AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Clean Water Act as amended, (33 U.S.C. §§1251 et seq.; the "CWA"), and the Massachusetts Clean Waters Act, as amended, (M.G.L. Chap. 21, §§26-53),

Town of Royalston

is authorized to discharge from the facility located at

Royalston Wastewater Treatment Plant
15 Blossom Street
South Royalston, MA 01368

to the receiving water named

Millers River (Segment MA35-04)

in accordance with effluent limitations, monitoring requirements, and other conditions set forth herein.

This permit shall become effective on November 1, 2009.

This permit and the authorization to discharge expire at midnight on October 31, 2014.

This permit supersedes the permit issued on March 15, 2004.

This permit consists of Part I including effluent limitations and monitoring requirements, Part II including Standard Conditions and Definitions, Attachment A (Freshwater Acute Toxicity Test Procedure and Protocol) and Attachment B (Summary of Required Reports).

Signed this 1st day of SEPTEMBER, 2009

/S/ SIGNATURE ON FILE

_____
Director
Office of Ecosystem Protection
Environmental Protection Agency
Boston, MA

_____
Director
Division of Watershed Management
Department of Environmental Protection
Commonwealth of Massachusetts
Boston, MA

Part I. A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning the effective date and lasting through expiration, the permittee is authorized to discharge treated effluent from outfall serial number **001**. Such discharges shall be limited and monitored by the permittee as specified below.

Effluent Characteristic	**Units**	**Effluent Limitations**			**Monitoring Requirements**	
		Average Monthly	**Average Weekly**	**Maximum Daily**	**Measurement Frequency**	**Sample Type**[2]
Flow[1]	mgd	0.039 Report	*** ***	*** Report	continuous	Recorder
BOD[3]	mg/l lbs/day	30 9.75	45 14.6	Report[5]	1/week	8-hour composite[4]
TSS[3]	mg/l lbs/day	30 9.75	45 14.6	Report[5]	1/week	8-hour composite
pH[5]	s.u.	6.5 – 8.3			1/day	grab
Dissolved Oxygen	NOT LESS THAN 6.0 mg/l AT ANY TIME				1/day	grab
E. coli[5,6] (April 1 – October 31)	cfu/100 ml	126	***	409	1/week[6]	grab
Total Residual Chlorine (April 1 – October 31)	mg/l	***	***	1.0	1/day	grab
Total Phosphorus	mg/l	***	***	Report	1/month	8-hour composite
Total Nitrogen	mg/l	***	***	Report	1/quarter	8-hour composite

Effluent characteristic	Units	Effluent Limitations			Monitoring Requirements	
		Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type
Total Ammonia Nitrogen	mg/l	***	***	Report	1/quarter	8-hour composite
Nitrate + Nitrite	mg/l	***	***	Report	1/quarter	8-hour composite
Total Kjeldahl Nitrogen	mg/l	***	***	Report	1/quarter	8-hour composite
Whole Effluent Toxicity [7,8,9]	%		Acute $LC_{50} \geq 50\%$		1/year	8-hour composite

Footnotes:

1. The flow limit is an annual average limit which shall be reported as a rolling average. The DMR will report the average flow that is calculated from the average monthly flow for the reporting month and the previous 11 months. In addition, report the average monthly flow and maximum daily flow for each month.

2. All sampling shall be representative of the influent and the effluent discharged through outfall 001 to the Millers River. A routine sampling program shall be developed in which samples are taken at the same location, same time, and same days of every month Any deviations from the routine sampling program shall be documented in correspondence appended to the applicable discharge monitoring report that is submitted to EPA. All samples shall be tested using the analytical methods found in 40 CFR §136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR §136. All samples shall be 8-hour composites unless specified as a grab sample in 40 CFR §136.

3. Sampling required for influent and effluent.

4. An 8-hour composite sample will consist of at least eight (8) grab samples taken during one working day.

5. Required for State certification.

6. The average monthly limits for *E. coli* are expressed as geometric means. The samples for *E. coli* and chlorine shall be taken at the same time.

7. The permittee shall conduct the acute toxicity test in the second week of July. The permittee shall test the daphnid, *Ceriodaphnia dubia*, only. The test results shall be submitted by **August 31st**. The test must be performed in accordance with the Freshwater Acute Toxicity Test Procedure and Protocol (Attachment A).

8. If toxicity test(s) using receiving water as diluent show the receiving water to be toxic or unreliable, the permittee shall either follow procedures outlined in **Attachment A (Toxicity Test Procedure and Protocol**) **Section IV., DILUTION WATER** in order to obtain an individual approval for use of an alternate dilution water, or the permittee shall follow the Self-Implementing Alternative Dilution Water Guidance which may be used to obtain automatic approval of an alternate dilution water, including the appropriate species for use with that water. This guidance is found in Attachment G of NPDES Program Instructions for the Discharge Monitoring Report Forms (DMRs) which is sent to all permittees with their annual set of DMRs and may also be found on the EPA, Region I web site at http://www.epa.gov/region01/enforcementandassistance/dmr.html. If this guidance is revoked, the permittee shall revert to obtaining individual approval as outlined in **Attachment A**. Any modification or revocation to this guidance 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 **Attachment A**.

9. The LC_{50} is the concentration of effluent which causes mortality to 50% of the test organisms. Therefore, a 50% limit means that a sample of 50% effluent shall cause no more than a 50% mortality rate.

I.A.1. (continued)

a. The discharge shall not cause a violation of the water quality standards of the receiving waters.

b. The discharge shall not cause objectionable discoloration of the receiving waters.

c. The effluent shall not contain a visible oil sheen, foam, or floating solids at any time.

d. The permittee's treatment facility shall maintain a minimum of 85 percent removal of both total suspended solids and biochemical oxygen demand. The percent removal shall be based on monthly average values.

e. Sample results using EPA approved methods for any parameter above its required frequency must also be reported.

g. If the average annual flow in any calendar year exceeds 80 percent of the facility's design flow, the permittee shall submit a report to MassDEP by March 31 of the following calendar year describing its plans for further flow increases and describing how it will maintain compliance with the flow limit and all other effluent limitations and conditions.

h. The permittee shall minimize the use of chlorine while maintaining adequate bacterial control.

2. All POTWs must provide adequate notice to the director of the following:

a. Any new introduction of pollutants into that POTW from an indirect discharger in a primary industry category discharging process water; and/or

b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of the permit issuance.

c. For the purposes of this paragraph, adequate notice shall include information on:

(i) The quantity and quality of effluent introduced into the POTW; and

(ii) Any anticipated impact of the change on the quantity and quality of effluent to be discharged from the POTW.

3. Prohibitions Concerning Interference and Pass Through

   Pollutants introduced into POTWs by a non-domestic source (user) shall not pass through the POTW or interfere with the operation or performance of the works.

4. Toxics Control

   a. The permittee shall not discharge any pollutant or combination of pollutants in toxic amounts.

   b. Any toxic components of the effluent shall not result in any demonstrable harm to aquatic life or violate any state or federal water quality standard which has been or may be promulgated. Upon promulgation of any such standard, this permit may be revised or amended in accordance with such standards.

5. Numerical Effluent Limitations for Toxicants

   EPA or the MassDEP may use the results of the toxicity tests and chemical analyses conducted pursuant to this permit, as well as national water quality criteria developed pursuant to Section 304(a)(1) of the Clean Water Act (CWA), state water quality criteria, and any other appropriate information or data, to develop numerical effluent limitations for any pollutants including, but not limited to, those pollutants listed in Appendix D of 40 CFR Part 122.

B. UNAUTHORIZED DISCHARGES

The permit only authorizes discharges in accordance with the terms and conditions of this permit and only from the outfall listed in PART I.A.1. of this permit. Discharges of wastewater from any other point sources, including sanitary sewer overflows (SSOs) from any portion of the collection system are not authorized by this permit and shall be reported in accordance with Section D.1.e. (1) of the General Requirements of this permit (Twenty-four hour reporting). Notification of SSOs to MassDEP shall be made on its SSO Reporting Form (which includes DEP Regional Office telephone numbers). The reporting form and instruction for its completion may be found on-line at http://www.mass.gov/dep/water/approvals/surffms.htm#sso.

C. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

Operation and maintenance of the sewer system shall be in compliance with the General Requirements of Part II and the following terms and conditions:

1. Maintenance Staff

   The permittee shall provide an adequate staff to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this permit.

2. Preventative Maintenance Program

   The permittee shall maintain an ongoing preventative maintenance program to prevent overflows and bypasses caused by malfunctions or failures of the sewer system infrastructure. The program shall include an inspection program designed to identify all potential and actual unauthorized discharges.

3. Infiltration/Inflow Control Plan

   The permittee shall update its plan to control infiltration and inflow (I/I) to the separate sewer system. The updated plan shall be submitted to EPA and MassDEP within six months of the effective date of this permit and shall describe the permittee's program for preventing I/I related effluent limit violations, and all unauthorized discharges of wastewater, including overflows and by-passes due to excessive infiltration/inflow.

   The plan shall include:

   - An ongoing program to identify and remove sources of I/I. The program shall include the necessary funding level and the source(s) of funding.

   - An inflow identification and control program that focuses on the disconnection and redirection of illegal sump pumps and roof down spouts. Priority should be given to the removal of public and private inflow sources that are upstream from, and potentially contribute to, known areas of sewer system backups and/or overflows.

   - Identification and prioritization of areas that will provide increased aquifer recharge as the result of reduction/elimination of I/I to the system.

   - An educational public outreach program for all aspects of I/I control, particularly private inflow.

   Reporting Requirements

   A summary report of all actions taken to minimize I/I during the previous calendar year shall be submitted to EPA and the MassDEP annually, by **March 31st** each year. This summary report shall, at a minimum, include:

   - A map and description of inspection and maintenance activities conducted and corrective actions taken during the previous year.

   - Expenditures for any I/I related maintenance activities and corrective actions taken during the previous year.

   - A map with areas identified for I/I-related investigation/action during the coming year.

- A calculation of the annual average I/I, the maximum month I/I for the reporting year.

- A report of any I/I related corrective actions taken as a result of unauthorized discharges reported pursuant to 314 CMR 3.19(20) and reported pursuant to B. UNAUTHORIZED DISCHARGES of this permit.

4. Alternative Power Source

   In order to maintain compliance with the terms and conditions of this permit, the permittee shall continue to provide an alternative power source with which to sufficiently operate its treatment works (as defined at 40 CFR §122.2).

D. SLUDGE CONDITIONS

1. The permittee shall comply with all existing federal and state laws and regulations that apply to sewage sludge use and disposal practices and with the CWA Section 405(d) technical standards.

2. The permittee shall comply with the more stringent of either the state or federal (40 CFR Part 503), requirements.

3. The requirements and technical standards of 40 CFR Part 503 apply to facilities which perform one or more of the following uses or disposal practices.

   a. Land application – the use of sewage sludge to condition or fertilize the soil

   b. Surface disposal – the placement of sewage sludge in a sludge-only landfill

   c. Sewage sludge incineration in a sludge-only incinerator

4. The 40 CFR Part 503 conditions do not apply to facilities which place sludge within a municipal solid waste landfill. These conditions also do not apply to facilities which do not dispose of sewage sludge during the life of the permit but rather treat the sludge (e.g. lagoons – reed beds) or are otherwise excluded under 40 CFR 503.6

5. The permittee shall use and comply with the sludge compliance guidance document to determine appropriate conditions. Appropriate conditions contain the following elements:

   - General requirements
   - Pollutant limitations
   - Operational standards (pathogen reduction requirements and vector attraction requirements)
   - Management practices
   - Record keeping
   - Monitoring
   - Reporting

Depending upon the quality of the material produced by a facility, all conditions may not apply to the facility.

6. The permittee shall monitor the pollutant concentrations, pathogen reduction and vector attraction reduction at one of the following frequencies. The frequency is based upon the volume of sewage sludge generated at the facility in dry metric tons per year:

Volume of dry sludge	Frequency
less than 290	1/year
290 to less than 1,500	1/quarter
1,500 to less than 15,000	6/year
Over 15,000	1/month

7. The permittee shall sample the sewage sludge using the procedures detailed in 40 CFR 503.8.

8. The permittee shall **submit an annual report containing the information specified in the guidance by February 19**. Reports shall be submitted to the address contained in the reporting section of the permit. Sludge monitoring by the permittee is not required when the permittee is not the responsible for the ultimate sludge disposal. The permittee must be assured that any third party contractor is in compliance with appropriate regulatory requirements. In such case, the permittee is required only to submit an annual report by February 19 containing the following information:

    - Name and address of contractor responsible for sludge disposal
    - Quantity of sludge in dry metric tons removed from the facility by the sludge contractor

E. MONITORING AND REPORTING

Monitoring results obtained during each calendar month shall be summarized and **reported on the Discharge Monitoring Report Form(s) postmarked no later than the 15th day of the following month.**

Signed and dated originals of these and all other reports required herein shall be submitted to the Director at the following address:

Environmental Protection Agency
Water Technical Unit (SEW)
P.O. Box 8127
Boston, MA 02114

Signed and dated originals of these, and all other reports required herein except for toxicity reports shall be submitted to the State at the following address:

and

Massachusetts Department of Environmental Protection
Bureau of Resource Protection
Western Regional Office
436 Dwight Street
Springfield, MA 01103

Signed and dated Discharge Monitoring Report Forms and toxicity reports as well as reports indicated in Attachment B required by this permit shall also be submitted to the State at:

Massachusetts Department of Environmental Protection
Division of Watershed Management
Surface Water Discharge Permit Program
627 Main Street, 2nd Floor
Worcester, MA 01608

F. STATE PERMIT CONDITIONS

This discharge permit is issued jointly by the Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental protection (MassDEP) under Federal and State law, respectively. As such, all the terms and conditions of this permit are hereby incorporated into and constitute a discharge permit issued by the Commissioner of the MassDEP pursuant to M.G.L. Chap. 21 §43.

Each agency shall have the independent right to enforce the terms and conditions of this permit. Any modification, suspension or revocation of this permit shall be effective only with respect to the agency taking such action, and shall not affect the validity or status of this permit as issued by the other agency, unless and until each agency has concurred in writing with such modification, suspension or revocation. In the event any portion of this permit is declared invalid, illegal or otherwise issued in violation of State law such permit shall remain in full force and effect under Federal law as a NPDES permit issued by the U.S. Environmental Protection Agency. In the event this permit is declared invalid, illegal or otherwise issued in violation of Federal law, this permit shall remain in full force and effect under State law as a permit issued by the Commonwealth of Massachusetts.

Attachment B

SUMMARY OF REQUIRED REPORTS

Royalston Wastewater Treatment Plant

This Table is a summary of reports required to be submitted under this NPDES permit as an aid to the permittee. If there are any discrepancies between the permit and this summary, the permittee shall follow the permit requirements.

Required Report	Date Due	Submitted To: (see bottom of page for key)
Discharge Monitoring Report (DMR)	Monthly, postmarked by the 15th of the month following the monitoring month (e.g. the March DMR is due by April 15th.	1, 2, 3
Whole Effluent Toxicity (WET)Test Report (Part I.A.1)	second week in July	1, 2, 3
I/I Control Plan (Part I.C.3)	Within 6 months of permit effective date	1,2
I/I Annual Report (Part I.C.3)	Anniversary of permit effective date	1,2
Annual Sludge Report (Part I.E.8.)	February 19 each year	1,2
Nitrogen Optimization Evaluation Report (Part I.E.)	Within 1 year of permit effective date	1,2
Nitrogen Optimization Annual Report (Part I.E..)	February 1 each year	1,2

1. EPA
   Water Technical Unit (SEW)
   P.O. Box 8127
   Boston, Massachusetts 02114

2. MassDEP
   Bureau of Resource Protection
   Western Regional Office
   436 Dwight Street
   Springfield, MA 01103

3. MassDEP
   Division of Watershed Management
   Surface Water Discharge Permit Program
   627 Main Street, 2nd Floor
   Worcester, Massachusetts 01608

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND
1 CONGRESS STREET
SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

FACT SHEET

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

NPDES NO: **MA0100161**

NAME AND ADDRESS OF APPLICANT:

Town of Royalston
Board of Sewer Commissioners
Town Hall
Royalston, Massachusetts 01368

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Royalston Wastewater Treatment Plant
Blossom Street
South Royalston, Massachusetts 01368

RECEIVING WATER: **Millers River (Segment MA35-04)**

CLASSIFICATION: **B (Warm Water Fishery)**

LATITUDE: **42° 37' 44" N** LONGITUDE: **72° 09' 11" W**

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 (MassDEP) reissue its NPDES permit to discharge into the designated receiving water, the Millers River. The location of the Royalston Wastewater Treatment Plant (WWTP) is shown on Figure 1.

The Royalston WWTP is a 39,000 gallon per day (gpd) extended aeration facility providing secondary treatment to domestic and commercial wastewater. The population served by the facility is approximately 300. Digested sludge is hauled to the Fitchburg POTW and ultimately incinerated. A process diagram of the plant is shown in Figure 2.

II. Description of Discharge

A quantitative description of the discharge in terms of significant effluent parameters based on recent monitoring data is shown in Attachment 1.

III. Permit Limitations and Conditions

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

IV. Permit Basis and Explanation of Effluent Limitation Derivation

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 monitoring, reporting and other requirements. This draft NPDES permit was developed in accordance with statutory and regulatory authorities established pursuant to the Act. The majority of regulations governing NPDES program requirements for publicly owned treatment plants are found in 40 CFR Parts 122, 124, 125 and 133.

EPA is required to consider technology and water quality requirements when developing permit effluent limits. Technology-based treatment requirements represent the minimum level of control
that must be imposed under Sections 402 and 301(b) of the Act (see 40 CFR 125 Subpart A) to meet Best Practicable Control Technology Currently Available (BPT), Best Conventional Control Technology (BCT) for conventional pollutants, and Best Available Technology Economically Available (BAT) for toxic pollutants.

Under Section 301(b)(1)(C) of the CWA, discharges are subject to effluent limitations based on water quality standards. The Massachusetts Surface Water Quality Standards, 314 CMR 4.00, include requirements for the regulation and control of toxic constituents and also require that EPA criteria, established pursuant to Section 304(a) of the CWA, shall be used unless a site specific criteria is established. The State will limit or prohibit discharges of pollutants to surface waters to assure that surface water quality standards of the receiving waters are protected and maintained.

The permit must also 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 contribute to an excursion above any water quality criterion [40 CFR §122.44(d)(1)]. An excursion occurs if the projected or actual in-stream concentrations exceed the applicable criterion. In determining reasonable potential, EPA considers existing controls on point and non-point sources of pollution, variability of the pollutant in the effluent, sensitivity of the species to toxicity and, where appropriate, the dilution of the effluent in the

receiving water.

Also note that according to Section 402 (o) of the Clean Water Act and EPA regulation 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, except under certain limited circumstances. In addition, in accordance with regulations found at 40 CFR Section 131.12, MassDEP has developed and adopted a statewide antidegradation policy to maintain and protect existing in-stream water quality. The Massachusetts Antidegradation Provisions are found at Title 314 CMR 4.04. No lowering of water quality is allowed, except in accordance with the antidegradation provisions.

The limits in the draft permit are based on information in the application, the existing permit, discharge monitoring reports, and toxicity test results.

Waterbody Classification and Usage

The Millers River is classified as a Class B, warm water fishery waterbody. The Massachusetts Surface Water Quality Standards (314 CMR 4.05(3)(b)) state that Class B waters shall 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."*

This 18.5 mile segment of the Millers River receiving the Royalston WWTP discharge extends from the USGS Station No. 01164000 in South Royalston to the Erving Center WWTP discharge. The *"Millers River Watershed 2000 Water Quality Assessment Report"* concludes that the aquatic life designated use is impaired in the upper 6.6 miles and is in "Alert Status" for the lower 11.9 miles due to PCB contamination from contaminated sediment and release from waste sites and dumps. PCBs and mercury are responsible for the "impaired" status for fish consumption in this segment. The aesthetics use is supported and the other designated uses, primary and secondary contact, were not assessed. The *Proposed Massachusetts Year 2008 Integrated List of Waters* 303 (d) list identifies non-attainment due to priority organics, nutrients, and pathogens.

Flow and Dilution Factor

The current permitted flow limit for the facility is 39,000 gpd (0.06 cfs) and is expressed as a rolling annual average. The current permit does not require reporting of the average monthly flow. The draft permit retains the rolling average limit but now also requires the Town to report the average monthly flow, which is more representative of actual flow conditions during any particular month.

A dilution factor based upon the design flow of the facility and the 7Q10 flow of the receiving stream is calculated and used to develop certain permit limits. A review of the data at the nearby gaging station and the drainage areas of the gaging station and treatment facility outfall indicated that the estimated 7Q10 flow and the dilution factor used in the current permit limit calculations are still valid and will be used in the calculations for this permit. The dilution factor calculation is as follows:

7Q10@ WWTF discharge = 23.4 cfs
Design flow = 0.039 mgd = 0.06 cfs

Dilution factor = (River 7Q10 @ Discharge + Design Flow) ÷ Design Flow
Dilution Factor = (23.4 + 0.06) ÷ 0.06 = 391

BOD and TSS

The secondary treatment technology-based effluent limitations for Publicly Owned Treatment Works are found at 40 CFR Part 133 (Secondary Treatment Regulation) and include a monthly average concentration limit of 30 mg/l and a weekly average concentration limit of 45 mg/l for BOD and TSS. Pursuant to 40 CFR Part 122.45(f) effluent limitations must also be expressed in terms of mass. The calculations for the monthly and weekly average BOD and TSS mass limits are:

mass limits	Flow x Concentration x Conversion Factor = lbs/day
30-day average	0.039 mgd x 30 mg/l x 8.34(lb)(l)/(mg)(gal) = 9.8 lbs/day
7-day average	0.039 mgd x 45 mg/l x 8.34(lb)(l)/(mg)(gal) = 14.6 lbs/day

These are the same as in the existing permit and are maintained in the draft permit.

The draft permit also includes an eighty-five percent (85%) removal requirement for BOD and TSS which is from the secondary treatment requirements of 40 CFR Part 133.

pH, fecal coliform, and Escherichia coli *(E. coli)*

The limitations for pH, fecal coliform, and *E. coli* are based upon water quality considerations and the Massachusetts state certification requirements under Section (401) (a) (1) of the Clean Water Act, as defined in 40 CFR §124.53 and water quality standards. The MassDEP has determined that disinfection may be provided seasonally in recognition that contact recreation, such as swimming, boating, and fishing, is not likely to occur from the early autumn through the early spring months (See 314CMR 4.05(3)(b)4.b.).

On December 29, 2006 the State approved Water Quality Standards which include a revision to the bacteria criteria. Several scientific studies have demonstrated that *E. coli* is a better indicator than coliform of potential human health effects of bacteria from certain recreational uses, such as swimming. EPA approved this revision to the State water quality standards on September 19, 2007.

The bacteria criteria are based on the EPA criteria originally published in 1986 and more recently included in the EPA bacteria ruling found in the Federal Register (November 16, 2004: "Water Quality Standards for Coastal and Great Lakes Recreation Waters: Final Rule"). The E. coli SSM (single sample maximum) values are based on 4 classes of exposure with the upper 75% confidence level being the most stringent. MassDEP views the use of the 90% upper confidence level (lightly used full body contact recreation) of 409 cfu/100 ml as appropriate for setting effluent bacteria levels in NPDES permits. MassDEP views this as in keeping with how the fecal coliform criteria were used with the 10% exceedance allowance. EPA explained that if NPDES permits limits are set at the 75% upper confidence level for SSM it would, in fact, be more stringent than intended by the criteria and "could impart a level of protection much more stringent than intended by the 1986 bacteria criteria document." (EPA-823-F-06-013, September 2006, Water Quality Standards for Coastal Recreation Waters: Using Single Sample Maximum Values in State Water Quality Standards).

The bacteria limits for this permit are thus set using the water quality standard based geometric mean value in the SWQS and setting the daily maximum at the 90% upper confidence level. The permit is more stringent in that it does not allow 10% of the effluent samples to be above 409 cfu/100 ml which is how the surface water criteria are applied in the water quality standards. Consequently, the draft permit contains *E. coli* limits that will become effective one year after the effective date of the permit. For the first year, there is a *report-only* requirement for *E. coli* as an adjustment period for the facility. The draft permit contains a fecal coliform limit as an interim limit during that first year, after which it will expire.

Total Residual Chlorine

Total Residual Chlorine (TRC) water quality criteria are established in the *National Recommended Water Quality Criteria* 2002 update and have been adopted into the State Water Quality Standards (See 314 CMR 4.05(5)(e)). The in-stream criteria shall not exceed 11 ug/l for chronic toxicity and 19 ug/l for acute toxicity to protect aquatic life. Allowing for available dilution at the annual monthly average flow, the TRC permit limit calculations based on the dilution factor of 391 are shown below.

Average Monthly Chlorine Limit = 11 ug/l * 391 = 4301 ug/l = 4.3 mg/l
Daily Maximum Chlorine Limit = 19 ug/l * 391 = 7429 ug/l = 7.4 mg/l

However, the Massachusetts Implementation Policy for the Control of Toxic Pollutants in Surface Waters stipulates that the maximum effluent concentration of chlorine shall not exceed 1.0 mg/l for discharges with dilution factors greater than 100. Consequently, the draft permit sets

a maximum daily limit of 1.0 mg/l and a report-only monthly average requirement in compliance with that policy.

Phosphorus

Phosphorus is a nutrient that can promote excessive plant growth which interferes with water uses and reduces in-stream dissolved oxygen. State water quality standards (314 CMR 4.04(5) Control of Eutrophication) require any existing point source discharge containing nutrients in concentrations which encourage eutrophication or growth of weeds or algae shall be provided with the highest and best practicable treatment to remove such nutrients. As discussed above, this segment of the Millers River appears on the Massachusetts 303(d) list for nutrients.

EPA has published national guidance documents which contain recommended total phosphorus criteria and other indicators of eutrophication. EPA's *Quality Criteria for Water 1986* (the Gold Book) recommends, in order to control eutrophication, that 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.

Sampling data from the 2000 Water Quality Assessment Report indicated a summer in-stream phosphorus concentration of 70 ug/l at Station MI10A at Blossom Street. Using the Gold Book criteria and accounting for this in-stream concentration, a permit limit for phosphorus is calculated as follows:

$$\{(Q_R + Q_{WWTP}) * C_{WQ} - (Q_R * C_R)\} / Q_{WWTP} = C_{WWTP}$$

where:

Q_R = 7Q10 flow of the Millers River = 23.4 cfs
Q_{WWTP} = Design Flow of Royalston WWTP = 0.06 cfs
C_{WQ} = In-stream water quality criteria = 100 ug/l
C_R = In-stream phosphorus concentration = 70 ug/l
C_{WWTP} = Phosphorus concentration limit for Royalston WWTP

{((0.06 cfs + 23.4 cfs) * 100 ug/l) – (23.4 cfs *70) ug/l} / 0.06 cfs =
{2346 – 1638} / 0.06 = 11800 ug/l = 11.8 mg/l

The eight samples taken in 2007 and 2008 averaged 1.85 mg/l of phosphorus. Consequently, the effluent does not have the reasonable potential to cause or contribute to an exceedance of the phosphorus Gold Book water quality criterion.

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. The Town of Royalston Wastewater Treatment Facility is within Ecoregion XIV, Eastern Coastal Plain,

Northeastern Coastal Zone. Recommended 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, 2001, and includes a total in-stream phosphorus criterion of 23.75 ug/l (0.024 mg/l). Although normally applied to the average river flow for the summer months, a phosphorus limit based upon the ecoregion in-stream criterion and the more stringent 7Q10 flow would still be 9.3 mg/l (0.02375 mg.l * 391). Because the existing in-stream phosphorus concentration of 70 ug/l is greater than the criterion, even an effluent discharge at the ecoregion criterion would contribute to an exceedance of the in-stream ecoregion phosphorus criterion.

EPA typically applies the Gold Book criterion because it was developed from an effects-based approach versus the reference conditions-based approach used to develop the ecoregion criteria. The effects-based approach is taken because it is more directly associated with an impairment to a designated use (e.g. fishing). The effects-based approach provides a threshold value above which water quality impairments are likely to occur. It applies empirical observations of a causal variable (i.e. phosphorus) and a response variable (i.e. algal growth) associated with designated use impairments. Referenced-base values are statistically derived from a comparison within a population of rivers in the same ecoregional class. They are a quantitative set of river characteristics (physical, chemical, and biological) that represent minimally impacted conditions.

In addition, the Winchendon WPCF and the Gardner and Templeton municipal treatment facilities which discharge to the Otter River are upstream of the Royalston WWTF. Improvements to control phosphorus in these upstream facilities should result in lower in-stream phosphorus concentrations. Considering the high dilution factor for the Royalston WWTF, phosphorus limits based upon the ecoregion criterion and the current in-stream phosphorus concentration will not be implemented in this draft permit. Rather, the reporting requirements of the current permit are retained in the draft permit. The phosphorus monitoring frequency, however, has been increased from quarterly to monthly. The increased testing will provide additional data to better quantify the phosphorus loading from the Royalston WWTP in establishing any future numerical phosphorus limits.

Nitrogen

In December 2000, the Connecticut Department of Environmental Protection (CT DEP) completed a Total Maximum Daily Load (TMDL) for addressing nitrogen-driven eutrophication impacts in Long Island Sound. The TMDL included a Waste Load Allocation (WLA) for point sources and a Load Allocation (LA) for non-point sources. The point source WLA for out-of-basin sources (Massachusetts, New Hampshire and Vermont wastewater facilities discharging to the Connecticut, Housatonic and Thames River watersheds) requires an aggregate 25% reduction from the baseline total nitrogen loading estimated in the TMDL.

The baseline total nitrogen point source loadings estimated for the Connecticut, Housatonic, and Thames River watersheds were 21,672 lbs/day, 3,286 lbs/day, and 1,253 lbs/day respectively (see table below). The estimated current point source total nitrogen loadings for the Connecticut, Housatonic, and Thames Rivers respectively are 13,836 lbs/day, 2,151 lbs/day, and 1,015

lbs/day. The following table summarizes the estimated baseline loadings, TMDL target loadings, and estimated current loadings:

Basin	Baseline Loading[1] lbs/day	TMDL Target[2] lbs/day	Current Loading[3] lbs/day
Connecticut River	21,672	16,254	13,836
Housatonic River	3,286	2,464	2,151
Thames River	1,253	939	1,015
Totals	26,211	19,657	17,002

1. Estimated loading from TMDL
2. Reduction of 25% from baseline loading
3. Estimated current loading from 2004 – 2005 DMR data

The TMDL target of a 25 percent aggregate reduction from baseline loadings is currently being met, and the overall loading from MA, NH and VT wastewater treatment plants discharging to the Connecticut River watershed has been reduced by about 36 percent.

In order to ensure that the aggregate nitrogen loading from out-of-basin point sources does not exceed the TMDL target of a 25 percent reduction over baseline loadings, EPA intends to include a permit condition for all existing treatment facilities in Massachusetts and New Hampshire that discharge to the Connecticut, Housatonic and Thames River watersheds, requiring the permittees to evaluate alternative methods of operating their treatment plants to optimize the removal of nitrogen, and to describe previous and ongoing optimization efforts. Facilities not currently engaged in optimization efforts will also be required to implement optimization measures sufficient to ensure that their nitrogen loads do not increase, and that the aggregate 25 % reduction is maintained. Such a requirement has been included in this permit. We also intend to work with the State of Vermont to ensure that similar requirements are included in its discharge permits.

Specifically, the permit requires an evaluation of alternative methods of operating the existing wastewater treatment facility in order to control total nitrogen levels, including, but not limited to, operational changes designed to enhance nitrification (seasonal and year round), incorporation of anoxic zones, septage receiving policies and procedures, and side stream management. This evaluation is required to be completed and submitted to EPA and MassDEP within one year of the effective date of the permit, along with a description of past and ongoing optimization efforts. The permit also requires implementation of optimization methods sufficient to ensure that there is no increase in total nitrogen compared to the existing average daily load. The annual average total nitrogen load from this facility (2004 – 2005) is estimated to be 11.4 lbs/day. The permit requires annual reports to be submitted that summarize progress and activities related to optimizing nitrogen removal efficiencies, document the annual nitrogen discharge load from the facility, and track trends relative to previous years.

The agencies will annually update the estimate of all out-of-basin total nitrogen loads and may incorporate total nitrogen limits in future permit modifications or reissuances as may be necessary to address increases in discharge loads, a revised TMDL, or other new information that

may warrant the incorporation of numeric permit limits. There have been significant efforts by the New England Interstate Water Pollution Control Commission (NEIWPCC) work group and others since completion of the 2000 TMDL, which are anticipated to result in revised wasteload allocations for in-basin and out-of-basin facilities. Although not a permit requirement, it is strongly recommended that any facilities planning that might be conducted for this facility should consider alternatives for further enhancing nitrogen reduction.

Metals

The *National Recommended Water Quality Criteria: 2002*, which have been adopted by the MassDEP in its water quality standards (See 314 CMR 4.05(5)(e), include water quality criteria for metals.

Due to the large dilution factor, metal limits calculated using the water quality criteria indicated that there is no reasonable potential to exceed the water quality criteria. Consequently, the draft permit does not include any limits for metals.

Whole Effluent Toxicity

The Massachusetts Surface Water Quality Standards require that EPA criteria established pursuant to Section 304(a)(1) of the Clean Water Act be used as guidance in the 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."*

EPA Region I has developed a toxicity control policy which requires wastewater treatment facilities to perform the toxicity testing in order to meet the state certification requirement.

National studies conducted by the Environmental Protection Agency have demonstrated that domestic sources contribute toxic constituents to WWTPs. These constituents include metals, chlorinated solvents and aromatic hydrocarbons among others. The impact of the toxicity of several constituents in a single effluent is accomplished through whole effluent toxicity (WET) testing.

Based on the potential for toxicity and in accordance with EPA regulation and policy, the draft permit includes acute toxicity limitations and monitoring requirements. (See, e.g., "Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants", 50 Fed. Reg. 30,784 (July 24, 1985); see also, EPA's Technical Support Document for Water Quality-Based Toxics Control).

The principal advantages of biological techniques are: (1) the effects of complex discharges of many known and unknown constituents can be measured only by biological analyses; (2) bioavailability of pollutants after discharge is best measured by toxicity testing including any synergistic effects of pollutants; and (3) pollutants for which there are inadequate chemical

analytical methods or criteria can be addressed. Therefore, toxicity testing is being used in conjunction with pollutant specific control procedures to control the discharge of toxic pollutants.
The frequency and type of WET tests depend on the dilution factor and risk factor. Pursuant to EPA Region 1 policy, and MassDEP's Implementation Policy for the Control of Toxic Pollutants in Surface Waters, WET policy, permittees can request a reduction in WET tests depending upon the successful results of previous WET tests. The current permit requires WET testing only once per year. WET test results indicate compliance with the current permit limit and the draft permit retains the current permit WET requirement.

As in the current permit, Whole Effluent Toxicity testing will be performed once per year using the daphnia, *Ceriodaphnia dubia.*

V. Sludge

Section 405(d) of the CWA requires that EPA develop technical regulations regarding the use and disposal of sewage sludge and that sludge conditions implementing these regulations are included in all POTW permits. The pertinent regulations are found at 40 CFR Part 503 and apply to any facility engaged in the treatment of domestic sewage.

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, a copy of the self-implementing *Sludge Compliance Guidance* document is being sent to the permittee with the Draft Permit for use by the permittee in determining the appropriate sludge conditions for its chosen method of sludge disposal.

VI. Endangered Species Act (ESA)

Under Section 7 of the Endangered Species Act, federal agencies are required to ensure that any action they conduct, authorize, or fund is not likely to jeopardize the continued existence of a federally listed species, or result in the adverse modification of critical habitat. EPA has initiated informal consultation with both NOAA Fisheries and the United State Fish and Wildlife Service (USFWS) concerning listed species under their purviews. The small whorled pogonia (*Isotria medeoloides*) is listed for Worcester County and the shortnose sturgeon (*Acipenser brevirostrom*) is listed for the Connecticut River to which the Millers River is a tributary on the USFWS website (www.fws.gov/northeast/endangered/pages/listing/States/mass.html).

EPA believes the authorized discharge from this facility is not likely to adversely affect any federally-listed species, or their habitats for the following reasons:

- The permit will prohibit violations of the state water quality standards.
- Acute toxicity tests will be conducted on *Ceriodaphnia dubia* and current results of the toxicity tests are in compliance with the permit limits;
- This is a re-issuance of an existing permit

EPA is seeking concurrence with this opinion from NOAA Fisheries and USFWS through the informal ESA consultation process

VII. Essential Fish Habitat

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. §1801 et seq. (1998)), EPA is required to consult with the National Fisheries Services (NOAA Fisheries) if EPA's action or proposed action that it funds, permits, or undertakes, may adversely impact any essential fish habitat (EFH). The Amendments broadly define essential fish habitat as: waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. § 1802 (10)). Adversely impact means any impact which reduces the quality and/or quantity of EFH (50 C.F.R. § 600.910 (a)). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

Essential fish habitat is only designated for species for which federal fisheries management plans exist (16 U.S.C. § 1855 (b) (1)(A)). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999.

There is no managed species believed to be present during one or more lifestages within the area which encompasses the discharge site, the Millers River.

Consequently, EPA believes that additional mitigation is not warranted.

VIII. State Certification Requirements

EPA may not issue a permit unless the Massachusetts Department of Environmental Protection (MassDEP) certifies that the effluent limitations included in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State Water Quality Standards. The MassDEP has reviewed the draft permit and advised EPA that the limitations are adequate to protect water quality. EPA has requested permit certification by the State pursuant to 40 CFR §124.53 and expects the draft permit will be certified.

IX. Comment Period and Procedures the Final Decision

All persons, 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 the EPA and MassDEP contacts listed below. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues to be raised in the hearing. A public hearing may be held after at least thirty (30) days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit the Regional Administrator will respond to all significant comments and make these responses available to the

public at EPA's Boston office.

Following the close of the comment period, and after the public hearing, if held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and to each person who has submitted written comments or requested notice.

X. EPA and MassDEP Contacts

Additional information concerning the draft permit may be obtained between the hours of 9 am and 5 pm, Monday through Friday from:

Mark Malone (CMP)
Municipal Permits Branch
U.S. EPA
One Congress Street - Suite 1100
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FAX: (617) 918-2064

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Paul Hogan
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Division of Watershed Management
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Stephen S. Perkins, Director
Office of Ecosystem Protection
U.S. EPA

Figure 1

Royalston WWTP
MA 0100161

0.7 0 0.7 1.4 Miles

▲ NPDES Draft Majors and Minors
MA Town Boundaries

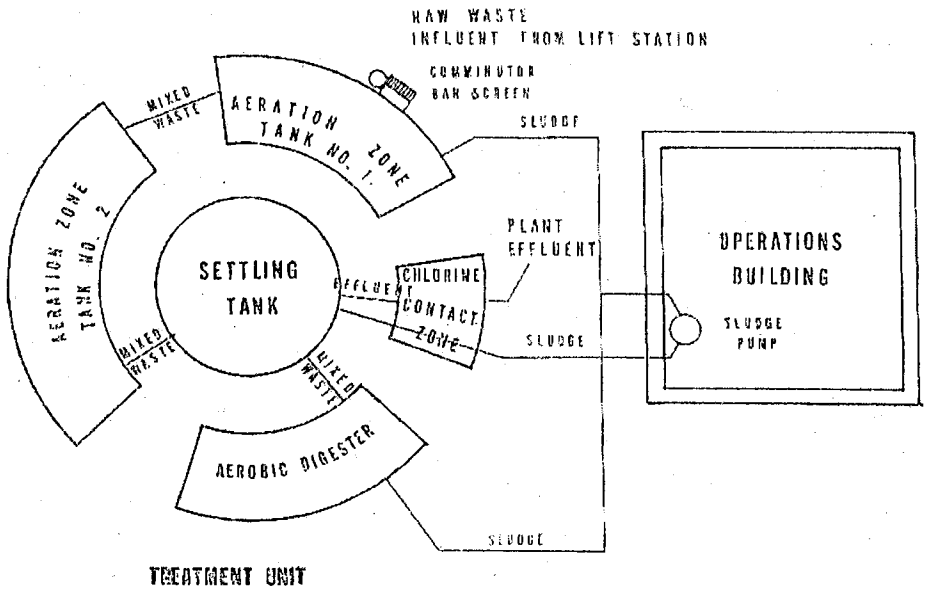

Figure 2
Royalston WWTP
MA0100161

Attachment 1

Royalston, Massachusetts
NPDES Permit No. MA0100161

	Flow gpd		BOD mg/l	TSS mg/l	pH su		Fecal Coliform cfu/100ml		Cl Residual mg/l		Phos mg/l	Total N mg/l
	ave mon[1]	max day	ave mon	ave mon	min	max	ave mon	max	ave	max	ave mon	ave mon
Limits			**30**	**30**	**6.5**	**8.3**	**200**	**400**		**1.0**	**Report**	**Report**
Jan, 2007	14218	50000	18	14	6.70	6.8	***	***	***	***	***	***
February	10876	30000	17	12	6.8	7.1	***	***	***	***	1.2	9.1
March	19067	50000	18	15	6.7	6.9	***	***	***	***	***	***
April	24800	100000	20	17	6.6	6.9	45	100	0.5	0.9	***	***
May	20000	50000	16	13	6.7	6.8	38	100	0.4	0.9	2.2	13.8
June	17000	100000	9	11	6.7	6.9	17	50	0.4	0.9	***	***
July	15600	45600	9	9	6.7	7.0	34	100	0.4	0.9	***	***
August	14000	30000	10	10	6.7	6.8	54	140	0.3	0.6	2.8	18.1
September	13069	42000	14	13	6.6	6.7	85	200	0.3	0.9	***	***
October	12700	89000	17	17	6.4	6.9	65	110	0.5	0.90	***	***
November	12600	29000	16	14.0	6.6	6.9	***	***	***	***	0.8	11.9
December	12400	29000	19	15	6.7	7	***	***	***	***	***	***
Jan, 2008	12460	15560	20	15	6.70	6.9	***	***	***	***	***	***
February	12580	14600	17	12	6.7	6.9	***	***	***	***	1.1	10.8

[1] 12-month rolling average
*** no monitoring required

Whole Effluent Toxicity	2004	2005	2006
Limit $LC_{50} \geq 50\%$	>100%	>100%	>100%