	05/16/02		8.8	8.8		05/31/02	06/17/02		17.3	17.3
	06/30/02	07/16/02		7.2	7.2		07/31/02	08/19/02		11.1	
11.1		08/31/02	09/16/02		14.6	14.6		09/30/02	10/17/02		13.5
	13.5		10/31/02	11/15/02		27.2	27.2		11/30/02	12/16/02	5.0
	5.0		12/31/02	01/17/02		12.5	12.5				
01/31/03	02/19/03		12.7	12.7		02/28/03	03/17/03		21.2	21.2	
03/31/03	04/16/03		29.1	29.1							
04/30/03	05/19/03		14.9		---						
05/31/03	06/16/03		20.2	20.2		06/30/03	07/15/03		9.9	9.9	

50050 FLOW, IN CONDUIT OR THRU TREA 1.0 ---

						MO AVG				DAILY MX
03/31/01	04/17/01		0.435			04/30/01	05/18/01		0.501	
	05/31/01	06/18/01		0.199		06/30/01	07/16/01		0.305	
	07/31/01	08/20/01		0.334		08/31/01	09/17/01		0.344	
	09/30/01	10/17/01		0.367		10/31/01	11/19/01		0.256	
	11/30/01	12/18/01		0.187		12/31/01	01/17/02		0.207	
	01/31/02	02/15/02		0.188		02/28/02	03/18/02		0.181	
	03/31/02	04/25/02		0.203		04/30/02	05/16/02		0.188	
	05/31/02	06/17/02		0.227		06/30/02	07/16/02		0.211	
	07/31/02	08/19/02		0.170		08/31/02	09/15/02		0.148	
	09/30/02	10/17/02		0.179		10/31/02	11/15/02		0.186	
	11/30/02	12/16/02		0.213		12/31/02	01/17/02		0.251	
01/31/03	02/19/03		0.248			02/28/03	03/17/03		0.218	
03/31/03	04/16/03		0.513							
04/30/03	05/19/03		0.63							
05/31/03	06/16/03		0.491							
06/30/03	07/15/03		0.636							

74055 COLIFORM, FECAL GENERAL 200 400 400 MO

						GEO WKLY				DAILY MX		
04/30/01	9	05/15/01		19.2	19.2	21						
05/31/01	06/18/01			19.2	19.2	21		06/30/01	07/16/01	40 40 670		
	07/31/01	08/20/01		52.4	52.4	61		08/31/01	09/17/01	61.5 63		
72		09/30/01	10/17/01		27	27	T	10/31/01	11/19/01	41.8		
41.8	115		04/30/02	05/16/02		156	156	167	05/31/02	06/17/02		
45.8	45.8	98		06/30/02	07/16/02		79.4	79.4	150	07/31/02	08/19/02	
	67.6	67.6	90		08/31/02	09/16/02		46	46	86	09/30/02	10/17/02

	75	75	98	10/31/02	11/15/02		45	45	79	04/30/03	9	
05/19/03				--	--	--						
05/31/03	06/16/03			183	183	284	06/30/03	07/15/03		262	262	400
81010 BOD, 5-DAY PERCENT REMOVAL											85	MO AVG
	03/31/01	07/15/03										95
81011 SOLIDS, SUSPENDED PERCENT RE											85	MO AVG
03/31/01	07/15/03											88
001B QUARTERLY TOXICITY DATA												
TAA3B LC50 STAT 48HR ACU CERIODAPHN							100	DELMON				
DAILY MN WKLY AVG 1 02/28/06												
05/31/01	06/15/01											
08/31/01	09/15/01											
11/30/01	12/15/01											
02/28/02	04/25/02						100					
05/31/02	06/15/02						100					
08/31/02	10/17/02					100						
11/30/02	01/14/03			100								
02/28/03	03/17/03			100								
05/31/03	07/15/03			100								
TAA6C LC50 STAT 48HR ACU PIMEPHALES												
	05/31/01	06/15/01	E00									
11/30/02	01/14/03	E00										
02/28/03	03/17/03	E00										
05/31/03	07/15/03	E00										
TBP3B NOEL STATRE 7DAY CHR CERIODAP												
DAILYMNWKLYAVG 04/01/01 02/28/06							90	DELMON DELMON				
05/31/01	06/15/01	E00										
08/31/01	09/15/01	E00										
11/30/01	12/15/01	E00										
02/28/02	04/25/02	E00 00			100		05/31/02	06/15/02	E00 00		100	
	08/31/02	10/17/02	E00 00		100		11/30/02	01/14/03	E00		100	
02/28/03	03/17/03	E00		94								
05/31/03	07/15/03	E00		94								