UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND
ONE CONGRESS STREET, SUITE 1100 (CPE)
BOSTON, MASSACHUSETTS 02114-2023

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES.

NPDES PERMIT NO.: **MA0100340**

DATE OF PUBLIC NOTICE:

NAME AND ADDRESS OF APPLICANT:

Town of Templeton
Board of Selectmen
Baldwinville, MA 01346

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Reservoir Road
Baldwinville, MA 01346

RECEIVING WATER: **Otter River**
Millers River Watershed (Segment MA35-08)

CLASSIFICATION: **B (warm water fishery)**

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

The above named applicant has requested that the U.S. Environmental Protection Agency and the Massachusetts Department of Environmental Protection (DEP) reissue its NPDES permit to discharge 2.8 million gallons per day (MGD) of treated municipal and industrial wastewater from a secondary treatment facility to the Otter River. The treatment plant is undergoing a facility upgrade and a design flow reduction to 0.6 MGD.

Some portions of the March 25, 2004 reapplication and supplemental information submitted to EPA by the Templeton Sewer Commission are paraphrased in this document without further reference. All documents used in the preparation of the permit and fact sheet are part of the administrative record and are retained on file by EPA.

II. Description of Discharge

Current facility as permitted

The Templeton Publicly Owned Treatment Works (POTW) was designed to treat a combination of domestic sanitary wastewater from the sewered portion of the town and paper mill wastewater from the American Tissue Mills (ATM), located diagonally across the Otter River from the treatment plant. The collection system is separate sanitary and serves a population of 3,500. The paper mill ceased operation on September 30, 1995. ATM continued to operate the treatment plant until the Town took over operations in April of 2002. With the closure of the mill, the POTW is under loaded for organic waste. The plant takes in septage for revenue and to offset the loss of influent loading from ATM.

Flow from the sanitary collection system enters the plant headworks where it passes through a comminutor and grit chamber. The sanitary flow is measured by a Parshall Flume. Septage (up to 130,000 GPD) is received in two 8 ft diameter receiving tanks. The sanitary flow and septage are blended and sent to the 120 foot diameter primary clarifier for settling. Primary sludge is sent to a belt filter press after polymer addition. From the primary clarifier, flow goes to a 14 million gallon aerated lagoon. From the lagoon, flow goes to a 13 ft deep secondary clarifier and then through a calcium hypochlorite tablet chlorination system and on to a polishing clarifier. The polishing clarifier also acts as a chlorine contact chamber. Dechlorination is achieved by the addition of a constant feed of sodium bisulfite introduced near the effluent discharge. Flow is measured on the influent sanitary side with the septage flow added in to calculate an effluent total.

Proposed plant upgrade and reduction in design flow to 0.6 MGD

Flow enters the Headworks Building from the collection system and passes through the prefabricated screening and grit removal unit. The screen removes solids larger than 1/4 inch, grit (sand, etc.) settles to the bottom of the unit. Screenings and grit are automatically washed and conveyed to hoppers.

Flow exiting the headworks then enters the Sequencing Batch Reactor (SBR) by gravity for biological (secondary) treatment. SBR effluent decants by gravity into the adjacent flow equalization tank. The SBR discharges (decants) at a high rate. By providing flow equalization the size/capacity of the downstream treatment processes can be decreased. Following flow equalization, the flow enters the Process Building by gravity for tertiary treatment. Inside the Process Building the flow first passes through a cloth filter where particles down to 10 microns in size, including precipitated phosphorus, are filtered out.

Following the filter, treated wastewater passes through the ultraviolet light treatment unit where bacteria is disinfected to very low levels. Filter effluent then flows by gravity to the Otter River.

Septage is discharged from trucks into the Headworks Building through an outside hose connection. Once inside the building, septage flows through a manual bar screen and then an open channel where rocks and heavy debris settle out.

Septage exiting the headworks then flows to the septage storage tank by gravity. The purpose of the septage storage tank is to equalize the flow rate of septage entering the treatment process thereby reducing (evening out) the peak pollutant concentrations. The septage storage tank has an inlet baffle to help consolidate solid matter that settles out, and is aerated to keep the contents mixed. Septage is pumped from the tank to the Headworks at a controlled rate for treatment in combination with domestic wastewater.

Sludge, which is the concentrated solids byproduct of the SBR process, flows by gravity from the SBR to the sludge storage tank. The sludge storage tank allows the sludge to be further concentrated through gravity settling, and provides storage prior to dewatering and disposal. Aeration is provided in the tank for mixing and to prevent septic conditions from developing.

Sludge is pumped from the storage tank to the belt filter press located in the Administration Building, where it is dewatered and then transported to the landfill for final disposal.

Sodium Aluminate will be used to aid in phosphorus removal by promoting flocculation. Chemical feed points include: (1) SBR influent; (2) equalization tank influent; and (3) cloth filter inlet. [March 24, 2004 memo from Mark Thompson, SEA Consultants]

III. Limitations and Conditions

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

IV. Permit Basis and Explanation of Effluent Limits Derivation

Brief history of recent NPDES actions

August 5, 1983	NPDES permit issued
November 23, 1987	NPDES reapplication submitted to EPAand DEP
August 4, 1989	Public notice of Draft NPDES permit
December 13, 1989	Public Hearing
March 22, 1991	NPDES permit reissued
September 30, 1999	NPDES permit reissued
Augusta 8, 2002	DEP Administrative Consent Order (ACO) No. ACO-02-1019
July 23, 2004	EPA notice of application deficiency sent to Town
August 17, 2004	Site visit by Doug Corb, EPA
October 8, 2004	Application effluent metal sample results received by EPA
October 21, 2004	Application priority pollutant sample results received by EPA
October 30, 2004	NPDES permit expired

The Clean Water Act (CWA or the Act) prohibits the discharge of pollutants to waters of the United States without an NPDES permit unless such a discharge is otherwise authorized by the Act. A NPDES permit is used to implement technology based and water quality based effluent limitations as well as other requirements including monitoring and reporting. This draft NPDES permit was developed in accordance with statutory and regulatory authorities established pursuant to the Act. The regulations governing the NPDES program are found in 40 CFR Parts 122, 124 and 125.

Waterbody Classification, Usage and current Water Quality

The Otter River is classified as Class B waterbody and warm water fishery by the Massachusetts Surface Water Quality Standards, 314 Code of Massachusetts Regulations [314 CMR 4.05(3)(b)] which states that Class B waters have the following designated uses:

> *"These waters are designated as habitat for fish, other aquatic life and wildlife, and for primary and secondary contact recreation. Where designated they shall be suitable as a source of public water supply with appropriate treatment. They shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. These waters shall have consistently good aesthetic value."*

Warm water fisheries are defined as those waters in which the maximum mean monthly temperature generally exceeds 68 degrees F (20 degrees C) during the summer months and that are not capable of a year-round population of cold water stenothermal aquatic life.

The report titled, Millers River Watershed 2002 Water Quality Assessment Report, provides a summary of current water quality data and information for the Otter River and watershed. The Templeton POTW discharge is located in segment MA 35-08, a 5.5 mile segment of the Otter River from the Seaman Paper Dam to the confluence with the Millers River in Winchendon.

> *The headwaters of the Otter River originate in the wetland areas of Hubbardston, Templeton, and Gardner. The river slowly meanders through the marshy areas of Gardner passing under Routes 2 and 2A where it receives the effluent from the Gardner WWTP. It then flows under Route 101 and meanders past sand and gravel operations before entering the impoundment at Seaman Paper Company. The paper company's treatment plant discharges a short distance below the dam. The river enters a short rapid section before entering another impounded area formed by the partially breached dam at the old Baldwinville Products Mill. Just below the old dam the Templeton WWTP discharges to the river.*
>
> *The velocity of the river picks up as the river flows through Baldwinville passing under Route 68. The river then enters the wetlands in the Otter River State Forest and continues for three miles before emptying into the Millers River. The USGS operates one gage on the Otter River at the Turner Street Bridge in Templeton. The drainage area here is 34.2 mi^2 with an average discharge of 53 cfs. The river can be generally characterized as sluggish, having an average fall of about 9 feet per mile.* (Millers River 2002 Water Quality Assessment Report, DEP, Page 13)

Section 303(d) of the Federal Clean Water Act (CWA) requires states to identify those water-bodies that are not expected to meet surface water quality standards after the implementation of technology-based controls and, as such require the development of total maximum daily loads (TMDL). The Massachusetts 2002 Integrated List of Waters, Combined CWA Section 305(b) and 303(d) Report, lists the pollutants requiring a TMDL in Otter River Segment MA35-08 as: priority organics, metals, nutrients, organic enrichment/low DO, salinity/TDS chlorides, other habitat alterations, and pathogens. The Templeton WWTP is in this segment. The upstream segment, MA35-07, which runs from the Gardner WWTP to the Seaman Paper Dam, is also on the 303(d) list for nutrients, organic enrichment/low DO, and other habitat alterations.

Municipal Wastewater Treatment Facility [also referred to as "Publicly Owned Treatment Works" or POTW Discharges] Effluent Limits Regulatory Basis

The Massachusetts Surface Water Quality Standards, 314 CMR 4.00, include the requirements for the regulation and control of toxic constituents and require that EPA criteria established pursuant to Section 304(a) of the CWA shall be used unless site specific criteria are established. The state will limit or prohibit discharges of pollutants to surface waters to assure that surface water quality standards of the receiving waters are protected and maintained or attained.

The permit must limit any pollutant or pollutant parameter (conventional, non-conventional, toxic, and whole effluent toxicity) that is or may be discharged at a level that caused, or has reasonable potential to cause, or contributes to an excursion above any water quality criterion [40 CFR §122.44(d)(1)]. An excursion occurs if the projected or actual instream 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.

Also note that according to EPA regulations 40 CFR § 122.44(l), when a permit is reissued, effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards or conditions in the previous permit, unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued.

River Flow and Available Dilution Calculation

Water quality based limitations are established with the use of a calculated available dilution. Title 314 CMR 4.03(3)(a) requires that the effluent dilution be calculated based on the receiving water 7Q10 flow. The 7Q10 is the lowest observed mean river flow for 7 consecutive days, recorded over a 10 year recurrence interval. Additionally, the discharge design flow is used to then calculate the available effluent dilution as required by 40 CFR §122.45(b)(1). A revised dilution was calculated from data obtained from the U.S. Geological Survey (USGS) low-flow frequency statistics for gaging stations. The revised 7Q10 at the USGS gaging station 01163200 on the Otter River at the village of Otter River is 4.35 cfs for the period 1965 through 2004, with a drainage area of 34.1 square miles. Since the drainage area of the Otter River at Templeton is 44.1 square miles, the 7Q10 and dilution factor are recalculated below:

Current Templeton plant design flow = 2.8 MGD = 4.34 cfs
Future Templeton plant design flow = 0.6 MGD = 0.93 cfs

7Q10 at USGS Station 01163200 Otter River at , MA = 4.35 cfs; Drainage area = 34.1 mi^2

Drainage area at Templeton = 44.1 mi^2

7Q10 at Templeton = (44.1 mi^2 / 34.1 mi^2) (4.35 cfs) =5.63 cfs = 3.63 MGD

Dilution Factor in Current Permit Issued September 30, 1999 = **3.38**
Dilution Factor = (7Q10) + (plant design Q 2.8 MGD) / (plant design Q) = 3.63 MGD + 2.8 MGD /2.8 MGD = **2.3**
Dilution Factor = (7Q10) + (plant design Q 0.6 MGD) / (plant design Q) = 3.63 MGD + 0.6 MGD /0.6 MGD = **7.0**

Conventional Pollutants and Non-Conventional Pollutants

Flow

The Templeton POTW has a design flow of 2.80 MGD, with 2003 peak flows as high as 0.732MGD. The annual average flow for 2003 was 0.300 MGD.

The design flow is used in calculating effluent limits per 40 CFR § 122.45(b)(1). Flow will be reported as an annual average flow, using monthly average flows from the previous eleven months. This change is consistent with other Massachusetts POTW permits as they are reissued.

BOD & TSS

The draft permit includes average monthly percent removal BOD and TSS limitations which are based on the secondary treatment requirements in 40 CFR §133.102(a)(3).

The draft permit includes technology based average monthly and average weekly mass and concentration limitations carried forward from the current permit. These limits are based on the secondary treatment requirements found at 40 CFR §133. Calculations of maximum allowable loads for average monthly and average weekly BOD_5 and TSS are based on the following equation and (40 CFR §122.45 (f)):

L	=	C x DF x 8.34 Where,
L	=	Maximum allowable load in lbs/day
C	=	Maximum allowable effluent concentration for reporting period in mg/l. Reporting periods are average monthly, average weekly and daily maximum.
DF	=	Design flow of facility in MGD.
8.34	=	Factor to convert effluent concentration in mg/l and flow in MGD to lbs/day.

[30] x 2.8 x 8.34 = 701 lbs/day	Average Monthly BOD_5 and TSS Load
[45] x 2.8 x 8.34 = 1051lbs/day	Average Weekly BOD_5 and TSS Load
[30] x 0.6 x 8.34 = 150 lbs/day	Average Monthly BOD_5 and TSS Load
[45] x 0.6 x 8.34 = 225 lbs/day	Average Weekly BOD_5 and TSS Load

The frequency of monitoring for BOD and TSS remains at 2/Week.

History of NPDES Permit Limits for BOD and TSS				
Permit signed **August 5, 1983**: Q = 2.81 monthly average				
Parameter	Season	Average Monthly	Average Weekly	Maximum Daily
BOD	July 1-October 31	**********	**********	1100 lbs
BOD	November 1- June 30	1882 lbs	**********	3623 lbs
TSS	July 1-October 31	1250 lbs	**********	2500 lbs
TSS	November 1- June 30	2592 lbs	**********	4815 lbs
Permit signed **March 22, 1991**: Q = 2.8 monthly average				
BOD	May 1-October 31	700 lbs	**********	1000 lbs
BOD	November 1- April 30	1600 lbs	**********	2560 lbs
TSS	May 1-October 31	1000 lbs	**********	2000 lbs
TSS	November 1- April 30	2000 lbs	**********	3500 lbs
Permit signed **September 30, 1999**: Q = 2.8 monthly avg				
BOD	Year Round	30 mg/l 701 lbs	45 mg/l 1051 lbs	**********
TSS	Year Round	30 mg/l 701 lbs	45 mg/l 1051 lbs	**********
Draft Permit: Q = 2.8 annual average				
BOD	Year Round	30 mg/l 701 lbs	45 mg/l 1051 lbs	**********
TSS	Year Round	30 mg/l 701 lbs	45 mg/l 1051 lbs	**********
Draft Permit: Q = 0.6 annual average				
BOD	Year Round	30 mg/l 150 lbs	45 mg/l 225 lbs	**********
TSS	Year Round	30 mg/l 150 lbs	45 mg/l 225 lbs	**********

pH

The pH limits in this draft permit are more stringent than the requirements found in 40 CFR §133.102(c). The limits are based on the state water quality standards for Class B waters [314 CMR 4.05(3)(b)], which specify a pH range of 6.5 to 8.3 S.U.. The frequency of monitoring remains at 1/day.

Total Residual Chlorine (TRC)

The chlorine and chlorine compounds produced by the chlorination of wastewater can be extremely toxic to aquatic life. The instream chlorine criteria for the Otter River are based on the chronic and acute values defined in the EPA Quality Criteria for Water as revised in the Federal Register on: December 27, 2002, Volume 67, Number 249) and as adopted by the MA DEP into the Massachusetts *Surface Water Quality Standards* (314 CMR 4.00). These standards specify the average Total Residual Chlorine in the receiving water should not exceed 11 ug/l for chronic toxicity effects, and 19 ug/l to protect aquatic life from acute toxicity.

The Templeton POTW uses a sodium hypochlorite tablet system to provide seasonal disinfection of the treated wastewater and dechlorination by sodium bisulfite prior to discharge. TRC draft permit effluent limits are based on the TRC water quality criteria, the dilution factor based on the 7Q10 flow of the receiving stream, and the treatment facility's design flow.

The calculations for the criteria and draft permit limits are as follows:

EPA Quality Criteria for Water, (Chlorine) as adopted by the DEP into the state water quality standards, and as revised in the Federal Register: December 27, 2002 (Volume 67, Number 249)
Chlorine- Chronic criteria (CCC) in freshwater = 11 ug/l
Chlorine- Acute criteria (CMC) in freshwater = 19 ug/l

TRC Limits (based upon design flow)

Average monthly limit = (CCC) x (Dilution Factor) = (11 ug/l)(2.3) = 26 ug/l = 0.025 mg/l
Maximum daily limit = (CMC) x (Dilution Factor) = (19 ug/l) (2.3) = 46 ug/l = 0.044 mg/l

There are no TRC limits calculated for the period after the facility upgrade as ultraviolet disinfection shall be used in place chlorine.

Fecal Coliform

The fecal coliform limits are based on state water quality standards for Class B waters [314 CMR 4.05(b)]. The draft permit allows seasonal for disinfection (April 1 -October 31), based on 318 CMR 4.05(3)(b)(4). Note that the draft permit includes a requirement that the fecal coliform samples shall be taken at the same time the daily total chlorine residual sample grab is collected, where applicable, until UV disinfection is brought online. The frequency of monitoring remains at 3/week.

Metals

EPA is required to limit any pollutant that is or may be discharged at a level that caused, or has reasonable potential to cause, or contributes to an excursion above any water quality criterion as specified in the EPA Quality Criteria for Water, as adopted by the DEP into the state water quality standards, and as revised in the Federal Register: December 27, 2002 (Volume 67, Number 249).

Because some metals can be toxic to aquatic life at low concentrations, applicable effluent limitations were compared to past monitoring data to determine if there is a reasonable potential to cause, or contribute to, a violation of water quality.

Total Aluminum

The Acute (CMC) criteria for total aluminum is 750 ug/l. The effluent data, adjusted for dilution, demonstrates no reasonable potential (RP) for total aluminum concentration to exceed the in-stream CMC criteria. The effluent data does show RP to exceed the Chronic (CCC) criteria of 87 ug/l in the Otter River, therefore, the draft permit includes a daily maximum total aluminum limit of 200 ug/l.

(CCC - 87 ug/l)(2.3 dilution) = 200 ug/l

The draft permit includes a maximum daily total mass limit of 4.9 lbs based on the provisions of 40 CFR §122.45(f). (0.200 mg/l)(8.34)(2.8 MGD) = 4.7 lbs
The whole effluent toxicity testing (WET) protocol (Permit Attachment A) requires analysis of the effluent for total aluminum. After the plant deign flow reduction to 0.6 MGD, the permittee shall be required to report monthly, total aluminum concentrations and loads. The permittee may use the information from the WET reports to satisfy this requirement for 4 of the 12 monthly sampling events when filling out the DMRs. If there is found to be reasonable potential for aluminum from the discharge to cause or contribute to an exceedance of the in-stream water quality criteria, EPA may reopen the permit to add chemical specific limits for total aluminum.

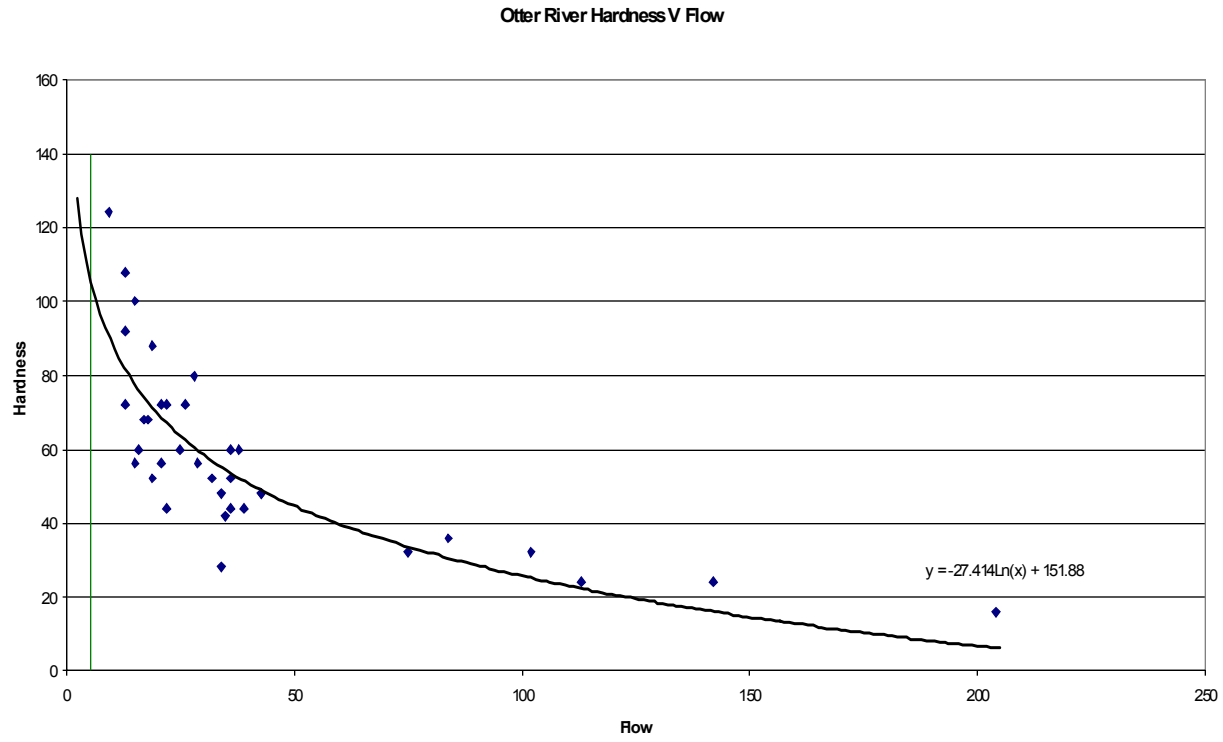
Total Copper

The maximum daily and average monthly total copper limits have been recalculated for this draft permit to account for in-stream hardness, planned changes to the design flow of the facility, and discharge monitoring report (DMR) data. The calculated maximum allowable total copper discharge concentrations at a plant flow of 2.8 MGD are a daily maximum of 44 ug/l (acute), and a monthly average of 28 ug/l (Chronic). After the plant upgrade and design flow decrease to 0.6 MGD, the calculated maximum allowable total copper discharge concentrations are a daily maximum of 109 ug/l (acute), and a monthly average of 72 ug/l (Chronic). All reported effluent concentrations from DMR data since August 2002 (See Fact Sheet Attachment A), meet these limits, however, the high variability in effluent copper concentrations demonstrate a reasonable potential for the discharges to cause or contribute to an exceedance of the state criteria for total copper as defined in 40 CFR §122.44(d). See calculation below:

Templeton POTW Effluent and Upstream Hardness as $CaCO_3$ from WET Reports

Date	Plant Effluent Hardness (mg/L as $CaCO_3$)	Plant Flow (MGD)	Otter River Hardness (mg/L as CaCO3)	Otter River Flow (CFS)
1/8/2002	120	0.3282	108	13
1/10/2002	136	0.2732	92	13
1/12/2002	140	0.2617	100	15
4/23/2002	172	0.3640	56	29
4/25/2002	160	0.3720	52	32
4/27/2002	148	0.3140	48	43
7/23/2002	196	0.3024	124	9.4
7/25/2002	208	0.2626	80	28
7/27/2002	200	0.1980	60	16
10/22/2002	216	0.2945	68	18
10/24/2002	200	0.2860	72	22
10/26/2002	220	0.2310	72	26
1/28/2003	188	0.2985	44	36
1/30/2003	208	0.3117	52	36
2/1/2003	192	0.2720	48	34
5/6/2003	200	0.3942	32	102
5/8/2003	200	0.3880	36	84
5/10/2003	204	0.3680	32	75
7/15/2003	228	0.2190	72	21
7/17/2003	220	0.2150	88	19
7/19/2003	208	0.2170	68	17
10/21/2003	232	0.3242	56	21
10/23/2003	208	0.3372	60	25
10/25/2003	228	0.2180	44	22
1/27/2004	152	0.2860	60	38
1/29/2004	172	0.2807	48	43
1/31/2004	168	0.2420	44	39
4/6/2004	148	0.4705	16	204
4/8/2004	164	0.4767	24	142
4/10/2004	148	0.3770	24	113
7/27/2004	200	0.3587	72	13
7/29/2004	204	0.3665	52	19
7/31/2004	196	0.3080	56	15

The average of the WET report effluent hardness values is 187 mg/l. The hardness concentration values from the dilution water samples collected from the Otter River, up-stream of discharge are plotted on the next page against the Otter River flow at the time the samples were taken. At a 7Q10 flow of 5.63 CFS, the projected upstream hardness is 100 mg/l.



The downstream hardness concentration is calculated as follows:

At a plant design flow of 2.8 MGD

$$C_r = \frac{Q_d C_d + Q_s C_s}{Q_r} = \frac{(2.8\text{MGD})(187\text{ mg/l}) + (3.63\text{ MGD})(100\text{ mg/l})}{(3.63\text{ MGD} + 2.8\text{ MGD})} = 138\text{ mg/l}$$

At a plant design flow of 0.6 MGD

$$C_r = \frac{Q_d C_d + Q_s C_s}{Q_r} = \frac{(0.6\text{ MGD})(187\text{ mg/l}) + (3.63\text{ MGD})(100\text{ mg/l})}{(3.63\text{ MGD} + 0.6\text{ MGD})} = 112\text{ mg/l}$$

Where:

Q_s = River flow upstream of plant
Q_d = Discharge flow from plant
Q_r = 7Q10 river flow measured downstream of the plant (upstream 7Q10 + plant Q)
C_s = Upstream river concentration
C_d = Plant discharge concentration
C_r = Receiving water concentration

EPA's Office of Water - Office of Science and Technology stated in a letter dated July 7, 2000, that: *The hardness of the water containing the discharged toxic metal should be used for determining the applicable criterion. Thus, the downstream hardness should be used.*

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 =138 or 112 mg/l as $CaCO_3$
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 = 138 or 112 mg/l as $CaCO_3$
ln = natural logarithm
CF = pollutant-specific conversion factor
(CF is used to convert total recoverable to dissolved metal)

Calculation - acute and chronic limits for total copper:

Where:

m_a = 0.9422	b_a = -1.700	CF = 0.960
m_c = 0.8545	b_c = -1.702	CF = 0.960

Acute criteria (dissolved) = $\exp\{0.9422 [\ln(138)] - 1.700\}$ (0.960) = 18.20 ug/l

Dilution Factor = 2.3

Effluent Limitation: = (18.20 ug/l x 2.3) = 41.86 ug/l (dissolved)
Total recoverable = 41.86 / CF = 41.86 / 0.960 = 43.60 ug/l ≈ **44 ug/l ***

Chronic criteria (dissolved) = $\exp\{0.8545 [\ln(138)] - 1.702\}$ (0.960) = 11.79 ug/l

Effluent Limitation: = (11.79 ug/l x 2.3) = 27.12ug/l (dissolved)
Total recoverable = 27.12 / CF = 27.12 / 0.960 = 28.3 ug/l ≈ **28 ug/l ***

(Concentration Limit in mg/l)(Design Flow in MGD)(Conversion Factor) = Mass Limit

(0.044 mg/l)(2.8 MGD)(8.34) = 1.0 lb/Day (Maximum daily)
(0.028 mg/l)(2.8 MGD)(8.34) = 0.7 lb/Day (Average Monthly)

After Plant Upgrade with a plant flow of 0.6 MGD, Dilution Factor of 7.0, and a river hardness of 112 mg/l as $CaCO_3$.

Acute criteria (dissolved) = exp{0.9422 [ln(112)] - 1.700} (0.960) = 14.95 ug/l

Effluent Limitation: = (14.95 ug/l x 7.0) = 104.65 ug/l (dissolved)
Total recoverable = 104.65 / CF = 104.65 / 0.960 = 109.01 ug/l ≈ **109 ug/l** *

Chronic criteria (dissolved) = exp{0.8545 [ln(112)] - 1.702 } (0.960) = 9.87 ug/l

Effluent Limitation: = (9.87 ug/l x 7.0) = 69.09 ug/l (dissolved)
Total recoverable = 69.09 / CF = 69.09 / 0.960 = 71.96 ug/l ≈ **72 ug/l** *

(Concentration Limit in mg/l)(Design Flow in MGD)(Conversion Factor) = Mass Limit

(0.109 mg/l)(0.6 MGD)(8.34) = 0.55 lb/Day (Maximum daily)
(0.072 mg/l)(0.6 MGD)(8.34) = 0.36 lb/Day (Average Monthly)

* 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. 40 CFR §122.45(c) 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.

Whole Effluent Toxicity

Under Section 301(b)(1) of the CWA, discharges are subject to effluent limitations based on water quality standards. The State Surface Water Quality Standards [314 CMR 4.05(5)(e)], include the following narrative statements and require that EPA criteria established pursuant to Section 304(a)(l) of the CWA be used as guidance for interpretation of the following narrative criteria:

> "All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife. Where the State determines that a specific pollutant not otherwise listed in 314 CMR 4.00 could reasonably be expected to adversely affect existing or designated uses, the State shall use the recommended limit published by EPA pursuant to 33 U.S.C. 1251 §304(a) as the allowable receiving water concentrations for the affected waters unless a site-specific limit is established. Site specific limits, human health risk levels and permit limits will be established in accordance with 314 CMR 4.05(5)(e)(1)(2)(3)(4)."

National studies conducted by the EPA have demonstrated that domestic sources contribute toxic constituents to WWTFs above those which may be contributed from industrial users. These pollutants include metals, chlorinated solvents, aromatic hydrocarbons and other constituents.

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 analysis; (2) bioavailability of pollutants after discharge is measured by toxicity testing including any synergistic effect of pollutants; and (3) pollutants for which there are inadequate analytical methods or criteria can be addressed. Therefore, toxicity testing is being used in connection with pollutant-specific control procedures to control the discharge of toxic pollutants.

In order to evaluate the toxicity of the Templeton discharge, the permittee is currently required to conduct acute (LC_{50}) and chronic (C-NOEC) whole effluent toxicity (WET) testing using one organism, the daphnid Ceriodaphnia dubia. The LC_{50} limit is $\geq$100%.

The current $\geq$30% chronic no observable effects concentration (C-NOEC) limit is the inverse of the receiving water concentration (1/3.38 X 100% = $\geq$30%). The C-NOEC limits in the draft permit are based on the two new dilutions: 1/2.3 X 100% = $\geq$42% and 1/7.0 X 100% = $\geq$14%.

The WET tests are required four times per year, during the months of January, April, July, and October, with results to be submitted by the last day of the following month. These months are chosen to be consistent with the Massachusetts Watershed Initiative and other facilities in the Millers River Watershed. Quarterly WET testing is carried forward in this draft permit. See Fact Sheet Attachment A for recent WET monitoring results.

WET testing shall be conducted in accordance with EPA Region I's Toxicity Test Procedure and Protocol found in **Attachment A** of the draft permit.

If toxicity test(s) using receiving water as dilutant show the receiving water to be toxic or unreliable, the permittee shall follow procedures outlined in the Toxicity Procedure and Protocol, Attachment A, Section IV. Dilution Water, in order to obtain permission to use alternate dilution water. In lieu of individual approvals for alternate dilution water required in Permit Attachment A, EPA-New England has developed a Self-Implementing Alternative Dilution Water Guidance document (called "Guidance Document") which may be used to obtain automatic approval of an alternate dilution water, including the appropriate species for use with that water.

The policy authorizes alternate dilution water use:

(1) in any WET test repeated due to site water toxicity. No prior notification to EPA is required for any current test that needs to be repeated due to site water toxicity; and

(2) in future WET tests where there are two previously documented incidents of site water toxicity associated with a particular test species. Written notification to EPA is required before switching to alternate dilution water testing for the duration of the life of the permit.

If this Guidance document is revoked, the permittee shall revert to obtaining approval as outlined in **Attachment A** of the draft permit.

The "Guidance Document" has been sent to all permittees with their annual set of DMRs and Revised Updated Instructions for Completing EPA's Pre-Printed NPDES Discharge Monitoring Report (DMR) Form 3320-1 and is not intended as a direct attachment to this permit. Any modification or revocation to this "Guidance Document" will be transmitted to the permittees as part of the annual DMR instruction package. However, at any time, the permittee may choose to contact EPA-New England directly using the approach outlined in **Permit Attachment A**.

Total Phosphorus

In freshwater systems including rivers, streams and impoundments, phosphorus is usually the limiting nutrient for primary production. Phosphorus promotes the growth of nuisance algae and aquatic plants and when these plants and algae undergo their decay processes, they generate odors and result in lower dissolved oxygen levels in the river and impair the fish community.

As noted earlier, the Massachusetts Year 2002 Integrated List of Waters indicates that the Otter River is in non-attainment of State Water Quality Standards for nutrients, organic enrichment/low dissolved oxygen.

No reasonably current total phosphorus (TP) data was available upstream of the POTW.

The Massachusetts Surface Water Quality Standards (WQS) (314 CMR 4.00) do not contain numerical criteria for TP. The 'criteria' for nutrients is found at 314 CMR 4.05(5)(c), which states that nutrients shall not exceed the site specific limits necessary to control accelerated or cultural eutrophication. The WQS require any existing point source discharge containing nutrients in concentrations which encourage eutrophication or growth of weeds or algae will ultimately require water quality limits based on a Total Maximum Daily Load (TMDL) study. If a TMDL is not available, non-watershed specific water quality limits or highest and best practical treatment (HBPT) limits shall be provided to remove such nutrients.

A TMDL study determines the maximum amount of a pollutant that a waterbody can receive and still meet WQS, and the allocations of that amount to the pollutant's sources, such as the Templeton POTW discharge.

Because a TMDL study for nutrients is not currently available for the Otter River, phosphorus limits must meet either non-watershed specific water quality based limits or a technology based HBPT limit. The DEP has established that, in the absence of a watershed specific TMDL review, a monthly average TP limit of 200 ug/l (or 0.2 mg/l) represents HBPT for municipal wastewater treatment facility effluent discharged to a nutrient impaired water body. The HBPT limit of 0.2 mg/l was derived from a literature search of generally accepted treatment technologies for the removal of phosphorus and is likely attainable by the existing treatment facility. Furthermore, EPA's Technical Transfer guidance published in 1987 (EPA 625/6-87/017) concludes that 0.2 mg/l is achievable with existing treatment technology.

EPA has produced several guidance documents which contain recommended total phosphorus criteria for receiving waters. The EPA's *Quality Criteria for Water 1986* (the Gold Book) recommends, in order to control eutrophication, in-stream phosphorus concentrations should be less than 100 ug/l (0.100 mg/l) in streams or other flowing waters not discharging directly to lakes or impoundments. More recently, EPA released Ecoregional Nutrient Criteria, established as part of an effort to reduce problems associated with excess nutrients in water bodies in specific areas of the country.

The published ecoregion-specific criteria represent conditions in waters minimally impacted by human activities, and thus representative of water without cultural eutrophication. Gardner is within Ecoregion XIV, Eastern Coastal Plains. The total phosphorus criteria for this ecoregion is found in *Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion XIV*, published in December, 2000, and is 24 ug/l (0.024 mg/l).

It is clear that the existing limits must be made more stringent to address the documented eutrophication problems in the receiving water. Given that the state has not yet adopted numerical water quality based phosphorus criteria, the draft permit will not establish limits based on the Gold Book or EPA Ecoregion guidance at this time, but will instead establish a monthly average TP limit on the discharge of 0.2 mg/l, based on HBPT as defined by the MA WQS.

While this limit will not ensure attainment of EPA's recommended Gold Book or Ecoregion guidance criteria, it will result in a significant reduction in phosphorus concentrations in the receiving water and will result in a receiving water concentration of about 0.09 mg/l at the dilution factor of 2.3 and 0.03 mg/l at the dilution factor of 7. The HBPT TP limit of 0.2 mg/l is a technology based limit; future permits may contain more stringent water quality based TP limits.

The monitoring frequency for the 0.2 mg/l TP limit is 2/week and is seasonal, with the season adjusted to April 1st through October 31st to be consistent with other downstream dischargers.

In addition to the seasonal total phosphorus limit of 0.2 mg/l, the permit contains a winter period total phosphorus limit of 1.0 mg/l during the period from November 1 through March 31st of each year. The winter period limitation on total phosphorus is necessary to ensure that the higher levels of phosphorus discharged in the winter period do not result in the accumulation of phosphorus in the sediments.

The limitation assumes that the vast majority of the phosphorus discharged will be in the dissolved fraction and that dissolved phosphorus will pass through the system given the short detention time of the impoundments and the lack of plant growth during the winter period. If future evaluations indicate that phosphorus may be accumulating in the impoundments, the winter period phosphorus limit may be reduced in future permit actions.

If, upon completion of a TMDL for nutrients based on a detailed study of eutrophication in the Otter River and its downstream impoundments, and a detailed analysis of the TP loading from the Templeton POTW, it is determined that either a higher or lower limit will result in compliance with WQS, then the EPA and DEP may exercise the reopener clause in Part II.A.4 (General Conditions) and modify the permit accordingly.

Total Ammonia Nitrogen

Nitrogen in the form of ammonia can be toxic to aquatic life. The toxicity level of ammonia depends on the temperature and pH of the receiving water.

Discharge Monitoring Report (DMR) data provided by the permittee for the period of January 1, 2001 through September 30, 2004 was compared to the EPA recommended aquatic life criteria for ammonia*, multiplied by the dilution factors, to establish whether "reasonable potential" exists for the POTW effluent to cause or contribute an in-stream exceedance of the State Water Quality Criteria concentrations. During July of 2002, Templeton reported an effluent ammonia concentration of 522 mg/l. More recently, ammonia concentrations have ranged from 1.7 to 50 mg/l.

> *EPA 1999 Update of Ambient Water Quality Criteria for Ammonia, Office of Water, EPA-822-R-99-014, December 1999
>
> The EPA recommended criteria are adopted into the State Water Quality Standards pursuant to 314 CMR §4.05(5)(c).

Historical DMR effluent pH data for the period, January 1, 2001 through September 30, 2004, recorded 5 occurrences of pH as high as 8.0 SU, with no reported values higher than 8.0 SU. There were six reported pH values of 7.9 SU during that same period. The highest reported effluent pH value (8.0 SU) shall be used in the calculation of ammonia limits.

A discharge limit for the period of November through May has been established to ensure that the ambient water quality criteria for ammonia toxicity is not exceeded. The applicable ambient chronic criteria for November through May is 2.43 mg/l based on a receiving water pH of 8.0, a receiving water temperature range of 0 - >14 degrees Celsius and the presence of early life stages of the most sensitive species used to derive the criteria (see EPA 1999 Update of Ambient Water Quality Criteria for Ammonia). The applicable ambient chronic criteria for June through October is 1.16 mg/l based on the same receiving water pH, the presence of early life stages, and a temperature range of 26 ->28 degrees Celsius. The summer maximum in-stream Otter River temperature of 27.5 degrees Celsius is derived from the Millers River Watershed 2002 Water Quality Assessment Report, Appendix A.

The acute criteria for ammonia are pH dependant, but are not temperature dependant. The acute ammonia criteria for a pH of 8 SU, with Salmonids present is 5.62 mg/l.

Total Ammonia Limits at a plant design flow of 2.8 MGD
Acute ammonia criteria, salmonids present, at a pH of 8.0 SU = (5.62 mg/l)(2.3 dilution) = **12.9 mg/l Daily Maximum year round**
Chronic ammonia criteria, early life stages present, at 0 - >14 degrees Celsius, and at a pH of 8.0 SU = (2.43 mg/l)(2.3 dilution) = **5.6 mg/l Average Monthly November through May**
Chronic ammonia criteria, early life stages present, at 26 >28 degrees Celsius, and at a pH of 8.0 SU = (1.16 mg/l)(2.3 dilution) = **2.7 mg/l Average Monthly June through October**
Total Ammonia Limits at a plant design flow of 0.6 MGD
Acute ammonia criteria, salmonids present, at a pH of 8.0 SU = (5.62 mg/l)(7.0 dilution) = **39.3 mg/l Daily Maximum year round**
Chronic ammonia criteria, early life stages present, at 0 - >14 degrees Celsius, and at a pH of 8.0 SU = (2.43 mg/l)(7.0 dilution) = **17.1 mg/l Average Monthly November through May**
Chronic ammonia criteria, early life stages present, at 26 >28 degrees Celsius, and at a pH of 8.0 SU = (1.16 mg/l)(7.0 dilution) = **8.1 mg/l Average Monthly June through October**

The monitoring frequency remains the same in the draft permit as in the current permit, at twice per week.

Nitrogen Monitoring: Total Nitrogen, Total Kjeldahl Nitrogen, Total Nitrate, Total Nitrite, and Ammonia Nitrogen:

It has been determined that excessive nitrogen loadings are causing significant water quality problems in Long Island Sound, including dissolved oxygen. The State of Connecticut has begun to impose nitrogen limitations on Connecticut discharges to Long Island Sound and its tributaries. EPA agrees there is a need to determine the loadings of nitrogen from sources in Massachusetts which are tributary to Long Island Sound, and to help determine what limits, if any should be imposed on discharges in Massachusetts. The Otter River flows into the Millers River, which in turn, flows into the Connecticut River and Long Island Sound. Therefore, based on Section 308 of the Clean Water Act, EPA has included quarterly requirements for testing for total nitrogen as Kjeldahl nitrogen, nitrate and nitrite, and ammonia in the draft permit. The information submitted by the permittee will help to establish a database of nitrogen loadings, which can be used quantitatively to assess the impact of loading and transport to Long Island Sound.

The monitoring data will provide a more sound decision making basis in any future decisions relating to nitrogen loadings to the Sound. This monitoring requirement may be removed by the agencies after sufficient data collection.

Effluent Monitoring

The effluent monitoring requirements have been specified in accordance with 40 CFR § 122.41(j), 122.44(i), and 122.48 to yield data representative of the discharge.

Anti-backsliding and Anti-degradation

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 under Section 402(o) and 303(d)(4) of the CWA, as described 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.

Effluent limits based on BPJ, water quality, and state certification requirements must also meet the anti-backsliding provisions found under Section 402(0) and 303(d)(4) of the CWA, as described in 40 CFR § 122.44(l).

Anti-backsliding does not apply to the discontinuance of settleable solids monitoring as the need to monitor this parameter is better measured by other means. The recalculated hardness values used in establishing whether there is a reasonable potential for the Templeton WWTP effluent to cause or contribute to an exceedance of the ambient in-stream criteria for total copper is new information that was not available when the permit limits were established in the current permit. The limits for total cooper are recalculated based on new information (recalculated hardness and dilution) and substantial and material changes to the treatment plant. Chlorine will not be used once UV disinfection is installed and therefore, the TRC limits shall be discontinued.

Total aluminum shall revert from a limit to a monitoring requirement based on the higher dilution and reduced reasonable potential for the effluent cause an in-stream exceedance of the State Water Quality Criteria for aluminum.

Effluent limits based on water quality and state certification requirements must also meet the anti-backsliding provisions found under 314 CMR 4.04 of the Massachusetts Anti-degradation Policy. All existing uses of the Otter River 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 limitation for total copper. There is no change in the outfall location. The Commonwealth of Massachusetts has indicated that there will be no lowering of water quality and no loss of existing water uses and that no additional anti-degradation review is warranted.

V. Operation and Maintenance of Wastewater Treatment and Related Facilities

The permit standard conditions for "Proper Operation and Maintenance" are found at 40 CFR § 122.41(e). These require proper operation and maintenance of permitted wastewater treatment systems and related facilities to achieve permit conditions. Similarly, the permittee has a 'duty to mitigate' as stated in 40 CFR § 122.41(d).

This requires the permittee to take all reasonable steps to minimize or prevent any discharge in violation of the permit which has a reasonable likelihood of adversely effecting human health or the environment. EPA and DEP maintain that these programs are an integral component of ensuring permit compliance under both of these provisions.

VI. Special Permit Conditions

Infiltration/Inflow Requirements

The draft permit includes requirements for the permittee develop a plan for the control of infiltration and inflow (I/I). Infiltration/inflow is extraneous water entering the wastewater collection system through a variety of sources. The permittee shall maintain an I/I removal program commensurate with the severity of the I/I in the collection system. Where portions of the collection system have little I/I, the control program will logically be scaled down.

Infiltration is groundwater that enters the collection system through physical defects such as cracked pipes or deteriorated joints. Inflow is extraneous flow entering the collection system through point sources such as roof leaders, yard and area drains, sump pumps, manhole covers, tide gates, and cross connections from storm water systems.

Significant I/I in a collection system may displace sanitary flow reducing the capacity and the efficiency of the treatment works and may cause bypasses to secondary treatment. It greatly increases the potential for sanitary sewer overflows (SSO) in separate systems, and combined sewer overflows in combined systems.

DEP has stated that the inclusion of the I/I conditions in the draft permit shall be a standard State Certification requirement under Section 401 of the Clean Water Act and 40 CFR § 124.55(b).

VII. Compliance Schedules

The reduction in design flow accompanied by the treatment plant upgrade will require time and testing to achieve the new more stringent water quality based limits. The draft permit provides an 18 month schedule for compliance with the new limits for total residual chlorine, ammonia nitrogen, and total phosphorus. 40 CFR Section 122.47 and Section 314:310(10) of Code of Massachusetts Regulations, Water Quality Standards, allow for schedules of compliance.

VIII. Sludge Information and Requirements

The Templeton WWTF generates approximately 35 metric tons of sludge annually. The waste sludge is landfilled at a sludge only monofill disposal site owned and operated by the town adjacent to the treatment plant.

Section 405(d) of the CWA requires that EPA develop technical regulations regarding the use and disposal of sewage sludge. These regulations are found at 40 CFR Part 503 and apply to any facility engaged in the treatment of domestic sewage. The CWA further requires that these conditions be implemented through permits. The sludge conditions in the draft permit are intended to implement these regulations.

The draft permit requires that sewage sludge use and disposal practices meet the CWA Section 405(d) Technical Standards. In addition, EPA New England has included with the draft permit a 72-page *Sludge Compliance Guidance* document for use by the permittee in determining their appropriate sludge conditions for their chosen method of sludge disposal.

The permittee is also required to submit to EPA an annual report containing the information specified in the *Sludge Compliance Guidance* document for the permittee's chosen method of sludge disposal.

IX. State Certification Requirements

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

The staff of the Massachusetts Department of Environmental Protection has reviewed the 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 permit will be certified.

X. Public Comment Period and Procedures for Final Decision

All person, including applicants, who believe any condition of the 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 **Doug Corb, U.S. EPA, 1 Congress Street, Suite 1100-CMP, Boston, Massachusetts 02114-2023 and Paul Hogan, Department of Environmental Protection, Division of Watershed Management, 627 Main Street, 2nd Floor, Worcester, MA 01608**. Any person, prior to such date, may submit a request in writing for a public hearing to consider the 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 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 decision to the applicant and each person who has submitted written comments or requested notice.

XI. EPA and MA DEP Contacts

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

Doug Corb
US Environmental Protection Agency
1 Congress Street
Suite 1100 - CMP
Boston, Massachusetts 02114-2023
Telephone: (617) 918-1565
Fax: (617) 918-0565
email: corb.doug@epa.gov

and

Paul Hogan
MA Department of Environmental Protection
Division of Watershed Management
627 Main Street, 2nd floor
Worcester, MA 01608
Telephone: (508) 767-2796
Fax: (508)791-4131
e-mail: paul.hogan@state.ma.us

July 7, 2005
Date

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

* Address comments to both Doug Corb and Paul Hogan