

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.: MA0101923

DATE OF PUBLIC NOTICE:

NAME AND ADDRESS OF APPLICANT:

Board of Sewer Commissioners  
P.O. Box 330  
Rockland, MA 02370

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Rockland Wastewater Treatment Plant  
South End of Concord Street  
Rockland, MA 02370

RECEIVING WATER: French Stream  
South Coastal Watershed (MA94-03)

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 2.5 million gallons per day (MGD) of treated municipal and industrial wastewater from an advanced secondary treatment facility to a man-made channel to the French Stream.

Some portions of the March 30, 2004 reapplication and supplemental information submitted to EPA by the Rockland 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.

The Rockland advanced secondary wastewater treatment facility has a design flow of 2.5 million gallons per day (MGD), with peak flows as high as 12 MGD. The annual average flow for 2003 was 2.7 MGD. The estimated average infiltration/inflow (I/I) flow is 0.2 MGD in the summer and 0.75 MGD in the winter. The facility provides treatment of domestic sanitary wastewater and industrial wastewater, with three significant industrial users. The plant serves a population of approximately 18,350 from the Towns of Rockland, Abington, Norwell, and Hingham. The collection system is separate with no known separate sewer overflows (SSOs).

## **II. Description of Discharge**

The facility is an advanced secondary treatment plant with seasonal phosphorus removal and nitrification. Raw wastewater enters the plant through an influent pump station followed by an aerated grit chamber. Flow then goes to a splitter box and to 4 primary settling tanks. From the settling tanks it flows to 8 nitrification tanks and two nitrification settling tanks. Flow bypasses 2 secondary aeration tanks and two secondary settling tanks. Many older plants with similar designs have been reconfigured to accomplish both secondary treatment and nitrification in the same units, rather than in two stages. After nitrification and secondary treatment, flow goes to 2 chlorine contact tanks followed by dechlorination. Chlorination is by sodium hypochlorite, with dechlorination by sodium bisulfite. The effluent is reaerated by passing over a cascade, and then flows to a 700 foot man-made channel which, in turn, flows into the French Stream.

When flow to the treatment plant exceeds the range of 6 to 6.5 MGD, excess flow is diverted by portable pumps to the surplus secondary aeration tanks and secondary settling tanks. The excess influent is fed back into the headworks when the high flows abate. During infrequent high flow events, the storage capacity is exceeded and flow is directed from the headworks and/or the manhole prior to the headworks and is sent directly to the chlorine contact chamber. Such bypasses are not permitted and must be reported pursuant to 40 CFR §122.41(m).

## **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*

April 1, 1982	NPDES Permit Issued
May 28, 1987	Public Notice of draft NPDES permit
June 29, 1987	CWA 401 Certification
July 8, 1987	NPDES permit reissued
September 28, 1990	Approval of pretreatment program
August 4, 1993	NPDES permit reissued
September 7, 1993	Request for Adjudicatory hearing: No schedule for TRC & WET, and can't meet Total Copper limits.
October 4, 1993	Petition to EAB for review of EPA denial of Evidentiary Hearing
August 4, 1994	Order denying review of Appeal No. 93-8
May 20, 1998	EPA application complete letter
March 12, 1999	Public Notice of draft NPDES permit
July 13, 1999	State CWA 401(a) certification
August 4, 1999	NPDES permit reissued
September 3, 1999	Request for evidentiary hearing
June 13, 2000	EPA denial of evidentiary hearing request
November 15, 2001	EPA issues an Administrative Order No. 02-01 to Town to address copper
March 28, 2002	EPA issues an Amended Administrative Order No. 02-10 to Town with interim copper limits
March 30, 2004	Re-application sent to EPA and DEP
July 28, 2004	EPA site visit
August 1, 2004	Aquarion takes over as contract operator of plant from CDM
October 28, 2004	EPA application complete letter sent to permittee
February 9, 2005	Pre-draft permit faxed to permittee
February 17, 2005	Comments from Metcalf and Eddy
March 10, 2005	Meeting at EPA Boston Office, M&E, Aquarion, DEP, and EPA
July 13, 2005	Current NPDES Permit Expires

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. An 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 French Stream is classified as a 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 *Commonwealth of Massachusetts South Coastal Watershed 1996 Draft Resource Assessment Report*, Page 31, provides a summary of current water quality data and information for the French Stream and watershed. This report notes that there is a need for additional water quality monitoring in the stream. *In stream monitoring including macroinvertebrate sampling, needs to be conducted to evaluate the effectiveness of this [dechlorination] and any other changes in the operation as a result of the new permit [August 4, 1993] for the WWTP.*

Section 303(d) of the Federal Clean Water Act (CWA) requires states to identify those waterbodies 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 DEP/Division of Watershed Management has also prepared the *Massachusetts Year 2002 Integrated List of Waters* [‘303(d) list’] which details the quality of waters in Massachusetts, including the French Stream. This report indicates that the river segment receiving the Rockland Wastewater Treatment Plant’s discharge, *Segment MA94-03, Headwaters on Southeast side of Naval Air Station, Rockland through Studley’s Pond to confluence with Drinkwater River, Hanover. Miles 5.9 - 0.0*, is listed for unknown toxicity, nutrients, organic enrichment/low DO, and pathogens.

The current permit states that the discharge is to a tributary to the French Stream. Schematic drawings of the facility indicate that the “tributary” is a man-made conveyance through an easement that passes through the adjoining farm to the French Stream. See 40 CFR §122.2: *Point source means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure....* The receiving water is therefore the French Stream, rather than a tributary to the French Stream.

***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. A revised dilution was calculated from data obtained from the U.S. Geological Survey (USGS) Streamflow Statistics web site, using the Streamstats v2.0 program. The resultant recalculated 7Q10 is 0.04 CFS. Additionally, the discharge design flow is used to then calculate the available effluent dilution as required by 40 CFR §122.45(b)(1).

Dilution based upon the design flow (2.5 MGD) of the facility:

$$\begin{aligned} DF &= (7Q10 \text{ Flow} + \text{WWTF Design Flow}) / (\text{WWTF Design Flow}) \\ &= (0.04 \text{ CFS} + 3.9 \text{ CFS}) / 3.9 \text{ CFS} = 1.01 \end{aligned}$$

***Conventional Pollutants and Non-Conventional Pollutants***

*Flow*

The Rockland POTW has a design flow of 2.5 MGD, with peak flows as high as 12 MGD. The annual average flow for 2003 was 2.7 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.

*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 water quality based average monthly, average weekly, and daily maximum mass and concentration limitations carried forward from the current permit and the permit issued previous to that, on August 4, 1993. These limits are more stringent the secondary treatment requirements found at 40 CFR §133. The summer BOD and TSS limits (May 1- September 30<sup>th</sup>) were included in the permit issued July 8, 1987 as state certification requirements under Section 401 of the CWA. The winter (October 1 - April 30) BOD and TSS limits which more stringent than secondary treatment requirements were introduced in the permit issued August 4, 1993. The permit limits have been carried forward in this draft permit based on antidegradation and antibacksliding requirements.

The current limits are seasonal:

Parameter	Average Monthly	Average Weekly	Maximum Daily
BOD <sub>5</sub> (October 1 - April 30)	20 mg/l 417 lbs/Day	20 mg/l 417 lbs/Day	30 mg/l 626 lbs/Day
TSS (October 1 - April 30)	20 mg/l 417 lbs/Day	20 mg/l 417 lbs/Day	30 mg/l 626 lbs/Day
BOD <sub>5</sub> (May 1 - September 30)	6 mg/l 125 lbs/Day	6 mg/l 125 lbs/Day	10 mg/l 209 lbs/Day
TSS (May 1 - September 30)	10 mg/l 209 lbs/Day	10 mg/l 209 lbs/Day	15 mg/l 313 lbs/Day

Calculations of maximum allowable loads for average monthly and average weekly BOD<sub>5</sub> 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.

May 1<sup>st</sup> through September 30<sup>th</sup>

- [6] x 2.5 x 8.34 = 125 lbs/day      Average Monthly and Average Weekly BOD<sub>5</sub> load
- [10] x 2.5 x 8.34 = 209 lbs/day      Daily Maximum BOD<sub>5</sub> load
- [10] x 2.5 x 8.34 = 209 lbs/day      Average Monthly and Average Weekly TSS load
- [15] x 2.5 x 8.34 = 313 lbs/day      Daily Maximum TSS load

October 1<sup>st</sup> through April 30<sup>th</sup>

- [20] x 2.5 x 8.34 = 417 lbs/day      Average Monthly and Average Weekly BOD<sub>5</sub> load
- [30] x 2.5 x 8.34 = 626 lbs/day      Daily Maximum BOD<sub>5</sub> load
- [20] x 2.5 x 8.34 = 417 lbs/day      Average Monthly and Average Weekly TSS load
- [30] x 2.5 x 8.34 = 626 lbs/day      Daily Maximum TSS load

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

*pH*

The pH limits in this permit are more stringent than the requirements found in 40 CFR §133.102(c). The permit 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..

*Fecal Coliform*

The fecal coliform limits are based on state water quality standards for Class B waters [314 CMR 4.05(b)]. The permit requires year round disinfection. Note that the draft permit includes a requirement that the fecal coliform samples shall be taken at the same time as the daily total chlorine residual grab sample is collected, when applicable.

*Settleable solids*

Settleable solids limits have been removed from the draft permit, as these are no longer state certification requirements. The permittee shall continue to monitor settleable solids for process control.

*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 French Stream 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 (TRC) 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 Rockland POTW uses a flow paced feed sodium hypochlorite to provide seasonal disinfection of the treated wastewater and flow paced dechlorination by sodium bisulfite prior to discharge. There are no inline sensors.

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)(1.01) = 11 ug/l = 0.011 mg/l  
Maximum daily limit = (CMC) x (Dilution Factor) = (19 ug/l) (1.01) = 19 ug/l ≈ 0.019 mg/l

The EPA Technical Support Document For Water Quality-Based Toxics Control, EPA/505/2-90-001, March 1991, Page 111, states: *For most NPDES permitting situations EPA recommends that the compliance level be defined in the permit as the minimum level (ML)*. The minimum level (ML) is the lowest point on the curve used to calibrate the test equipment for the pollutant of concern. Data collected at or above the ML is quantifiable. The ML for total residual chlorine is defined as 20 ug/l. This value is the minimum level for chlorine using EPA approved methods found in the most currently approved version of Standard Methods for the Examination of Water and Wastes, Method 4500 CL-E and G, or USEPA Manual of Methods of Analysis of Water and Wastewater, Method 330.5. One of these methods must be used to determine total residual chlorine.

For effluent limitations less than 20 ug/l, compliance/non-compliance will be determined based on the ML. Sample results of 20 ug/l or less shall be reported as zero on the discharge monitoring report.

To verify consistent compliance with the TRC limit, continuous monitoring for TRC is required in the draft permit. The permittee shall monitor total residual chlorine concentration after dechlorination to assure that discharge concentrations do not exceed permit limits and cause toxic conditions in the receiving water.

*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). Some metals can be toxic to aquatic life at low concentrations, so 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*

Aluminum effluent concentrations

Dates	Effluent Al (mg/l)	Receiving Water Concentration after dilution (mg/l)
03/14/04	0.13	0.10
06/03/01	0.1401	0.11
01/11/04	0.13	0.10
09/14/03	0.18	0.14
09/15/02	0.0633	0.05
06/16/02	<0.0197*	****
03/03/02	0.0267	0.02
12/03/01	<0.0197*	****
09/16/01	<0.0197*	****
<b>*Non-detects not used to calculate average</b>		
<b>Average concentrations</b>	<b>112 ug/l av. (n=6)</b>	<b>99 ug/l av. (n=6)</b>

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 French Stream. The draft permit has an average monthly total aluminum limit of 88 ug/l.

$$(CCC - 87 \text{ ug/l})(1.01 \text{ dilution}) = 88 \text{ ug/l}$$

The permittee shall be required to report the maximum daily total aluminum concentration

### ***Total Copper***

The NPDES permit issued to the Town of Rockland on August 4, 1999 includes water quality based limitations for total copper. The limits are 6.7 ug/l maximum daily and 4.9 average monthly. The effluent concentrations of total copper exceeded the new limits. EPA issued an Administrative Order (AO) on November 15, 2001 and an amended AO on March 28, 2002 with interim total copper limits and conditions to address the exceedances. The interim limits are average monthly 13.2 ug/l and maximum daily 18.7 ug/l. See Fact Sheet Attachment A for effluent copper data.

The draft permit maintains monthly testing for total copper discharge concentration limits of , maximum daily - 19 ug/l (acute), and average monthly - 12 ug/l (Chronic). Although all recent effluent discharge monitoring report (DMR) data concentrations would meet these limits, the effluent variability indicates there still remains a reasonable potential for the discharges to cause or contribute to an exceedance of the state criteria for copper as defined in 40 CFR §122.44(d). See the Anti-backsliding and Anti-degradation Section latter in this fact sheet for a further discussion of the recalculated copper limits. See calculation below:

EPA's recommended criteria for copper, as adopted by Massachusetts into the water quality standards, are hardness dependant. The toxicity of total copper to aquatic organisms is reduced as the hardness concentration in the receiving water increases. In a letter dated July 7, 2000 EPA's Office of Water - Office of Science and Technology stated 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.*

During this permit reissuance, the downstream hardness is recalculated using receiving water and effluent hardness values from whole effluent toxicity tests submitted by the permittee.

**Rockland POTW Effluent and Receiving Water Hardness from WET Reports**

Date	Effluent Hardness mg/l	Receiving Water Hardness mg/l
06/04/01	174	36
06/06/01	169	38
06/08/01	181	40
09/16/01	172	41
09/18/01	173	42
09/20/01	166	43
12/03/01	161	46
12/05/01	167	46
12/73/01	153	47
03/03/02	132	44
03/05/02	129	47
03/05/02	119	43
06/16/02	141	31
06/18/02	149	34
06/20/02	149	35
09/15/02	167	18
09/17/02	137	38
09/19/02	173	39
09/14/03	150	41
09/16/03	150	42
09/18/03	150	49
01/13/04	120	40
01/15/04	120	41
01/17/04	120	45
03/14/04	150	49
03/16/04	110	45
03/18/04	120	45
<b>Average</b>	<b>148 av. n=27</b>	<b>41 av. n=27</b>

$$C_r = \frac{Q_d C_d + Q_s C_s}{Q_r} = \frac{(2.5 \text{ MGD})(148 \text{ mg/l}) + (0.4 \text{ MGD})(41 \text{ mg/l})}{(2.8 \text{ MGD})} = 138 \text{ mg/l}$$

Where:

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

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

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

- Where:  $m_a$  = pollutant-specific coefficient
- $b_a$  = pollutant-specific coefficient
- $h$  = hardness of the receiving water = 138 mg/l as  $\text{CaCO}_3$
- $\ln$  = natural logarithm
- CF = pollutant-specific conversion factor  
(CF is used to convert total recoverable to dissolved metal)

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

- Where:  $m_c$  = pollutant-specific coefficient
- $b_c$  = pollutant-specific coefficient
- $h$  = hardness of the receiving water = 138 mg/l as  $\text{CaCO}_3$
- $\ln$  = 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

$$\text{Acute criteria (dissolved)} = \exp\{0.9422 [\ln(138)] - 1.700\} (0.960) = 18.2 \text{ ug/l}$$

Dilution Factor = 1.01

$$\text{Effluent Limitation:} = (18.2 \text{ ug/l} \times 1.01) = 18.38 \text{ ug/l (dissolved)}$$

$$\text{Total recoverable} = 18.38 / \text{CF} = 18.38 / 0.960 = 19 \text{ ug/l} *$$

$$\text{Chronic criteria (dissolved)} = \exp\{0.8545 [\ln(138)] - 1.702\} (0.960) = 11.7 \text{ ug/l}$$

Effluent Limitation: =  $(11.7 \text{ ug/l} \times 1.01) = 11.82 \text{ ug/l}$  (dissolved)  
Total recoverable =  $11.82 / \text{CF} = 11.82 / 0.960 = \mathbf{12 \text{ ug/l}}$  \*

- \* 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. 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.

### *Toxics Control*

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)(1) 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 Rockland discharge, the permittee is currently required to conduct acute (LC<sub>50</sub>) and chronic (C-NOEC) whole effluent toxicity (WET) testing using one organism, the daphnid Ceriodaphnia dubia. The LC<sub>50</sub> limit is  $\geq 100\%$  and the  $\geq 99\%$  chronic no observable effects concentration (C-NOEC) limit is the inverse of the receiving water concentration.  $1/1.01 = \geq 99\%$

The WET tests are required four times per year, 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 South Coastal Watershed.

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.

See Fact Sheet Attachment A for recent WET report data. The permittee consistently meets the 100% LC<sub>50</sub>, acute limit, while periodically exceeding both present and proposed chronic no observable effects limits.

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 French Stream is in non-attainment of State Water Quality Standards for nutrients, organic enrichment/low dissolved oxygen. No reasonably current TP data was available upstream of the POTW.

<b>Total Phosphorus Discharge Monitoring Data</b>			
End Date	Monthly Average mg/l		Daily Maximum mg/l
05/31/01	0.3		0.4
06/30/01	0.3		0.4
07/31/01	0.3		0.5
08/31/01	0.3		0.5
09/30/01	0.3		0.4
05/31/02	0.3		0.5
06/30/02	0.3		0.5
07/31/02	0.3		0.4
08/31/02	0.3		0.4
09/30/02	0.3		0.6
05/31/03	0.2		0.3
06/30/03	0.3		0.5
07/31/03	0.4		0.5
08/31/03	0.3		0.4
09/30/03	0.2		0.3
Averages	0.29 mg/l	n = 15	0.5 mg/l n = 15

Monthly average flow for the 15 months listed above was 1.9 MGD

The Rockland POTW is currently estimated to discharge an average of 4.6 lbs/day of TP to the French Stream, based on an average TP concentration of 0.29 mg/l and an average discharge flow of 1.9 MGD.  $(0.29 \text{ mg/l})(1.9 \text{ MGD})(8.34 \text{ conversion}) = 4.6 \text{ lbs/day Total Phosphorus}$ .

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 Rockland POTW discharge.

Because a TMDL study for nutrients is not currently available for the French River, phosphorus limits must meet either non-watershed specific water quality based limits or a technology based HBPT limit. The MADEP 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. EPA's Technical Transfer guidance published in 1987 (EPA 625/6-87/017) concludes that 0.2 mg/l is achievable with currently available treatment technologies. The draft permit includes a schedule of compliance to allow the permittee make such changes as may be needed to achieve the new 0.2 mg/l total phosphorous limit. **The permittee shall be required to report total phosphorus without limit during the summer months until the schedule is completed.**

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. Rockland 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 slightly greater than the Gold Book criteria. The HBPT seasonal 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 TP is continued at twice per week. This is the same frequency with which phosphorus is currently monitored. The 0.2 mg/l limit is seasonal, with the season running May 1<sup>st</sup> through September 30th.

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 October through April. 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 French Stream and its downstream impoundments, and a detailed analysis of the TP loading from the Rockland 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 and modify the permit accordingly.

#### *Dissolved Oxygen (DO)*

The French Stream is effluent dominated during periods of low river flow. The river is listed ('303(d) list') as being in non-attainment for the Class B dissolved oxygen standard of 5.0 mg/l (314 CMR 4.05(3)(b)(1)). DEP determined that the minimum effluent DO must be 7.4 mg/l as part of a load allocation for the Rockland STP, as stated in the memorandum dated 19, 1974, from Glenn Haas to Russell Issac (See also DEP letter to Al Curran of M&E, dated, June 10, 1975). The draft permit carries forward the seasonal minimum effluent DO limitation of 7.4 mg/l.

#### *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. The current permit has seasonal ammonia limits as listed below.

Period	Average Monthly	Average Weekly	Daily Maximum
May 1 <sup>st</sup> -May 31 <sup>st</sup>	5 mg/l	5 mg/l	7.7 mg/l
June 1 <sup>st</sup> - September 30 <sup>th</sup>	1 mg/l	1 mg/l	1.5 mg/l
October <sup>1st</sup> - April 30 <sup>th</sup>	Monitor and Report		

The monitoring frequency is currently twice per week, year round.

Discharge Monitoring Report (DMR) data provided by the permittee for the period of January 1, 2001 through April 30, 2004 was compared to the EPA recommended aquatic life criteria for ammonia\*, multiplied by the 1.01 dilution factor, 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.

\*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).

A comparison of the reported effluent pH to the receiving water pH found in whole effluent toxicity (WET) reports demonstrates little variation between the two values. Therefore, the highest reported effluent pH will be used as the receiving water pH for the derivation of the pH dependant in-stream ammonia criteria. Historical DMR effluent pH data for the period, May of 2001 through April 2004, recorded two occurrences of pH as high as 8.0 SU, with no reported values higher than 8.0 SU. There were four 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 October 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 October through March is 3.26 mg/l based on a receiving water pH of 8.0, a receiving water temperature of 10 degrees Celsius, and the absence 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 criteria for April through May is 2.43 mg/l based on the same receiving water pH and temperature, and the presence of early life stages. A monthly average limit of 3.3 mg/l has been established for October through March to ensure that the ambient chronic criteria are met. A lower chronic (monthly average) limit for April and May has been established based on the presence of early life stages. The limit is 2.5 mg/l as a monthly average.

Acute ammonia criteria, salmonids present, at 10 degrees Celsius, and at a pH of 8.0 SU = (5.62 mg/l)(1.01 dilution) = 5.68 ≈ **5.7 mg/l Daily Maximum October through May**

Chronic ammonia criteria, early life stages absent, at 10 degrees Celsius, and at a pH of 8.0 SU = (3.26 mg/l)(1.01 dilution) = 3.29 ≈ **3.3 mg/l Average Monthly October through March**

Chronic ammonia criteria, early life stages present, at 10 degrees Celsius, and at a pH of 8.0 SU = (2.43 mg/l)(1.01 dilution) = 2.45 ≈ **2.5 mg/l Average Monthly April and May**

Draft Ammonia Limits and Effective Period	Source of Limits
1.0 mg/l Average Monthly June through September	Carried forward from current permit
3.3 mg/l Average Monthly October through March	New water quality based limit
2.5 mg/l Average Monthly April and May	New water quality based limit
1.5 mg/l Daily Maximum June through September	Carried forward from current permit
5.7 mg/l Daily Maximum October through May	New water quality based limit

The draft permit includes a schedule of compliance to allow the permittee make such changes as may be needed to achieve the new winter (**October through May**) limits. **The permittee shall be required to report total ammonia without limit during the winter months until the schedule is completed.**

*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.

Relaxation is only allowed when cause for permit modification is met (see 40 CFR § 122.62). Effluent limits based on BPJ, 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 the replacement of settleable solids limits with monitoring as the limit is no longer a state certification requirement. The recalculated hardness values used in establishing the ambient in-stream criteria for total copper are new information that was not available when the permit limits were established in the current permit. The limits for total copper are relaxed based on this new information (recalculated hardness).

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 French Stream 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 settleable solids, and 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. Pretreatment**

The permittee is required to administer a pretreatment program based on the authority granted under 40 CFR §122.44(j), 40 CFR Part 403 and section 307 of the Act. The Permittee's pretreatment program received EPA approval on September 28, 1990 and, as a result, appropriate pretreatment program requirements were incorporated into the previous permit which were consistent with that approval and federal pretreatment regulations in effect when the permit was issued.

The Federal Pretreatment Regulations in 40 CFR Part 403 were amended in October 1988, and again in July 1990. Those amendments established new requirements for implementation of pretreatment programs. Upon reissuance of this NPDES permit, the permittee is obligated to insure that its pretreatment program is consistent with current Federal Regulations. Those activities that the permittee must address include, but are not limited to, the following: (1) develop and enforce EPA approved specific effluent limits (technically-based local limits); (2) revise the local sewer-use ordinance or regulation, as appropriate, to be consistent with Federal Regulations; (3) develop an enforcement response plan; (4) implement a slug control evaluation program; (5) track significant noncompliance for industrial users; and (6) establish a definition of and track significant industrial users.

These requirements are necessary to ensure continued compliance with the POTW's NPDES permit and its sludge use or disposal practices.

In addition to the requirements described above, the draft permit requires the permittee to submit to EPA in writing, within 180 days of the permit's effective date, a description of proposed changes to permittee's pretreatment program deemed necessary to assure conformity with current federal pretreatment regulations.

These requirements are included in the draft permit to ensure that the pretreatment program is consistent and up-to-date with all pretreatment requirements in effect. Lastly, the permittee must continue to submit, annually on October 1, a pretreatment report detailing the activities of the program for the twelve month period ending 60 days prior to the due date.

## **VI. 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 affecting human health or the environment. EPA and MADEP maintain that these programs are an integral component of ensuring permit compliance under both of these provisions.

## **VII. 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. Flow data submitted by the permittee shows large increases in flow during wet weather, indicating significant I/I.

MADEP 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).

### VIII. Sludge Information and Requirements

The Rockland WWTF generates approximately 360-380 dry metric tons of sludge annually. The waste sludge undergoes a two stage anaerobic digestion process and is periodically removed off-site by truck to the We Care Environmental, LLC, facility in Marlboro, Massachusetts for final disposal.

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 has been conditioned to ensure 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, 2<sup>nd</sup> 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:

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1 Congress Street  
Suite 1100 -CMP  
Boston, Massachusetts 02114-2023  
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and

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Fax: 508-791-4131  
e-mail: paul.hogan@state.ma.us

May 23, 2005  
Date

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

\* Address comments to both Doug Corb and Paul Hogan