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 Concord
Department of Public Works

is authorized to discharge from the facility located at

Concord Wastewater Treatment Plant
509 Bedford Street
Concord, MA 01742

to receiving water named

Concord River

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

This permit shall become effective on **(See ** below)**

This permit and the authorization to discharge expire at midnight, five (5) years from the effective date.

This permit supersedes the permit issued on January 12, 2006.

This permit consists of 14 pages in Part I including effluent limitations and monitoring requirements, 25 pages in Part II Standard Conditions, Attachment A – Revised Freshwater Chronic Toxicity Test Procedure and Protocol, and Attachment B – Summary of Required Reports.

Signed this day of

Stephen S. Perkins, Director	David Ferris, Director
Office of Ecosystem Protection	Massachusetts Wastewater Management Program
Environmental Protection Agency	Department of Environmental Protection
Boston, MA	Commonwealth of Massachusetts
	Boston, MA

** This permit will become effective on the date of signature if no comments are received during public notice. If comments are received during public notice, this permit will be made effective no sooner than 30 days after signature

PART I

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

EFFLUENT CHARACTERISTIC	**EFFLUENT LIMITS**					**MONITORING REQUIREMENTS** [3]	
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE**
FLOW[2]	*********	*********	1.2 MGD	*********	Report MGD	CONTINUOUS	RECORDER
FLOW[2]	*********	*********	Report MGD	*********	*********	CONTINUOUS	RECORDER
BOD_5 [4]	300 lbs/Day 136 kgs/Day	450 lbs/Day 204 kgs/Day	30 mg/l	45 mg/l	Report mg/l	2/WEEK	24-HOUR COMPOSITE[5]
TSS [4]	300 lbs/Day 136 kgs/Day	450 lbs/Day 204 kgs/Day	30 mg/l	45 mg/l	Report mg/l	2/WEEK	24-HOUR COMPOSITE[5]
pH RANGE[1]	6.0- 8.3 SU (SEE PERMIT PAGE 5 OF 14, PARAGRAPH I.A.1.b.)					1/DAY	GRAB
ESCHERICHIA COLI [1,6]	*********	*********	126 cfu/100 ml	*********	409 cfu/100 ml	2/WEEK	GRAB
DISSOLVED OXYGEN (April 1st-October 31st)	NOT LESS THAN 5.0 mg/l					1/DAY	GRAB
TOTAL PHOSPHORUS[7] April 1st – October 31st November 1st – March 31st	 ********* *********	 ********* *********	 200 µg/l 1,000 µg/l	 ********* *********	 1,000 µg/l Report µg/l	1/MONTH	24-HOUR COMPOSITE[5]
DI(2-ETHYLHEXYL) PHTHALATE[8]	*********	*********	********	*********	Report µg/l	1/QUARTER	24-HOUR COMPOSITE[5]
TOTAL RECOVERABLE ALUMINUM[9]	*********	*********	306 µg/l	*********	Report µg/l	1/MONTH	24-HOUR COMPOSITE[5]
WHOLE EFFLUENT TOXICITY [10, 11, 12, 13] Total Recoverable Cadmium Total Recoverable Lead Total Recoverable Copper Total Recoverable Zinc Total Recoverable Nickel Total Recoverable Aluminum	Acute $LC_{50} \geq$ 100% Chronic C-NOEC Report Report maximum daily, µg/l Report maximum daily, µg/l Report maximum daily, µg/l Report maximum daily, µg/l Report maximum daily, µg/l Report maximum daily, µg/l					4/YEAR	24-HOUR COMPOSITE[5]

Footnotes:

1. Required for State Certification.

2. Report annual average, monthly average, and the maximum daily flow. The limit is an annual average, which shall be reported as a rolling average. The value will be calculated as the arithmetic mean of the monthly average flow for the reporting month and the monthly average flows of the previous eleven months.

3. All samples shall be representative of the discharge from outfall 001. A routine sampling program shall be developed in which samples are taken at the same location, same time and same days of the week each month. Occasional deviations from the routine sampling program are allowed, but the reason for the deviation shall be documented in correspondence appended to the applicable discharge monitoring report. 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.

4. Sampling required for influent and effluent.

5. 24-hour composite samples will consist of at least twenty-four (24) grab samples taken during one consecutive 24 hour period, either collected at equal intervals and combined proportional to flow or continuously collected proportionally to flow.

6. The monthly average limit for *E. coli* is expressed as a geometric mean.

7. The sampling frequency identified is the minimum sampling frequency and, in accordance with footnote #3, sampling must be conducted on the same day(s) each week. If any additional phosphorus sampling is conducted, including process control samples, the individual phosphorus results, including the day each sample was taken, the type of sample, i.e., 24-hour composite or grab, and the analytical method, must be reported on an attachment to the DMR. Additionally, the chemical dosing rate for all chemicals added for the purpose of phosphorus removal shall be reported for each day of the month. Only 24 hour composite samples analyzed with an EPA approved method shall be used in determining compliance with the permit limit.

8. If DEHP analysis is non-detect, the permittee shall include the reporting limit in the DMR cover letter or as an attachment to the DMR.

9. The aluminum samples shall be collected concurrently with the phosphorus samples.

10. The permittee shall conduct chronic (and modified acute) toxicity tests four times per year. The chronic test may be used to calculate the acute LC50 at the 48-hour exposure interval. The permittee shall test the daphnid, *Ceriodaphnia dubia*, only. Toxicity test samples shall

be collected during the second week of the months of March, June, September, and December. The test results shall be submitted by the last day of the month following the completion of the test. The results are due April 30th, July 31st, October 31st and January 31st, respectively. The tests must be performed in accordance with test procedures and protocols specified in Attachment A of this permit.

Test Dates Second Week in	**Submit Results By:**	**Test Species**	**Acute Limit LC_{50}**	**Chronic Limit C-NOEC**
March June September December	April 30 July 31 October 31 January 31	Ceriodaphnia dubia (daphnid)	≥ 100%	Report

11. The LC50 is the concentration of effluent which causes mortality to 50% of the test organisms. Therefore, a 100% limit means that a sample of 100% effluent (no dilution) shall cause no more than a 50% mortality rate.

12. C-NOEC (chronic-no observed effect concentration) is defined as the highest concentration of toxicant or effluent to which organisms are exposed in a life cycle or partial life cycle test which causes no adverse effect on growth, survival, or reproduction, based on a statistically significant difference from dilution control, at a specific time of observation as determined from hypothesis testing. Under the NPDES program, as indicated in the EPA WET Method Manual EPA 821-R-02-013, Section 10.2.6.2, all test results are to be reviewed and reported in consultation with EPA guidance on the evaluation of the concentration-response relationship.

13. 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 at http://epa.gov/region1/npdes/permits/generic/Alternatedilutionwaterguidance.pdf. 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. However, at any time, the permittee may choose to contact EPA-New England directly using the approach outlined in Attachment A.

Part I.A.1. (Continued)

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

b. The pH of the effluent shall not be less than 6.0 or greater than 8.3 at any time.

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

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

e. 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.

f. Use of chlorine is prohibited.

g. The results of sampling for any parameter done in accordance with EPA approved methods above its required frequency must also be reported.

2. All WWTPs must provide adequate notice to the Director of the following:

a. Any new introduction of pollutants into the WWTP from an indirect discharger which would be subject to section 301 or 306 of the Clean Water Act if it were directly discharging those pollutants; and

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

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

i. The quantity and quality of effluent introduced into the WWTP; and

ii. Any anticipated impact of the change on the quantity or quality of effluent to be discharged from the WWTP.

3. Prohibitions Concerning Interference and Pass Through:

Pollutants introduced into WWTP's by a non-domestic source (user) shall not pass through the WWTP 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 that 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 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 permittee is authorized to discharge only in accordance with the terms and conditions of this permit and only from the outfall(s) listed in Part I. A.1.of this permit. Discharges of wastewater from any other point sources, including sanitary sewer overflows (SSOs), are not authorized by this permit and shall be reported to EPA and MassDEP in accordance with Section D.1.e. (1) of Part II Standard Conditions of this permit (Twenty-four hour reporting).

Notification of SSOs to MassDEP shall be made on its SSO Reporting Form (which includes MassDEP 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. The permittee is required to complete the following activities for the collection system which it owns:

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. Provisions to meet this requirement shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

2. Preventive Maintenance Program

The permittee shall maintain an ongoing preventive 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. Plans and programs to meet this requirement shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

3. Infiltration/Inflow

The permittee shall control infiltration and inflow (I/I) into the sewer system as necessary to prevent high flow related unauthorized discharges from their collection systems and high flow related violations of the wastewater treatment plant's effluent limitations. Plans and programs to control I/I shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

4. Collection System Mapping

Within 30 months of the effective date of this permit, the permittee shall prepare a map of the sewer collection system it owns and/or operates (see page 1 of this permit for the effective date). The map shall be on a street map of the community, with sufficient detail and at a scale to allow easy interpretation. The collection system information shown on the map shall be based on current conditions and shall be kept up to date and available for review by federal, state, or local agencies. Such map(s) shall include, but not be limited to the following:

a. All sanitary sewer lines and related manholes;
b. All combined sewer lines, related manholes, and catch basins;
c. All combined sewer regulators and any known or suspected connections between the sanitary sewer and storm drain systems (e.g. combination manholes);
d. All outfalls, including the treatment plant outfall(s), CSOs, and any known or suspected SSOs, including stormwater outfalls that are connected to combination manholes;
e. All pump stations and force mains;
f. The wastewater treatment facility(ies);
g. All surface waters (labeled);
h. Other major appurtenances such as inverted siphons and air release valves;
i. A numbering system which uniquely identifies manholes, catch basins, overflow points, regulators and outfalls;
j. The scale and a north arrow; and
k. The pipe diameter, date of installation, type of material, distance between manholes, and the direction of flow.

5. Collection System Operation and Maintenance Plan

The permittee shall develop and implement a Collection System Operation and Maintenance

Plan.

a. Within six (6) months of the effective date of the permit, the permittee shall submit to EPA and MassDEP

(1) A description of the collection system management goals, staffing, information management, and legal authorities;
(2) A description of the collection system and the overall condition of the collection system including a list of all pump stations and a description of recent studies and construction activities; and
(3) A schedule for the development and implementation of the full Collection System O & M Plan including the elements in paragraphs b.1. through b.8. below.

b. The full Collection System O & M Plan shall be submitted and implemented to EPA and MassDEP within twenty four (24) months from the effective date of this permit. The Plan shall include:

(1) The required submittal from paragraph 5.a. above, updated to reflect current information;
(2) A preventive maintenance and monitoring program for the collection system;
(3) Description of sufficient staffing necessary to properly operate and maintain the sanitary sewer collection system and how the operation and maintenance program is staffed;
(4) Description of funding, the source(s) of funding and provisions for funding sufficient for implementing the plan;
(5) Identification of known and suspected overflows and back-ups, including manholes. A description of the cause of the identified overflows and back-ups, corrective actions taken, and a plan for addressing the overflows and back-ups consistent with the requirements of this permit;
(6) A description of the permittee's programs for preventing I/I related effluent violations and all unauthorized discharges of wastewater, including overflows and by-passes and the ongoing program to identify and remove sources of I/I. The program shall include an inflow identification and control program that focuses on the disconnection and redirection of illegal sump pumps and roof down spouts; and
(7) An educational public outreach program for all aspects of I/I control, particularly private inflow.
(8) An Overflow Emergency Response Plan to protect public health from overflows and unanticipated bypasses or upsets that exceed any effluent limitation in the permit.

6. Annual Reporting Requirement

The permittee shall submit a summary report of activities related to the implementation of its Collection System O & M Plan during the previous calendar year. The report shall be submitted to EPA and MassDEP annually by March 31. The summary report shall, at a minimum, include:

a. A description of the staffing levels maintained during the year;
b. A map and a description of inspection and maintenance activities conducted and corrective actions taken during the previous year;
c. Expenditures for any collection system maintenance activities and corrective actions taken during the previous year;
d. A map with areas identified for investigation/action in the coming year;
e. If treatment plant flow has reached 80% of the design flow (0.96 MGD) or there have been capacity related overflows, submit a calculation of the maximum daily, weekly, and monthly infiltration and the maximum daily, weekly, and monthly inflow for the reporting year; and
f. A summary of unauthorized discharges during the past year and their causes and a report of any corrective actions taken as a result of the unauthorized discharges reported pursuant to the Unauthorized Discharges section of this permit.

7. Alternate Power Source

In order to maintain compliance with the terms and conditions of this permit, the permittee shall provide an alternative power source(s) sufficient to operate the portion of the publicly owned treatment works[1] it owns and operates.

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, including EPA regulations promulgated at 40 CFR Part 503, which prescribe "Standards for the Use or Disposal of Sewage Sludge" pursuant to Section 405(d) of the CWA, 33 U.S.C. § 1345(d).

2. If both state and federal requirements apply to the permittee's sludge use and/or disposal practices, the permittee shall comply with the more stringent of the applicable requirements.

3. The requirements and technical standards of 40 CFR Part 503 apply to the following sludge use 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; and
c. Sewage sludge incineration in a sludge only incinerator.

1 As defined at 40 CFR §122.2, which references the definition at 40 CFR §403.3

4. The requirements of 40 CFR Part 503 do not apply to facilities which dispose of sludge in a municipal solid waste landfill. 40 CFR § 503.4. These requirements also do not apply to facilities which do not use or 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 40 CFR. Part 503 requirements including the following elements:
   a. General requirements
   b. Pollutant limitations
   c. Operational Standards (pathogen reduction requirements and vector attraction reduction requirements)
   d. Management practices
   e. Record keeping
   f. Monitoring
   g. Reporting

   Which of the 40 C.F.R. Part 503 requirements apply to the permittee will depend upon the use or disposal practice followed and upon the quality of material produced by a facility. The EPA Region 1 Guidance document, "EPA Region 1 - NPDES Permit Sludge Compliance Guidance" (November 4, 1999), may be used by the permittee to assist it in determining the applicable requirements.[2]

6. The sludge shall be monitored for pollutant concentrations (all Part 503 methods) and pathogen reduction and vector attraction reduction (land application and surface disposal) at the following frequency. This frequency is based upon the volume of sewage sludge generated at the facility in dry metric tons per year

less than 290	1/ year
290 to less than 1,500	1 /quarter
1,500 to less than 15,000	6 /year
15,000 +	1 /month

   Sampling of the sewage sludge shall use the procedures detailed in 40 CFR 503.8.

7. Under 40 CFR § 503.9(r), the permittee is a "person who prepares sewage sludge" because it "is … the person who generates sewage sludge during the treatment of domestic sewage in a treatment works …." If the permittee contracts with *another* "person who prepares sewage sludge" under 40 CFR § 503.9(r) – i.e., with "a person who derives a material from sewage sludge" – for use or disposal of the sludge, then compliance with Part 503 requirements is the responsibility of the contractor engaged for that purpose. If the permittee does not engage a "person who prepares sewage sludge," as defined in 40 CFR § 503.9(r), for use or

2 This guidance document is available upon request from EPA Region 1 and may also be found at: http://www.epa.gov/region1/npdes/permits/generic/sludgeguidance.pdf

disposal, then the permittee remains responsible to ensure that the applicable requirements in Part 503 are met. 40 CFR § 503.7. If the ultimate use or disposal method is land application, the permittee is responsible for providing the person receiving the sludge with notice and necessary information to comply with the requirements of 40 CFR Part 503 Subpart B.

8. The permittee shall submit an annual report containing the information specified in the 40 CFR Part 503 requirements (§ 503.18 (land application), § 503.28 (surface disposal), or § 503.48 (incineration)) by **February 19** (*see also* "EPA Region 1 - NPDES Permit Sludge Compliance Guidance"). Reports shall be submitted to the address contained in the reporting section of the permit. If the permittee engages a contractor or contractors for sludge preparation and ultimate use or disposal, the annual report need contain only the following information:

   a. Name and address of contractor(s) responsible for sludge preparation, use or disposal; and
   b. Quantity of sludge (in dry metric tons) from the POTW that is transferred to the sludge contractor(s), and the method(s) by which the contractor will prepare and use or dispose of the sewage sludge.

E. MONITORING AND REPORTING

1. **For a period of one year from the effective date of the permit**, the permittee may either submit monitoring data and other reports to EPA in hard copy form or report electronically using NetDMR, a web-based tool that allows permittees to electronically submit discharge monitoring reports (DMRs) and other required reports via a secure internet connection. **Beginning no later than one year after the effective date of the permit**, the permittee shall begin reporting using NetDMR, unless the facility is able to demonstrate a reasonable basis that precludes the use of NetDMR for submitting DMRs and reports. Specific requirements regarding submittal of data and reports in hard copy form and for submittal using NetDMR are described below:

a. Submittal of Reports Using NetDMR

NetDMR is accessed from: http://www.epa.gov/netdmr. **Within one year of the effective date of this permit**, the permittee shall begin submitting DMRs and reports required under this permit electronically to EPA using NetDMR, unless the facility is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for submitting DMRs and reports ("opt-out request").

DMRs shall be submitted electronically to EPA no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA, including the MassDEP Monthly Operations and Maintenance Report, as an electronic attachment to the DMR. Once a permittee begins submitting reports using

NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA and will no longer be required to submit hard copies of DMRs to MassDEP. However, permittees shall continue to send hard copies of reports other than DMRs (including Monthly Operation and Maintenance Reports) to MassDEP until further notice from MassDEP.

b. Submittal of NetDMR Opt-Out Requests

Opt-out requests must be submitted in writing to EPA for written approval at least sixty (60) days prior to the date a facility would be required under this permit to begin using NetDMR. This demonstration shall be valid for twelve (12) months from the date of EPA approval and shall thereupon expire. At such time, DMRs and reports shall be submitted electronically to EPA unless the permittee submits a renewed opt-out request and such request is approved by EPA. All opt-out requests should be sent to the following addresses:

Attn: NetDMR Coordinator
U.S. Environmental Protection Agency, Water Technical Unit
5 Post Office Square, Suite 100 (OES04-4)
Boston, MA 02109-3912

And

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

c. Submittal of Reports in Hard Copy Form

Monitoring results shall be summarized for each calendar month and reported on separate hard copy Discharge Monitoring Report Form(s) (DMRs) postmarked no later than the 15th day of the month following the completed reporting period. All reports required under this permit, including MassDEP Monthly Operation and Maintenance Reports, shall be submitted as an attachment to the DMRs. Signed and dated originals of the DMRs, and all other reports or notifications required herein or in Part II shall be submitted to the Director at the following address:

U.S. Environmental Protection Agency
Water Technical Unit (OES04-SMR)
5 Post Office Square - Suite 100
Boston, MA 02109-3912

Duplicate signed copies of all reports or notifications required above shall be submitted to the State at the following addresses:

MassDEP – Northeast Region
Bureau of Resource Protection
205B Lowell Street
Wilmington, MA 01887

Copies of WET test reports **only** shall be submitted to the following address:

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

Any verbal reports, if required in **Parts I** and/or **II** of this permit, shall be made to both EPA-New England and to MassDEP.

F. STATE PERMIT CONDITIONS

1. This authorization to discharge includes two separate and independent permit authorizations. The two permit authorizations are (i) a federal National Pollutant Discharge Elimination System permit issued by the U.S. Environmental Protection Agency (EPA) pursuant to the Federal Clean Water Act, 33 U.S.C. §§1251 et seq.; and (ii) an identical state surface water discharge permit issued by the Commissioner of the Massachusetts Department of Environmental Protection (MassDEP) pursuant to the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53, and 314 C.M.R. 3.00. All of the requirements contained in this authorization, as well as the standard conditions contained in 314 CMR 3.19, are hereby incorporated by reference into this state surface water discharge permit.

2. This authorization also incorporates the state water quality certification issued by MassDEP under § 401(a) of the Federal Clean Water Act, 40 C.F.R. 124.53, M.G.L. c. 21, § 27 and 314 CMR 3.07. All of the requirements (if any) contained in MassDEP's water quality certification for the permit are hereby incorporated by reference into this state surface water discharge permit as special conditions pursuant to 314 CMR 3.11.

3. 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.

NPDES PART II STANDARD CONDITIONS
(January, 2007)

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PART II. A. GENERAL REQUIREMENTS

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

a. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirements.

b. The CWA provides that any person who violates Section 301, 302, 306, 307, 308, 318, or 405 of the CWA or any permit condition or limitation implementing any of such sections in a permit issued under Section 402, or any requirement imposed in a pretreatment program approved under Section 402 (a)(3) or 402 (b)(8) of the CWA is subject to a civil penalty not to exceed $25,000 per day for each violation. Any person who negligently violates such requirements is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both. Any person who knowingly violates such requirements is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or both.

c. Any person may be assessed an administrative penalty by the Administrator for violating Section 301, 302, 306, 307, 308, 318, or 405 of the CWA, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the CWA. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.

Note: See 40 CFR §122.41(a)(2) for complete "Duty to Comply" regulations.

2. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or notifications of planned changes or anticipated noncompliance does not stay any permit condition.

3. Duty to Provide Information

The permittee shall furnish to the Regional Administrator, within a reasonable time, any information which the Regional Administrator may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Regional Administrator, upon request, copies of records required to be kept by this permit.

4. Reopener Clause

The Regional Administrator reserves the right to make appropriate revisions to this permit in order to establish any appropriate effluent limitations, schedules of compliance, or other provisions which may be authorized under the CWA in order to bring all discharges into compliance with the CWA.

For any permit issued to a treatment works treating domestic sewage (including "sludge-only facilities"), the Regional Administrator or Director shall include a reopener clause to incorporate any applicable standard for sewage sludge use or disposal promulgated under Section 405 (d) of the CWA. The Regional Administrator or Director may promptly modify or revoke and reissue any permit containing the reopener clause required by this paragraph if the standard for sewage sludge use or disposal is more stringent than any requirements for sludge use or disposal in the permit, or contains a pollutant or practice not limited in the permit.

Federal regulations pertaining to permit modification, revocation and reissuance, and termination are found at 40 CFR §122.62, 122.63, 122.64, and 124.5.

5. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from responsibilities, liabilities or penalties to which the permittee is or may be subject under Section 311 of the CWA, or Section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

6. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges.

7. Confidentiality of Information

a. In accordance with 40 CFR Part 2, any information submitted to EPA pursuant to these regulations may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission in the manner prescribed on the application form or instructions or, in the case of other submissions, by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with the procedures in 40 CFR Part 2 (Public Information).

b. Claims of confidentiality for the following information will be denied:

(1) The name and address of any permit applicant or permittee;
(2) Permit applications, permits, and effluent data as defined in 40 CFR §2.302(a)(2).

c. Information required by NPDES application forms provided by the Regional Administrator under 40 CFR §122.21 may not be claimed confidential. This includes information submitted on the forms themselves and any attachments used to supply information required by the forms.

8. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee must apply for and obtain a new permit. The permittee shall submit a new application at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Regional Administrator. (The Regional Administrator shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)

9. State Authorities

Nothing in Part 122, 123, or 124 precludes more stringent State regulation of any activity covered by these regulations, whether or not under an approved State program.

10. Other Laws

The issuance of a permit does not authorize any injury to persons or property or invasion of other private rights, nor does it relieve the permittee of its obligation to comply with any other applicable Federal, State, or local laws and regulations.

PART II. B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of storm water pollution prevention plans. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of the permit.

2. Need to Halt or Reduce Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

4. Bypass

a. Definitions

(1) *Bypass* means the intentional diversion of waste streams from any portion of a treatment facility.

(2) *Severe property damage* means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can be reasonably expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Bypass not exceeding limitations

The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provision of Paragraphs B.4.c. and 4.d. of this section.

c. Notice

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.
(2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in paragraph D.1.e. of this part (Twenty-four hour reporting).

d. Prohibition of bypass

Bypass is prohibited, and the Regional Administrator may take enforcement action against a permittee for bypass, unless:

(1) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
(2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and
(3) i) The permittee submitted notices as required under Paragraph 4.c. of this section.
ii) The Regional Administrator may approve an anticipated bypass, after considering its adverse effects, if the Regional Administrator determines that it will meet the three conditions listed above in paragraph 4.d. of this section.

5. Upset

a. Definition. *Upset* means an exceptional incident in which there is an unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph B.5.c. of this section are met. No determination made during

administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the cause(s) of the upset;
(2) The permitted facility was at the time being properly operated;
(3) The permittee submitted notice of the upset as required in paragraphs D.1.a. and 1.e. (Twenty-four hour notice); and
(4) The permittee complied with any remedial measures required under B.3. above.

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

PART II. C. MONITORING REQUIREMENTS

1. Monitoring and Records

a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

b. Except for records for monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application except for the information concerning storm water discharges which must be retained for a total of 6 years. This retention period may be extended by request of the Regional Administrator at any time.

c. Records of monitoring information shall include:

(1) The date, exact place, and time of sampling or measurements;
(2) The individual(s) who performed the sampling or measurements;
(3) The date(s) analyses were performed;
(4) The individual(s) who performed the analyses;
(5) The analytical techniques or methods used; and
(6) The results of such analyses.

d. Monitoring results must be conducted according to test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, unless other test procedures have been specified in the permit.

e. The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by

imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

2. Inspection and Entry

The permittee shall allow the Regional Administrator or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

PART II. D. REPORTING REQUIREMENTS

1. Reporting Requirements

a. Planned Changes. The permittee shall give notice to the Regional Administrator as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is only required when:

(1) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR§122.29(b); or
(2) The alteration or addition could significantly change the nature or increase the quantities of the pollutants discharged. This notification applies to pollutants which are subject neither to the effluent limitations in the permit, nor to the notification requirements at 40 CFR§122.42(a)(1).
(3) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition or change may justify the application of permit conditions different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

b. Anticipated noncompliance. The permittee shall give advance notice to the Regional Administrator of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

c. Transfers. This permit is not transferable to any person except after notice to the Regional Administrator. The Regional Administrator may require modification or revocation and reissuance of the permit to change the name of the permittee and

incorporate such other requirements as may be necessary under the CWA. (See 40 CFR Part 122.61; in some cases, modification or revocation and reissuance is mandatory.)

d. Monitoring reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(1) Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by the Director for reporting results of monitoring of sludge use or disposal practices.

(2) If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in the permit, the results of the monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Director.

(3) Calculations for all limitations which require averaging or measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

e. Twenty-four hour reporting.

(1) The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances.

A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(2) The following shall be included as information which must be reported within 24 hours under this paragraph.

(a) Any unanticipated bypass which exceeds any effluent limitation in the permit. (See 40 CFR §122.41(g).)
(b) Any upset which exceeds any effluent limitation in the permit.
(c) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Regional Administrator in the permit to be reported within 24 hours. (See 40 CFR §122.44(g).)

(3) The Regional Administrator may waive the written report on a case-by-case basis for reports under Paragraph D.1.e. if the oral report has been received within 24 hours.

f. Compliance Schedules. Reports of compliance or noncompliance with, any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

g. Other noncompliance. The permittee shall report all instances of noncompliance not reported under Paragraphs D.1.d., D.1.e., and D.1.f. of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in Paragraph D.1.e. of this section.

h. Other information. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Administrator, it shall promptly submit such facts or information.

2. Signatory Requirement

a. All applications, reports, or information submitted to the Regional Administrator shall be signed and certified. (See 40 CFR §122.22)

b. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 2 years per violation, or by both.

3. Availability of Reports.

Except for data determined to be confidential under Paragraph A.8. above, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water pollution control agency and the Regional Administrator. As required by the CWA, effluent data shall not be considered confidential. Knowingly making any false statements on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the CWA.

PART II. E. DEFINITIONS AND ABBREVIATIONS

1. Definitions for Individual NPDES Permits including Storm Water Requirements

Administrator means the Administrator of the United States Environmental Protection Agency, or an authorized representative.

Applicable standards and limitations means all, State, interstate, and Federal standards and limitations to which a “discharge”, a “sewage sludge use or disposal practice”, or a related activity is subject to, including “effluent limitations”, water quality standards, standards of performance, toxic effluent standards or prohibitions, “best management practices”, pretreatment standards, and “standards for sewage sludge use and disposal” under Sections 301, 302, 303, 304, 306, 307, 308, 403, and 405 of the CWA.

Application means the EPA standard national forms for applying for a permit, including any additions, revisions, or modifications to the forms; or forms approved by EPA for use in "approved States", including any approved modifications or revisions.

Average means the arithmetic mean of values taken at the frequency required for each parameter over the specified period. For total and/or fecal coliforms and Escherichia coli, the average shall be the geometric mean.

Average monthly discharge limitation means the highest allowable average of "daily discharges" over a calendar month calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

Average weekly discharge limitation means the highest allowable average of "daily discharges" measured during the calendar week divided by the number of "daily discharges" measured during the week.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "waters of the United States." BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Best Professional Judgment (BPJ) means a case-by-case determination of Best Practicable Treatment (BPT), Best Available Treatment (BAT), or other appropriate technology-based standard based on an evaluation of the available technology to achieve a particular pollutant reduction and other factors set forth in 40 CFR §125.3 (d).

Coal Pile Runoff means the rainfall runoff from or through any coal storage pile.

Composite Sample means a sample consisting of a minimum of eight grab samples of equal volume collected at equal intervals during a 24-hour period (or lesser period as specified in the section on Monitoring and Reporting) and combined proportional to flow, or a sample consisting of the same number of grab samples, or greater, collected proportionally to flow over that same time period.

Construction Activities - The following definitions apply to construction activities:

(a) Commencement of Construction is the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities.

(b) Dedicated portable asphalt plant is a portable asphalt plant located on or contiguous to a construction site and that provides asphalt only to the construction site that the plant is located on or adjacent to. The term dedicated portable asphalt plant does not include facilities that are subject to the asphalt emulsion effluent limitation guideline at 40 CFR Part 443.

(c) Dedicated portable concrete plant is a portable concrete plant located on or contiguous to a construction site and that provides concrete only to the construction site that the plant is located on or adjacent to.

(d) Final Stabilization means that all soil disturbing activities at the site have been complete, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

(e) Runoff coefficient means the fraction of total rainfall that will appear at the conveyance as runoff.

Contiguous zone means the entire zone established by the United States under Article 24 of the Convention on the Territorial Sea and the Contiguous Zone.

Continuous discharge means a "discharge" which occurs without interruption throughout the operating hours of the facility except for infrequent shutdowns for maintenance, process changes, or similar activities.

CWA means the Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub. L. 92-500, as amended by Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, and Pub. L. 97-117; 33 USC §§1251 et seq.

Daily Discharge means the discharge of a pollutant measured during the calendar day or any other 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

Director normally means the person authorized to sign NPDES permits by EPA or the State or an authorized representative. Conversely, it also could mean the Regional Administrator or the State Director as the context requires.

Discharge Monitoring Report Form (DMR) means the EPA standard national form, including any subsequent additions, revisions, or modifications for the reporting of self-monitoring results by permittees. DMRs must be used by "approved States" as well as by EPA. EPA will supply DMRs to any approved State upon request. The EPA national forms may be modified to substitute the State Agency name, address, logo, and other similar information, as appropriate, in place of EPA's.

Discharge of a pollutant means:

(a) Any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source", or

(b) Any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation (See "Point Source" definition).

This definition includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person which do not lead

to a treatment works; and discharges through pipes, sewers, or other conveyances leading into privately owned treatment works.

This term does not include an addition of pollutants by any "indirect discharger."

Effluent limitation means any restriction imposed by the Regional Administrator on quantities, discharge rates, and concentrations of "pollutants" which are "discharged" from "point sources" into "waters of the United States", the waters of the "contiguous zone", or the ocean.

Effluent limitation guidelines means a regulation published by the Administrator under Section 304(b) of CWA to adopt or revise "effluent limitations".

EPA means the United States "Environmental Protection Agency".

Flow-weighted composite sample means a composite sample consisting of a mixture of aliquots where the volume of each aliquot is proportional to the flow rate of the discharge.

Grab Sample – An individual sample collected in a period of less than 15 minutes.

Hazardous Substance means any substance designated under 40 CFR Part 116 pursuant to Section 311 of the CWA.

Indirect Discharger means a non-domestic discharger introducing pollutants to a publicly owned treatment works.

Interference means a discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

(a) Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

(b) Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act (CWA), the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resources Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the SDWA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection Research and Sanctuaries Act.

Landfill means an area of land or an excavation in which wastes are placed for permanent disposal, and which is not a land application unit, surface impoundment, injection well, or waste pile.

Land application unit means an area where wastes are applied onto or incorporated into the soil surface (excluding manure spreading operations) for treatment or disposal.

Large and Medium municipal separate storm sewer system means all municipal separate storm sewers that are either: (i) located in an incorporated place (city) with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census (these cities are listed in Appendices F and 40 CFR Part 122); or (ii) located in the counties with unincorporated urbanized

populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships, or towns within such counties (these counties are listed in Appendices H and I of 40 CFR 122); or (iii) owned or operated by a municipality other than those described in Paragraph (i) or (ii) and that are designated by the Regional Administrator as part of the large or medium municipal separate storm sewer system.

Maximum daily discharge limitation means the highest allowable "daily discharge" concentration that occurs only during a normal day (24-hour duration).

Maximum daily discharge limitation (as defined for the Steam Electric Power Plants only) when applied to Total Residual Chlorine (TRC) or Total Residual Oxidant (TRO) is defined as "maximum concentration" or "Instantaneous Maximum Concentration" during the two hours of a chlorination cycle (or fraction thereof) prescribed in the Steam Electric Guidelines, 40 CFR Part 423. These three synonymous terms all mean "a value that shall not be exceeded" during the two-hour chlorination cycle. This interpretation differs from the specified NPDES Permit requirement, 40 CFR § 122.2, where the two terms of "Maximum Daily Discharge" and "Average Daily Discharge" concentrations are specifically limited to the daily (24-hour duration) values.

Municipality means a city, town, borough, county, parish, district, association, or other public body created by or under State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes, or an Indian tribe or an authorized Indian tribe organization, or a designated and approved management agency under Section 208 of the CWA.

National Pollutant Discharge Elimination System means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318, and 405 of the CWA. The term includes an "approved program".

New Discharger means any building, structure, facility, or installation:

(a) From which there is or may be a "discharge of pollutants";

(b) That did not commence the "discharge of pollutants" at a particular "site" prior to August 13, 1979;

(c) Which is not a "new source"; and

(d) Which has never received a finally effective NPDES permit for discharges at that "site".

This definition includes an "indirect discharger" which commences discharging into "waters of the United States" after August 13, 1979. It also includes any existing mobile point source (other than an offshore or coastal oil and gas exploratory drilling rig or a coastal oil and gas exploratory drilling rig or a coastal oil and gas developmental drilling rig) such as a seafood processing rig, seafood processing vessel, or aggregate plant, that begins discharging at a "site" for which it does not have a permit; and any offshore rig or coastal mobile oil and gas exploratory drilling rig or coastal mobile oil and gas developmental drilling rig that commences the discharge of pollutants after August 13, 1979, at a "site" under EPA's permitting jurisdiction for which it is not covered by an individual or general permit and which is located in an area determined by the Regional Administrator in the issuance of a final permit to be in an area of biological concern. In determining whether an area is an area of biological concern, the Regional Administrator shall consider the factors specified in 40 CFR §§125.122 (a) (1) through (10).

An offshore or coastal mobile exploratory drilling rig or coastal mobile developmental drilling rig will be considered a "new discharger" only for the duration of its discharge in an area of biological concern.

New source means any building, structure, facility, or installation from which there is or may be a "discharge of pollutants", the construction of which commenced:

(a) After promulgation of standards of performance under Section 306 of CWA which are applicable to such source, or

(b) After proposal of standards of performance in accordance with Section 306 of CWA which are applicable to such source, but only if the standards are promulgated in accordance with Section 306 within 120 days of their proposal.

NPDES means "National Pollutant Discharge Elimination System".

Owner or operator means the owner or operator of any "facility or activity" subject to regulation under the NPDES programs.

Pass through means a Discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation).

Permit means an authorization, license, or equivalent control document issued by EPA or an "approved" State.

Person means an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof.

Point Source means any discernible, confined, and discrete conveyance, including but not limited to any pipe ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff (see 40 CFR §122.2).

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. §§2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. It does not mean:

(a) Sewage from vessels; or

(b) Water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well is used either to facilitate production or for disposal purposes is approved by the authority of the State in which the well is located, and if the State determines that the injection or disposal will not result in the degradation of ground or surface water resources.

Primary industry category means any industry category listed in the NRDC settlement agreement (Natural Resources Defense Council et al. v. Train, 8 E.R.C. 2120 (D.D.C. 1976), modified 12 E.R.C. 1833 (D. D.C. 1979)); also listed in Appendix A of 40 CFR Part 122.

Privately owned treatment works means any device or system which is (a) used to treat wastes from any facility whose operation is not the operator of the treatment works or (b) not a "POTW".

Process wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

Publicly Owned Treatment Works (POTW) means any facility or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature which is owned by a "State" or "municipality".

This definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment.

Regional Administrator means the Regional Administrator, EPA, Region I, Boston, Massachusetts.

Secondary Industry Category means any industry which is not a "primary industry category".

Section 313 water priority chemical means a chemical or chemical category which:

(1) is listed at 40 CFR §372.65 pursuant to Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986);

(2) is present at or above threshold levels at a facility subject to EPCRA Section 313 reporting requirements; and

(3) satisfies at least one of the following criteria:

(i) are listed in Appendix D of 40 CFR Part 122 on either Table II (organic priority pollutants), Table III (certain metals, cyanides, and phenols), or Table V (certain toxic pollutants and hazardous substances);
(ii) are listed as a hazardous substance pursuant to Section 311(b)(2)(A) of the CWA at 40 CFR §116.4; or
(iii) are pollutants for which EPA has published acute or chronic water quality criteria.

Septage means the liquid and solid material pumped from a septic tank, cesspool, or similar domestic sewage treatment system, or a holding tank when the system is cleaned or maintained.

Sewage Sludge means any solid, semisolid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. Sewage sludge includes, but is not limited to, solids removed during primary, secondary, or advanced wastewater treatment, scum, septage, portable toilet pumpings, Type III Marine Sanitation Device pumpings (33 CFR Part 159), and sewage sludge products. Sewage sludge does not include grit or screenings, or ash generated during the incineration of sewage sludge.

Sewage sludge use or disposal practice means the collection, storage, treatment, transportation, processing, monitoring, use, or disposal of sewage sludge.

Significant materials includes, but is not limited to: raw materials, fuels, materials such as solvents, detergents, and plastic pellets, raw materials used in food processing or production, hazardous substance designated under section 101(14) of CERCLA, any chemical the facility is required to report pursuant to EPCRA Section 313, fertilizers, pesticides, and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

Significant spills includes, but is not limited to, releases of oil or hazardous substances in excess of reportable quantities under Section 311 of the CWA (see 40 CFR §110.10 and §117.21) or Section 102 of CERCLA (see 40 CFR § 302.4).

Sludge-only facility means any "treatment works treating domestic sewage" whose methods of sewage sludge use or disposal are subject to regulations promulgated pursuant to Section 405(d) of the CWA, and is required to obtain a permit under 40 CFR §122.1(b)(3).

State means any of the 50 States, the District of Columbia, Guam, the Commonwealth of Puerto Rico, the Virgin Islands, American Samoa, the Trust Territory of the Pacific Islands.

Storm Water means storm water runoff, snow melt runoff, and surface runoff and drainage.

Storm water discharge associated with industrial activity means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing, or raw materials storage areas at an industrial plant. (See 40 CFR §122.26 (b)(14) for specifics of this definition.

Time-weighted composite means a composite sample consisting of a mixture of equal volume aliquots collected at a constant time interval.

Toxic pollutants means any pollutant listed as toxic under Section 307 (a)(1) or, in the case of "sludge use or disposal practices" any pollutant identified in regulations implementing Section 405(d) of the CWA.

Treatment works treating domestic sewage means a POTW or any other sewage sludge or wastewater treatment devices or systems, regardless of ownership (including federal facilities), used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated for the disposal of sewage sludge. This definition does not include septic tanks or similar devices.

For purposes of this definition, "domestic sewage" includes waste and wastewater from humans or household operations that are discharged to or otherwise enter a treatment works. In States where there is no approved State sludge management program under Section 405(f) of the CWA, the Regional Administrator may designate any person subject to the standards for sewage sludge use and disposal in 40 CFR Part 503 as a "treatment works treating domestic sewage", where he or she finds that there is a potential for adverse effects on public health and the environment from poor sludge quality or poor sludge handling, use or disposal practices, or where he or she finds that such designation is necessary to ensure that such person is in compliance with 40 CFR Part 503.

Waste Pile means any non-containerized accumulation of solid, non-flowing waste that is used for treatment or storage.

Waters of the United States means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of tide;

(b) All interstate waters, including interstate "wetlands";

(c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands", sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

(1) Which are or could be used by interstate or foreign travelers for recreational or other purpose;

(2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(3) Which are used or could be used for industrial purposes by industries in interstate commerce;

(d) All impoundments of waters otherwise defined as waters of the United States under this definition;

(e) Tributaries of waters identified in Paragraphs (a) through (d) of this definition;

(f) The territorial sea; and

(g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in Paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA (other than cooling ponds as defined in 40 CFR §423.11(m) which also meet the criteria of this definition) are not waters of the United States.

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Whole Effluent Toxicity (WET) means the aggregate toxic effect of an effluent measured directly by a toxicity test. (See Abbreviations Section, following, for additional information.)

2. Definitions for NPDES Permit Sludge Use and Disposal Requirements.

Active sewage sludge unit is a sewage sludge unit that has not closed.

Aerobic Digestion is the biochemical decomposition of organic matter in sewage sludge into carbon dioxide and water by microorganisms in the presence of air.

Agricultural Land is land on which a food crop, a feed crop, or a fiber crop is grown. This includes range land and land used as pasture.

Agronomic rate is the whole sludge application rate (dry weight basis) designed:

(1) To provide the amount of nitrogen needed by the food crop, feed crop, fiber crop, cover crop, or vegetation grown on the land; and

(2) To minimize the amount of nitrogen in the sewage sludge that passes below the root zone of the crop or vegetation grown on the land to the ground water.

Air pollution control device is one or more processes used to treat the exit gas from a sewage sludge incinerator stack.

Anaerobic digestion is the biochemical decomposition of organic matter in sewage sludge into methane gas and carbon dioxide by microorganisms in the absence of air.

Annual pollutant loading rate is the maximum amount of a pollutant that can be applied to a unit area of land during a 365 day period.

Annual whole sludge application rate is the maximum amount of sewage sludge (dry weight basis) that can be applied to a unit area of land during a 365 day period.

Apply sewage sludge or sewage sludge applied to the land means land application of sewage sludge.

Aquifer is a geologic formation, group of geologic formations, or a portion of a geologic formation capable of yielding ground water to wells or springs.

Auxiliary fuel is fuel used to augment the fuel value of sewage sludge. This includes, but is not limited to, natural gas, fuel oil, coal, gas generated during anaerobic digestion of sewage sludge, and municipal solid waste (not to exceed 30 percent of the dry weight of the sewage sludge and auxiliary fuel together). Hazardous wastes are not auxiliary fuel.

Base flood is a flood that has a one percent chance of occurring in any given year (i.e. a flood with a magnitude equaled once in 100 years).

Bulk sewage sludge is sewage sludge that is not sold or given away in a bag or other container for application to the land.

Contaminate an aquifer means to introduce a substance that causes the maximum contaminant level for nitrate in 40 CFR §141.11 to be exceeded in ground water or that causes the existing concentration of nitrate in the ground water to increase when the existing concentration of nitrate in the ground water exceeds the maximum contaminant level for nitrate in 40 CFR §141.11.

Class I sludge management facility is any publicly owned treatment works (POTW), as defined in 40 CFR §501.2, required to have an approved pretreatment program under 40 CFR §403.8 (a) (including any POTW located in a state that has elected to assume local program responsibilities pursuant to 40 CFR §403.10 (e) and any treatment works treating domestic sewage, as defined in 40 CFR § 122.2,

classified as a Class I sludge management facility by the EPA Regional Administrator, or, in the case of approved state programs, the Regional Administrator in conjunction with the State Director, because of the potential for sewage sludge use or disposal practice to affect public health and the environment adversely.

Control efficiency is the mass of a pollutant in the sewage sludge fed to an incinerator minus the mass of that pollutant in the exit gas from the incinerator stack divided by the mass of the pollutant in the sewage sludge fed to the incinerator.

Cover is soil or other material used to cover sewage sludge placed on an active sewage sludge unit.

Cover crop is a small grain crop, such as oats, wheat, or barley, not grown for harvest.

Cumulative pollutant loading rate is the maximum amount of inorganic pollutant that can be applied to an area of land.

Density of microorganisms is the number of microorganisms per unit mass of total solids (dry weight) in the sewage sludge.

Dispersion factor is the ratio of the increase in the ground level ambient air concentration for a pollutant at or beyond the property line of the site where the sewage sludge incinerator is located to the mass emission rate for the pollutant from the incinerator stack.

Displacement is the relative movement of any two sides of a fault measured in any direction.

Domestic septage is either liquid or solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device, or similar treatment works that receives only domestic sewage. Domestic septage does not include liquid or solid material removed from a septic tank, cesspool, or similar treatment works that receives either commercial wastewater or industrial wastewater and does not include grease removed from a grease trap at a restaurant.

Domestic sewage is waste and wastewater from humans or household operations that is discharged to or otherwise enters a treatment works.

Dry weight basis means calculated on the basis of having been dried at 105 degrees Celsius (°C) until reaching a constant mass (i.e. essentially 100 percent solids content).

Fault is a fracture or zone of fractures in any materials along which strata on one side are displaced with respect to the strata on the other side.

Feed crops are crops produced primarily for consumption by animals.

Fiber crops are crops such as flax and cotton.

Final cover is the last layer of soil or other material placed on a sewage sludge unit at closure.

Fluidized bed incinerator is an enclosed device in which organic matter and inorganic matter in sewage sludge are combusted in a bed of particles suspended in the combustion chamber gas.

Food crops are crops consumed by humans. These include, but are not limited to, fruits, vegetables, and tobacco.

Forest is a tract of land thick with trees and underbrush.

Ground water is water below the land surface in the saturated zone.

Holocene time is the most recent epoch of the Quaternary period, extending from the end of the Pleistocene epoch to the present.

Hourly average is the arithmetic mean of all the measurements taken during an hour. At least two measurements must be taken during the hour.

Incineration is the combustion of organic matter and inorganic matter in sewage sludge by high temperatures in an enclosed device.

Industrial wastewater is wastewater generated in a commercial or industrial process.

Land application is the spraying or spreading of sewage sludge onto the land surface; the injection of sewage sludge below the land surface; or the incorporation of sewage sludge into the soil so that the sewage sludge can either condition the soil or fertilize crops or vegetation grown in the soil.

Land with a high potential for public exposure is land that the public uses frequently. This includes, but is not limited to, a public contact site and reclamation site located in a populated area (e.g., a construction site located in a city).

Land with low potential for public exposure is land that the public uses infrequently. This includes, but is not limited to, agricultural land, forest and a reclamation site located in an unpopulated area (e.g., a strip mine located in a rural area).

Leachate collection system is a system or device installed immediately above a liner that is designed, constructed, maintained, and operated to collect and remove leachate from a sewage sludge unit.

Liner is soil or synthetic material that has a hydraulic conductivity of 1×10^{-7} centimeters per second or less.

Lower explosive limit for methane gas is the lowest percentage of methane gas in air, by volume, that propagates a flame at 25 degrees Celsius and atmospheric pressure.

Monthly average (Incineration) is the arithmetic mean of the hourly averages for the hours a sewage sludge incinerator operates during the month.

Monthly average (Land Application) is the arithmetic mean of all measurements taken during the month.

Municipality means a city, town, borough, county, parish, district, association, or other public body (including an intermunicipal agency of two or more of the foregoing entities) created by or under State law; an Indian tribe or an authorized Indian tribal organization having jurisdiction over sewage sludge management; or a designated and approved management agency under section 208 of the CWA, as amended. The definition includes a special district created under state law, such as a water district, sewer district, sanitary district, utility district, drainage district, or similar entity, or an integrated waste management facility as defined in section 201 (e) of the CWA, as amended, that has as one of its principal responsibilities the treatment, transport, use or disposal of sewage sludge.

Other container is either an open or closed receptacle. This includes, but is not limited to, a bucket, a box, a carton, and a vehicle or trailer with a load capacity of one metric ton or less.

Pasture is land on which animals feed directly on feed crops such as legumes, grasses, grain stubble, or stover.

Pathogenic organisms are disease-causing organisms. These include, but are not limited to, certain bacteria, protozoa, viruses, and viable helminth ova.

Permitting authority is either EPA or a State with an EPA-approved sludge management program.

Person is an individual, association, partnership, corporation, municipality, State or Federal Agency, or an agent or employee thereof.

Person who prepares sewage sludge is either the person who generates sewage sludge during the treatment of domestic sewage in a treatment works or the person who derives a material from sewage sludge.

pH means the logarithm of the reciprocal of the hydrogen ion concentration; a measure of the acidity or alkalinity of a liquid or solid material.

Place sewage sludge or sewage sludge placed means disposal of sewage sludge on a surface disposal site.

Pollutant (as defined in sludge disposal requirements) is an organic substance, an inorganic substance, a combination or organic and inorganic substances, or pathogenic organism that, after discharge and upon exposure, ingestion, inhalation, or assimilation into an organism either directly from the environment or indirectly by ingestion through the food chain, could on the basis on information available to the Administrator of EPA, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunction in reproduction) or physical deformations in either organisms or offspring of the organisms.

Pollutant limit (for sludge disposal requirements) is a numerical value that describes the amount of a pollutant allowed per unit amount of sewage sludge (e.g., milligrams per kilogram of total solids); the amount of pollutant that can be applied to a unit of land (e.g., kilograms per hectare); or the volume of the material that can be applied to the land (e.g., gallons per acre).

Public contact site is a land with a high potential for contact by the public. This includes, but is not limited to, public parks, ball fields, cemeteries, plant nurseries, turf farms, and golf courses.

Qualified ground water scientist is an individual with a baccalaureate or post-graduate degree in the natural sciences or engineering who has sufficient training and experience in ground water hydrology and related fields, as may be demonstrated by State registration, professional certification, or completion of accredited university programs, to make sound professional judgments regarding ground water monitoring, pollutant fate and transport, and corrective action.

Range land is open land with indigenous vegetation.

Reclamation site is drastically disturbed land that is reclaimed using sewage sludge. This includes, but is not limited to, strip mines and construction sites.

Risk specific concentration is the allowable increase in the average daily ground level ambient air concentration for a pollutant from the incineration of sewage sludge at or beyond the property line of a site where the sewage sludge incinerator is located.

Runoff is rainwater, leachate, or other liquid that drains overland on any part of a land surface and runs off the land surface.

Seismic impact zone is an area that has 10 percent or greater probability that the horizontal ground level acceleration to the rock in the area exceeds 0.10 gravity once in 250 years.

Sewage sludge is a solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to:, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in treatment works.

Sewage sludge feed rate is either the average daily amount of sewage sludge fired in all sewage sludge incinerators within the property line of the site where the sewage sludge incinerators are located for the number of days in a 365 day period that each sewage sludge incinerator operates, or the average daily design capacity for all sewage sludge incinerators within the property line of the site where the sewage sludge incinerators are located.

Sewage sludge incinerator is an enclosed device in which only sewage sludge and auxiliary fuel are fired.

Sewage sludge unit is land on which only sewage sludge is placed for final disposal. This does not include land on which sewage sludge is either stored or treated. Land does not include waters of the United States, as defined in 40 CFR §122.2.

Sewage sludge unit boundary is the outermost perimeter of an active sewage sludge unit.

Specific oxygen uptake rate (SOUR) is the mass of oxygen consumed per unit time per unit mass of total solids (dry weight basis) in sewage sludge.

Stack height is the difference between the elevation of the top of a sewage sludge incinerator stack and the elevation of the ground at the base of the stack when the difference is equal to or less than 65 meters. When the difference is greater than 65 meters, stack height is the creditable stack height determined in accordance with 40 CFR §51.100 (ii).

State is one of the United States of America, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Trust Territory of the Pacific Islands, the Commonwealth of the Northern Mariana Islands, and an Indian tribe eligible for treatment as a State pursuant to regulations promulgated under the authority of section 518(e) of the CWA.

Store or storage of sewage sludge is the placement of sewage sludge on land on which the sewage sludge remains for two years or less. This does not include the placement of sewage sludge on land for treatment.

Surface disposal site is an area of land that contains one or more active sewage sludge units.

Total hydrocarbons means the organic compounds in the exit gas from a sewage sludge incinerator stack measured using a flame ionization detection instrument referenced to propane.

Total solids are the materials in sewage sludge that remain as residue when the sewage sludge is dried at 103 to 105 degrees Celsius.

Treat or treatment of sewage sludge is the preparation of sewage sludge for final use or disposal. This includes, but is not limited to, thickening, stabilization, and dewatering of sewage sludge. This does not include storage of sewage sludge.

Treatment works is either a federally owned, publicly owned, or privately owned device or system used to treat (including recycle and reclaim) either domestic sewage or a combination of domestic sewage and industrial waste of a liquid nature.

Unstable area is land subject to natural or human-induced forces that may damage the structural components of an active sewage sludge unit. This includes, but is not limited to, land on which the soils are subject to mass movement.

Unstabilized solids are organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Vector attraction is the characteristic of sewage sludge that attracts rodents, flies, mosquitoes, or other organisms capable of transporting infectious agents.

Volatile solids is the amount of the total solids in sewage sludge lost when the sewage sludge is combusted at 550 degrees Celsius in the presence of excess air.

Wet electrostatic precipitator is an air pollution control device that uses both electrical forces and water to remove pollutants in the exit gas from a sewage sludge incinerator stack.

Wet scrubber is an air pollution control device that uses water to remove pollutants in the exit gas from a sewage sludge incinerator stack.

3. Commonly Used Abbreviations

BOD	Five-day biochemical oxygen demand unless otherwise specified
CBOD	Carbonaceous BOD
CFS	Cubic feet per second
COD	Chemical oxygen demand
Chlorine	
Cl_2	Total residual chlorine
TRC	Total residual chlorine which is a combination of free available chlorine (FAC, see below) and combined chlorine (chloramines, etc.)

TRO	Total residual chlorine in marine waters where halogen compounds are present
FAC	Free available chlorine (aqueous molecular chlorine, hypochlorous acid, and hypochlorite ion)
Coliform	
Coliform, Fecal	Total fecal coliform bacteria
Coliform, Total	Total coliform bacteria
Cont. (Continuous)	Continuous recording of the parameter being monitored, i.e. flow, temperature, pH, etc.
Cu. M/day or M^3/day	Cubic meters per day
DO	Dissolved oxygen
kg/day	Kilograms per day
lbs/day	Pounds per day
mg/l	Milligram(s) per liter
ml/l	Milliliters per liter
MGD	Million gallons per day
Nitrogen	
Total N	Total nitrogen
NH_3-N	Ammonia nitrogen as nitrogen
NO_3-N	Nitrate as nitrogen
NO_2-N	Nitrite as nitrogen
NO_3-NO_2	Combined nitrate and nitrite nitrogen as nitrogen
TKN	Total Kjeldahl nitrogen as nitrogen
Oil & Grease	Freon extractable material
PCB	Polychlorinated biphenyl
pH	A measure of the hydrogen ion concentration. A measure of the acidity or alkalinity of a liquid or material
Surfactant	Surface-active agent

Temp. °C	Temperature in degrees Centigrade
Temp. °F	Temperature in degrees Fahrenheit
TOC	Total organic carbon
Total P	Total phosphorus
TSS or NFR	Total suspended solids or total nonfilterable residue
Turb. or Turbidity	Turbidity measured by the Nephelometric Method (NTU)
ug/l	Microgram(s) per liter
WET	"Whole effluent toxicity" is the total effect of an effluent measured directly with a toxicity test.
C-NOEC	"Chronic (Long-term Exposure Test) – No Observed Effect Concentration". The highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specified time of observation.
A-NOEC	"Acute (Short-term Exposure Test) – No Observed Effect Concentration" (see C-NOEC definition).
LC_{50}	LC_{50} is the concentration of a sample that causes mortality of 50% of the test population at a specific time of observation. The LC_{50} = 100% is defined as a sample of undiluted effluent.
ZID	Zone of Initial Dilution means the region of initial mixing surrounding or adjacent to the end of the outfall pipe or diffuser ports.

FRESHWATER CHRONIC
TOXICITY TEST PROCEDURE AND PROTOCOL
USEPA Region 1

I. GENERAL REQUIREMENTS

The permittee shall be responsible for the conduct of acceptable chronic (and modified acute) toxicity tests using three fresh samples collected during each test period. The following tests shall be performed as prescribed in Part 1 of the NPDES discharge permit in accordance with the appropriate test protocols described below. (Note: the permittee and testing laboratory should review the applicable permit to determine whether testing of one or both species is required).

- **Daphnid (Ceriodaphnia dubia) Survival and Reproduction Test.**

- **Fathead Minnow (Pimephales promelas) Larval Growth and Survival Test.**

Chronic and modified acute toxicity data shall be reported as outlined in Section VIII. The chronic fathead minnow and daphnid test data can be used to calculate an LC50 at the end of 48 hours of exposure when both acute (LC50) and chronic (C-NOEC) test endpoints are specified in the permit.

II. METHODS

Methods to follow are those recommended by EPA in: Short Term Methods For Estimating The Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Fourth Edition. October 2002. United States Environmental Protection Agency. Office of Water, Washington, D.C., EPA 821-R-02-013. The methods are available on-line at http://www.epa.gov/waterscience/WET/ . Exceptions and clarification are stated herein.

III. SAMPLE COLLECTION AND USE

A total of three fresh samples of effluent and receiving water are required for initiation and subsequent renewals of a freshwater, chronic, toxicity test. The receiving water control sample must be collected immediately upstream of the permitted discharge's zone of influence. Fresh samples are recommended for use on test days 1, 3, and 5. However, provided a total of three samples are used for testing over the test period, an alternate sampling schedule is acceptable. The acceptable holding times until initial use of a sample are 24 and 36 hours for on-site and off-site testing, respectively. A written waiver is required from the regulating authority for any hold time extension. All test samples collected may be used for 24, 48 and 72 hour renewals after initial use. All samples held for use beyond the day of sampling shall be refrigerated and maintained at a temperature range of 0-6^{o} C.

All samples submitted for chemical and physical analyses will be analyzed according to Section VI of this protocol.

Sampling guidance dictates that, where appropriate, aliquots for the analysis required in this protocol shall be split from the samples, containerized and immediately preserved, or analyzed as per 40 CFR Part 136. EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection. Testing for the presence of total residual chlorine (TRC) must be analyzed immediately or as soon as possible, for all effluent samples, prior to WET testing. TRC analysis may be performed on-site or by the toxicity testing laboratory and the samples must be dechlorinated, as necessary, using sodium thiosulfate prior to sample use for toxicity testing.

If any of the renewal samples are of sufficient potency to cause lethality to 50 percent or more of the test organisms in any of the test treatments for either species or, if the test fails to meet its permit limits, then chemical analysis for total metals (originally required for the initial sample only in Section VI) will be required on the renewal sample(s) as well.

IV. DILUTION WATER

Samples of receiving water must be collected from a location in the receiving water body immediately upstream of the permitted discharge's zone of influence at a reasonably accessible location. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist. EPA strongly urges that screening for toxicity be performed prior to the set up of a full, definitive toxicity test any time there is a question about the test dilution water's ability to achieve test acceptability criteria (TAC) as indicated in Section V of this protocol. The test dilution water control response will be used in the statistical analysis of the toxicity test data. All other control(s) required to be run in the test will be reported as specified in the Discharge Monitoring Report (DMR) Instructions, Attachment F, page 2,Test Results & Permit Limits.

The test dilution water must be used to determine whether the test met the applicable TAC. When receiving water is used for test dilution, an additional control made up of standard laboratory water (0% effluent) is required. This control will be used to verify the health of the test organisms and evaluate to what extent, if any, the receiving water itself is responsible for any toxic response observed.

If dechlorination of a sample by the toxicity testing laboratory is necessary a "sodium thiosulfate" control, representing the concentration of sodium thiosulfate used to adequately dechlorinate the sample prior to toxicity testing, must be included in the test.

If the use of an alternate dilution water (ADW) is authorized, in addition to the ADW test control, the testing laboratory must, for the purpose of monitoring the receiving water, also run a receiving water control.

If the receiving water diluent is found to be, or suspected to be toxic or unreliable an ADW of known quality with hardness similar to that of the receiving water may be substituted. Substitution is species specific meaning that the decision to use ADW is made for each species and is based on the toxic response of that particular species. Substitution to an ADW is authorized in two cases. The first is the case where repeating a test due to toxicity in the site dilution water requires an **immediate decision** for ADW use be made by the permittee and toxicity testing laboratory. The second is in the case where two of the most recent documented incidents of unacceptable site dilution water toxicity requires ADW use in future WET testing.

For the second case, written notification from the permittee requesting ADW use **and** written authorization from the permit issuing agency(s) is required **prior to** switching to a long-term use of ADW for the duration of the permit.

Written requests for use of ADW must be mailed with supporting documentation to the following addresses:

Director
Office of Ecosystem Protection (CAA)
U.S. Environmental Protection Agency-New England
One Congress St., Suite 1100
Boston, MA 02114-2023

and

Manager
Water Technical Unit (SEW)
U.S. Environmental Protection Agency
One Congress Street, Suite 1100
Boston, MA 02114-2023

Note: USEPA Region 1 retains the right to modify any part of the alternate dilution water policy stated in this protocol at any time. Any changes to this policy will be documented in the annual DMR posting.

See the most current annual DMR instructions which can be found on the EPA Region 1 website at http://www.epa.gov/region1/enforcementandassistance/dmr.html for further important details on alternate dilution water substitution requests.

V. TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA

Method specific test conditions and TAC are to be followed and adhered to as specified in the method guidance document, EPA 821-R-02-013. If a test does not meet TAC the test must be repeated with fresh samples within 30 days of the initial test completion date.

V.1. Use of Reference Toxicity Testing

Reference toxicity test results and applicable control charts must be included in the toxicity testing report.

If reference toxicity test results fall outside the control limits established by the laboratory for a specific test endpoint, a reason or reasons for this excursion must be evaluated, correction made and reference toxicity tests rerun as necessary.

If a test endpoint value exceeds the control limits at a frequency of more than one out of twenty then causes for the reference toxicity test failure must be examined and if problems are identified corrective action taken. The reference toxicity test must be repeated during the same month in which the exceedance occurred.

If two consecutive reference toxicity tests fall outside control limits, the possible cause(s) for the exceedance must be examined, corrective actions taken and a repeat of the reference toxicity test must take place immediately. Actions taken to resolve the problem must be reported.

V.1.a. Use of Concurrent Reference Toxicity Testing

In the case where concurrent reference toxicity testing is required due to a low frequency of testing with a particular method, if the reference toxicity test results fall slightly outside of laboratory established control limits, but the primary test met the TAC, the results of the primary test will be considered acceptable. However, if the results of the concurrent test fall well outside the established **upper** control limits i.e. ≥3 standard deviations for IC25s and LC50 values and ≥ two concentration intervals for NOECs or NOAECs, and even though the primary test meets TAC, the primary test will be considered unacceptable and must be repeated.

V.2. For the *C. dubia* test, the determination of TAC and formal statistical analyses must be performed using only the first three broods produced.

V.3. Test treatments must include 5 effluent concentrations and a dilution water control. An additional test treatment, at the permitted effluent concentration (% effluent), is required if it is not included in the dilution series.

VI. CHEMICAL ANALYSIS

As part of each toxicity test's daily renewal procedure, pH, specific conductance, dissolved oxygen (DO) and temperature must be measured at the beginning and end of each 24-hour period in each test treatment and the control(s).

The additional analysis that must be performed under this protocol is as specified and noted in the table below.

Parameter	Effluent	Receiving Water	ML (mg/l)
Hardness[1, 4]	x	x	0.5
Total Residual Chlorine (TRC)[2, 3, 4]	x		0.02
Alkalinity[4]	x	x	2.0
pH[4]	x	x	--
Specific Conductance[4]	x	x	--
Total Solids[6]	x		--
Total Dissolved Solids[6]	x		--
Ammonia[4]	x	x	0.1
Total Organic Carbon[6]	x	x	0.5
Total Metals[5]			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005
Al	x	x	0.02
Other as permit requires			

Notes:

1. Hardness may be determined by:

- APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
  -Method 2340B (hardness by calculation)
  -Method 2340C (titration)

2. Total Residual Chlorine may be performed using any of the following methods provided the required minimum limit (ML) is met.

- APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
  -Method 4500-CL E Low Level Amperometric Titration
  -Method 4500-CL G DPD Colorimetric Method
- USEPA 1983. Manual of Methods Analysis of Water and Wastes
  -Method 330.5

3. Required to be performed on the sample used for WET testing prior to its use for toxicity testing
4. Analysis is to be performed on samples and/or receiving water, as designated in the table above, from all three sampling events.
5. Analysis is to be performed on the initial sample(s) only unless the situation arises as stated in Section III, paragraph 4
6. Analysis to be performed on initial samples only

VII. TOXICITY TEST DATA ANALYSIS AND REVIEW

A. Test Review

1. Concentration / Response Relationship

A concentration/response relationship evaluation is required for test endpoint determinations from both Hypothesis Testing and Point Estimate techniques. The test report is to include documentation of this evaluation in support of the endpoint values reported. The dose-response review must be performed as required in Section 10.2.6 of EPA-821-R-02-013. Guidance for this review can be found at http://www.epa.gov/waterscience/methods/wet/pdf/wetguide.pdf . In most cases, the review will result in one of the following three conclusions: (1) Results are reliable and reportable; (2) Results are anomalous and require explanation; or (3) Results are inconclusive and a retest with fresh samples is required.

2. Test Variability (Test Sensitivity)

This review step is separate from the determination of whether a test meets or does not meet TAC. Within test variability is to be examined for the purpose of evaluating test sensitivity. This evaluation is to be performed for the sub-lethal hypothesis testing endpoints reproduction and growth as required by the permit. The test report is to include documentation of this evaluation to support that the endpoint values reported resulted from a toxicity test of adequate sensitivity. This evaluation must be performed as required in Section 10.2.8 of EPA-821-R-02-013.

To determine the adequacy of test sensitivity, USEPA requires the calculation of test percent minimum significant difference (PMSD) values. In cases where NOEC determinations are made based on a non-parametric technique, calculation of a test PMSD value**,** for the sole purpose of assessing test sensitivity, shall be calculated using a comparable parametric statistical analysis technique. The calculated test PMSD is then compared to the upper and lower PMSD bounds shown for freshwater tests in Section 10.2.8.3, p. 52, Table 6 of EPA-821-R-02-013. The comparison will yield one of the following determinations.

- The test PMSD exceeds the PMSD upper bound test variability criterion in Table 6, the test results are considered highly variable and the test may not be sensitive enough to determine the presence of toxicity at the permit limit concentration (PLC). If the test results indicate that the discharge is not toxic at the PLC, then the test is considered insufficiently sensitive and must be repeated within 30 days of the initial test completion using fresh samples. If the test results indicate that the discharge is toxic at the PLC, the test is considered acceptable and does not have to be repeated.

- The test PMSD falls below the PMSD lower bound test variability criterion in Table 6, the test is determined to be very sensitive. In order to determine which treatment(s) are statistically significant and which are not, for the purpose of reporting a NOEC, the relative percent difference (RPD) between the control and each treatment must be calculated and compared to the lower PMSD boundary. See *Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program*, EPA 833-R-00-003, June 2002, Section 6.4.2. The following link: Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program can be used to locate the USEPA website containing this document. If the RPD for a treatment falls below the PMSD lower bound, the difference is considered statistically insignificant. If the RPD for a treatment is greater that the PMSD lower bound, then the treatment is considered statistically significant.

- The test PMSD falls within the PMSD upper and lower bounds in Table 6, the sub-lethal test endpoint values shall be reported as is.

B. Statistical Analysis

1. General - Recommended Statistical Analysis Method

Refer to general data analysis flowchart, EPA 821-R-02-013, page 43

For discussion on Hypothesis Testing, refer to EPA 821-R-02-013, Section 9.6

For discussion on Point Estimation Techniques, refer to EPA 821-R-02-013, Section 9.7

2. *Pimephales promelas*

Refer to survival hypothesis testing analysis flowchart, EPA 821-R-02-013, page 79

Refer to survival point estimate techniques flowchart, EPA 821-R-02-013, page 80

Refer to growth data statistical analysis flowchart, EPA 821-R-02-013, page 92

3. *Ceriodaphnia dubia*

Refer to survival data testing flowchart, EPA 821-R-02-013, page 168

Refer to reproduction data testing flowchart, EPA 821-R-02-013, page 173

VIII. TOXICITY TEST REPORTING

A report of results must include the following:

- Test summary sheets (2007 DMR Attachment F) which includes:
  - Facility name
  - NPDES permit number
  - Outfall number
  - Sample type
  - Sampling method
  - Effluent TRC concentration
  - Dilution water used
  - Receiving water name and sampling location
  - Test type and species
  - Test start date
  - Effluent concentrations tested (%) and permit limit concentration
  - Applicable reference toxicity test date and whether acceptable or not
  - Age, age range and source of test organisms used for testing
  - Results of TAC review for all applicable controls
  - Test sensitivity evaluation results (test PMSD for growth and reproduction)
  - Permit limit and toxicity test results
  - Summary of test sensitivity and concentration response evaluation

In addition to the summary sheets the report must include:

- A brief description of sample collection procedures
- Chain of custody documentation including names of individuals collecting samples, times and dates of sample collection, sample locations, requested analysis and lab receipt with time and date received, lab receipt personnel and condition of samples upon receipt at the lab(s)
- Reference toxicity test control charts
- All sample chemical/physical data generated, including minimum limits (MLs) and analytical methods used
- All toxicity test raw data including daily ambient test conditions, toxicity test chemistry, sample dechlorination details as necessary, bench sheets and statistical analysis
- A discussion of any deviations from test conditions
- Any further discussion of reported test results, statistical analysis and concentration-response relationship and test sensitivity review per species per endpoint

Summary of Required Report Submittals*

Required Report	Date Due	Submitted by:	Submitted to:
Whole Effluent Toxicity Test Report (Part I.A.1)	January 31, April 30, July 31, and October 31 of each year	Concord WWTF	Via NetDMR Or Environmental Protection Agency Water Technical Unit 5 Post Office Square, Suite 100 (OES04-4) Boston, MA 02109-3912
			MassDEP Division of Watershed Management Surface Water Discharge Permit Program 627 Main Street, 2nd Floor Worcester, MA 01608
Initial Collection System Operation and Maintenance Plan (Part I.C.5.a.)	Within 6 months of effective date	Concord WWTF	Via NetDMR Or U.S. Environmental Protection Agency Water Technical Unit 5 Post Office Square, Suite 100 (OES04-4) Boston, MA 02109-3912
			MassDEP Bureau of Resource Protection Northeast Regional Office 205B Lowell Street Wilmington, MA 01887
Full Collection System Operations and Maintenance Plan (Part I.C.5.b.)	Two years from the effective date of the permit	Concord WWTF	Via NetDMR Or U.S. Environmental Protection Agency Water Technical Unit 5 Post Office Square, Suite 100 (OES04-4) Boston, MA 02109-3912

Required Report	Date Due	Submitted by:	Submitted to:
			MassDEP Bureau of Resource Protection Northeast Regional Office 205B Lowell Street Wilmington, MA 01887
Collection System Annual Report (Part I.C.6.)	Annually by March 31	Concord WWTF	Via NetDMR Or U.S. Environmental Protection Agency Water Technical Unit 5 Post Office Square, Suite 100 (OES04-4) Boston, MA 02109-3912
			MassDEP Bureau of Resource Protection Northeast Regional Office 205B Lowell Street Wilmington, MA 01887
Notification of Sanitary Sewer Overflows (Part I.B.)	Oral Report -Within 24 hours of discovery of event Written Report – Within 5 calendar days of discovery of event	Concord WWTF	U.S. Environmental Protection Agency Water Technical Unit 5 Post Office Square, Suite 100 (OES04-4) Boston, MA 02109-3912
			MassDEP Bureau of Resource Protection Northeast Regional Office 205B Lowell Street Wilmington, MA 01887
Annual Sludge Report (Part I.D.8)	Annually by February 19	Concord WWTF	Via NetDMR or U.S. Environmental Protection Agency Water Technical Unit 5 Post Office Square, Suite 100 (OES04-4) Boston, MA 02109-3912

Required Report	Date Due	Submitted by:	Submitted to:
			MassDEP Bureau of Resource Protection Northeast Regional Office 205B Lowell Street Wilmington, MA 01887

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

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND - REGION I
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MA 02109-3912

FACT SHEET

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

NPDES PERMIT NO: **MA0100668**

PUBLIC NOTICE START AND END DATES: July 13, 2012 thru August 11, 2012

NAME AND ADDRESS OF PERMITTEE:

Town of Concord
135 Keyes Road
Concord, MA 01742

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Concord Wastewater Treatment Plant
509 Bedford Street
Concord, MA 01742

RECEIVING WATERS: **Concord River (MA82A-07)**
USGS Hydrologic Code: 01070005

CLASSIFICATION: **Class B - Warm Water Fishery, Treated Water Supply**

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Appendices

Figures

I. PROPOSED ACTION

The above named applicant has applied to the U.S. Environmental Protection Agency (EPA) for the re-issuance of its National Pollutant Discharge Elimination System (NPDES) permit to discharge into the designated receiving water. The current permit became effective March 13, 2006 and expired on February 28, 2011. EPA received the re-application on September 1, 2010. The draft permit proposes an expiration date five (5) years from the effective date of the final permit.

In discussions regarding the draft permit, the Town requested that EPA delay the public notice of the draft permit to allow the Town time to complete planning that it believes will support an increase to the authorized discharge flow. The Town has indicated that it will be conducting such planning consistent with EPA's recently issued *Integrated Municipal Stormwater and Wastewater Planning Approach Framework*. (EPA Office of Water and Office of Enforcement and Compliance Assurance. June 5, 2012) As stated in the framework, EPA is committed to working with states and communities to find efficiencies in implementing municipal wastewater and stormwater programs, and we encourage the Town to proceed with this approach.

However, as stated in the memorandum, "permit issuance and the implementation of existing permit and enforcement requirements and activities shall not be delayed while an integrated plan is being developed." We believe that completion of an integrated plan for the Town, addressing the six elements described in the June, 5, 2012 memo, is (conservatively) over a year away. In addressing the likely timeframe, we note that the Town's requested flow increase requires a state approved Comprehensive Wastewater Management Plan (CWMP). This CWMP can be an initial step, and potentially an effective basis, for the fourth element of the framework - a process for identifying, evaluating, and selecting alternatives.

For this reason, EPA has decided to release the draft permit for public comment without delay. EPA is committed to working with and assisting the Town as it undertakes its planning process. Completion of the plan, including the state-required CWMP, will be considered new information for purposes of reopening or modifying the final permit.

II. TYPE OF FACILITY AND DISCHARGE LOCATION

The facility's discharge outfall is listed below:

Outfall	Description of Discharge	Receiving water	Outfall Location
001	Treated Effluent	Concord River	42.475º N 71.341° W

The above named applicant has applied to EPA for the reissuance of its NPDES permit to discharge into the designated receiving waters. The facility collects and treats domestic wastewater and septage. The discharge from this advanced secondary wastewater treatment facility is via Outfall 001 to the Concord River. See Figure 1 for site location.

The Town of Concord's Wastewater Treatment Plant (Concord WWTP or WWTP) is a 1.2 million gallon per day (MGD) secondary wastewater treatment facility located in Concord, Massachusetts, serving a population of about 6,500. The facility also accepts up to 13,000 gallons per day of septage from the Town of Concord. There are currently no industrial users contributing wastewater to this facility.

The collection system is 100% separate sanitary sewers.

III. DESCRIPTION OF DISCHARGE

Quantitative descriptions of the discharge in terms of significant effluent parameters, based on discharge monitoring reports (DMRs) submitted for January 2009 through December 2010, are shown in Appendix A of this fact sheet.

IV. LIMITATIONS AND CONDITIONS

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

V. PERMIT BASIS AND EXPLANATION OF EFFLUENT LIMITATION DERIVATION

A. PROCESS DESCRIPTION

The Concord WWTP, located in Concord, Massachusetts, is an advanced secondary treatment facility equipped with CoMag phosphorus removal and ultraviolet disinfection. See Figure 2 for treatment plant schematic.

The influent first passes through a rotary fine screen to remove solid material over ¼ inch in diameter. In-town septage is delivered via private hauler to a bar rack receiving station. Septage is stored in two 20,000-gallon capacity tanks, aerated to blend and freshen, circulated through chopper pumps to further blend and suspend solids and discharged to the headworks. Grit and sand is removed in a shallow detention basin using a motor-driven, continuously operating sweep.

After being screened and de-gritted, wastewater goes to primary clari-thickeners, and then flows through trickling filters for biological treatment, followed by secondary clarifiers, which provide further removal of solids. Aluminum sulfate is fed to the influent to the clarifiers to enhance phosphorus removal.

Following the secondary clarifiers, flow enters the CoMag process for further phosphorus removal. CoMag is a ballasted flocculation system consisting of a flocculator, clarifier, and magnetic filter. Magnetite, alum, and polymer are mixed with wastewater in the flocculator to create a floc with a high specific gravity. This floc settles quickly in the clarifier. Effluent quality is further enhanced by passing the clarified effluent through a magnet filter, which removes any remaining magnetite.

Flow then goes to a single channel three bank ultraviolet disinfection system, and the final effluent then flows through a Parshall flume where the flow rate is measured before discharge to the Concord River.

B. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. Overview of Federal and State Regulations

EPA is issuing this permit pursuant to Section 402(a) of the Clean Water Act (CWA). The Commonwealth of Massachusetts is also issuing this permit pursuant to Massachusetts General Laws ch. 21, § 43 (2004).

The CWA prohibits the discharge of pollutants to waters of the United States without a NPDES permit unless such a discharge is otherwise authorized by the CWA. The NPDES permit is the mechanism used to implement technology and water quality-based effluent limitations and other requirements including monitoring and reporting. The draft NPDES permit was developed in accordance with various statutory and regulatory requirements established pursuant to the CWA and any applicable State administrative rules. The regulations governing EPA's NPDES permit program are generally found in 40 CFR Parts 122, 124, 125 and 136.

EPA is required to consider technology and water quality-based requirements when developing permit limits. The technology-based limits for publicly owned treatment works (POTWs) are based on secondary treatment and are found in 40 CFR Part 133.

Section 301(b)(1)(C) of the CWA requires NPDES permits to contain effluent limits more stringent than technology-based limits where more stringent limits are necessary to comply with, among other things, any applicable state or federal water quality standards. EPA's regulations at 40 C.F.R. §122.44(d)(1) requires that effluent limits more stringent than technology-based limits be included in permits when necessary to achieve water quality standards. Compliance schedules to meet water quality-based effluent limits may be included in permits only when the state's water quality standards clearly authorize such schedules and when the limits are established to meet a water quality standard that is adopted, revised, or newly interpreted after July 1, 1977.

A water quality standard consists of three elements: (1) beneficial designated use or uses for a water body or a segment of a water body; (2) numeric and narrative water quality criteria sufficient to protect the assigned designated use(s); and (3) antidegradation requirements to ensure that existing uses and high quality waters are protected and maintained.

The Massachusetts Surface Water Quality Standards (314 CMR 4.00) establish designated uses of the State's waters, criteria to protect those uses, and an antidegradation provision to ensure that existing uses and high quality waters are protected and maintained. They also include requirements for the regulation and control of toxic constituents and specify that EPA's recommended water quality criteria, established pursuant to Section 304(a) of the CWA, shall be used unless a site-specific criterion is established.

Section 401(a)(1) of the CWA forbids the issuance of a federal license for a discharge to waters of the United States unless the state where the discharge originates either certifies that the discharge will comply with, among other things, state water quality standards, or waives certification. EPA's regulations at 40 CFR §122.44(d)(3), §124.53 and §124.55 describe the manner in which NPDES permits must conform to conditions contained in state certifications.

Section 402(o) of the CWA and 40 CFR §122.44(l) provide, generally, that the effluent limitations of a renewed, reissued, or modified permit must be at least as stringent as the comparable effluent limitations in the previous permit. Except under certain limited circumstances "backsliding" from effluent limitations contained in previously issued permits is prohibited.

2. Development of Water Quality-based Limits

Receiving stream requirements are established according to numerical and narrative standards adopted under state law for each stream classification. When using chemical-specific numeric criteria from the state's water quality standards to develop permit limits, both the acute and chronic aquatic life criteria are used and expressed in terms of maximum allowable in-stream pollutant concentration. Maximum daily limits are generally derived from the acute aquatic life criteria, and the average monthly limit is generally derived from the chronic aquatic life criteria. Chemical specific limits are established in accordance with 40 CFR § 122.44(d) and § 122.45(d).

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 causes or has "reasonable potential" to cause or contribute to an excursion above any water quality criterion. An excursion occurs if the projected or actual in stream concentration exceeds the applicable criterion.

In determining reasonable potential, EPA considers: (1) existing controls on point and non-point sources of pollution; (2) pollutant concentration and variability in the effluent and receiving water as determined from the permit application, monthly discharge monitoring reports (DMRs), and State and Federal water quality reports; (3) sensitivity of the species to toxicity testing; (4) statistical approach outlined in *Technical Support Document for Water Quality-based Toxics Controls,* March 1991, EPA/505/2-90-001 in Section 3; and, where appropriate, (5) dilution of the effluent in the receiving water. In accordance with Massachusetts Water Quality Standards [314 CMR 4.03(3)], available dilution for rivers and streams is based on a known or estimated value of the lowest average flow which occurs for seven (7) consecutive days with a recurrence interval of once in ten (10) years (7Q10).

3. Water Quality Standards; Designated Use; Outfall 001

The segment of the Concord River receiving the Concord WWTP discharge is classified in the Massachusetts Surface Water Quality Standards (314 CMR 4.00) as a Class B-warm water fishery and treated water supply.

These waters are designated as a habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. Where designated in 314 CMR 4.06, they shall be suitable as a source of public water supply with appropriate treatment ("Treated Water Supply"). Class B waters 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.

A warm water fishery is defined in the Massachusetts Surface Water Quality Standards (314 CMR 4.02) as waters in which the maximum mean monthly temperature generally exceeds 20° Celsius (68° Fahrenheit) during the summer months and are not capable of supporting a year-round population of cold water stenothermal aquatic life.

The Town of Billerica uses the Concord River as its drinking water supply. A designated treated water supply is a Class B water that is used as a water supply after appropriate treatment. These waters may be subject to site-specific criteria to protect this use. No site-specific criteria have been designated for the Concord River.

Section 303(d) of the 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). This reach of the Concord River (MA82A-07), which extends from the confluence of the Sudbury and Assabet Rivers to the Billerica water supply intake, is listed on the *Massachusetts 2010 Integrated List of Waters* (303d) as impaired and requiring a TMDL for mercury in fish tissue, total phosphorus, and fecal coliform. EPA anticipates submission and approval of the final bacteria TMDL in 2012. The mercury impairment, which is caused by airborne deposition, is subject to a regional mercury TMDL. It is not known when the total phosphorus TMDL will be finalized.

4. Design Flow, 7Q10, and Available Dilution

Water quality based limits are established with the use of a calculated available dilution. Title 314 CMR 4.03(3)(a) requires that effluent dilution be calculated based on the receiving water 7Q10. The 7Q10 is the lowest observed mean river flow for 7 consecutive days, occurring over a 10-year recurrence interval. Additionally, the facility design flow is used to calculate available effluent dilution.

Discharge Flow

Review of facility flow between January 2009 and December 2010 shows that the average flow was 1.1 MGD. The facility design flow is 1.2 MGD (1.9 cfs). The flow limit in the current permit is expressed as a 12-month rolling average. No exceedances of this limit occurred during the specified data period. This limit has been carried forward in the draft permit.

7Q10

The 7Q10 for the Concord River at the Concord WWTP has been calculated as 34 cfs (21.9 MGD). Please see Appendix B for supporting calculations.

Available Dilution

Dilution Factor = (Facility Flow + 7Q10)/Facility Flow
Dilution Factor = (34 cfs + 1.9 cfs)/1.9 cfs = **19**

5. Conventional Pollutants: BOD_5, TSS, pH, and *E. coli*

BOD and TSS

The Biochemical Oxygen Demand (BOD) and the Total Suspended Solids (TSS) draft limits are based on secondary treatment requirements and are the same as those in the current permit. Discharge monitoring data was reviewed from January 2009- December 2010. There have been no violations for BOD or TSS during this period with discharge levels typically well below permit limitations. Mass limits of 300 pounds (lbs)/day average monthly and 450 lbs/day maximum daily have also been included for BOD and TSS. The BOD and TSS removal percentages have met the 85% removal requirement. The monitoring frequency remains twice per week.

E. coli

The *Escherichia coli* (*E. coli*) limits for Outfall 001 are based on state water quality standards for Class B waters (314 CMR 4.05(b)(4)). The Commonwealth of Massachusetts promulgated *E. coli* criteria in the Surface Water Quality Standards (314 CMR 4.00) on December 29, 2006, replacing fecal coliform bacteria criteria. These new criteria were approved by EPA on September 19, 2007.

The current permit contains a year-round monthly average fecal coliform limit of 200 colony forming units per 100 milliliters (mL) (cfu/100 mL) and a maximum daily limit of 400 cfu/100 mL. Monitoring frequency is twice per week. Concord WWTF met all of its fecal coliform limits, with reported bacteria counts well below the permit limit.

The *E. coli* limits proposed in the draft permit for Outfall 001 are a monthly geometric mean of 126 colony cfu/100 ml and a daily maximum of 409 cfu/100 ml (this is the 90% distribution of the geometric mean of 126 cfu/100 ml). The proposed *E. coli* monitoring frequency in the draft permit is twice per week.

pH

The current permit requires effluent pH to be between 6.0 and 8.3. The minimum pH limit of 6.0 is less stringent than the customary limit of 6.5 for facilities discharging to Class B waters, and was granted in the current permit based on dilution levels and operational considerations. Because the receiving water has not shown any adverse effects due to occasional low pH in the discharge, the pH range requirement in the draft permit is maintained as 6.0 to 8.3. From January 2009 through December 2010, two pH values exceeded the maximum limit of 8.3. The pH shall be monitored daily.

6. Non-Conventional Pollutants

Total Phosphorus

The Massachusetts Surface Water Quality Standards (314 CMR 4.00) do not contain numerical criteria for total phosphorus. The narrative criterion for nutrients is found at 314 CMR 4.05(5)(c), which states that, "unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses…"

The Standards also require that "any existing point source discharge containing nutrients in concentrations that would cause or contribute to cultural eutrophication, including the excessive growth of aquatic plants or algae, in any surface water shall be provided with the most appropriate treatment as determined by the Department, including, where necessary, highest and best practical treatment (HBPT) for POTWs,… to remove such nutrients to ensure protection of existing and designated uses." (314 CMR 4.05(5)(c)). The Massachusetts Department of Environmental Protection (MassDEP) has established that a monthly average total phosphorus limit of 0.2 mg/l (200 µg/l) represents highest and best practical treatment (HBPT) for Publicly Owned Treatment Works (POTWs).

The current permit contains the HBPT limit of 0.2 mg/l (200 µg/l) from April through October and a limit of 1 mg/l the rest of the year. From January 2009 through December 2010, there were no violations of the total phosphorus limit.

EPA calculated the downstream phosphorus concentration with the existing 0.2 mg/l permit limit for Concord WWTP to verify that the existing limit is sufficiently protective of designated uses. The upstream concentration, 45 µg/l, is the median phosphorus concentration reported for the Concord River at Lowell Street, Concord by the Organization for the Assabet River (OARS) in 2009 and 2010[1]. As the calculation below shows, the existing limit results in a downstream phosphorus concentration of 53 µg/l during 7Q10 conditions, lower than the Gold Book criteria of 100 µg/l.

Downstream Phosphorus Concentration

$$Q_rC_r = Q_dC_d + Q_sC_s$$

Where

C_r	=	Concentration below outfall		
Q_d	=	Discharge flow	=	1.2 MGD
C_d	=	Discharge concentration	=	200 µg/l
Q_s	=	Upstream flow	=	21.9 MGD
C_s	=	Upstream concentration	=	45 µg/l
Q_r	=	Streamflow below outfall	=	23.1 MGD (effluent + upstream)

Therefore,

$$C_r = \frac{(1.2\ \text{MGD} \times 200\ \mu\text{g/l}) + (21.9\ \text{MGD} \times 45\ \mu\text{g/l})}{23.1\ \text{MGD}}$$

$$= \mathbf{53\ \mu g/l} < 100\ \mu\text{g/l (Gold Book criterion)}$$

[1] http://www.oars3rivers.org/sites/default/files/Data-2009-2010-Appendix-II.pdf

The average monthly total phosphorus limit remains at 200 µg/l from April 1st through October 31st. From November 1st through March 31st, the average monthly limit remains at 1 mg/l. Sampling frequency will be once per month.

The draft permit also requires Concord WWTP to report daily alum, magnetite, and polymer dosing levels with the DMR. The CoMag process allows for rapid changes in phosphorus removal by adjusting the dosing levels of the chemicals used in the process. The rationale for this requirement is that reporting of dosing level will provide verification that nutrient removal occurs throughout the month without more frequent effluent monitoring.

Aluminum

Aluminum, in the form of alum or other compounds, is a commonly used chemical additive in wastewater treatment to remove phosphorus. The release of metals such as aluminum into the environment can result in levels that are highly toxic to aquatic life. Therefore, it is necessary to evaluate the downstream effects of discharges of aluminum from wastewater treatment plants. Water quality-based effluent limitations are imposed on dischargers when it is determined that limitations more stringent than technology-based limitations are necessary to achieve or maintain the water quality standards in the receiving water (40 CFR § 122.44(d)(1)). Such determinations are made when EPA finds that there is reasonable potential for the discharge to cause or contribute to an instream excursion above a water quality criterion contained within applicable state water quality standards (40 CFR § 122.44(d)(1)(i)).

In determining reasonable potential, EPA considers existing controls on point and nonpoint sources of pollution, pollutant concentration and variability in the effluent and receiving water as determined from the permittee's reissuance application, DMRs, state and federal water quality reports; and, where appropriate, the dilution of the effluent in the receiving water (see 40 CFR §122.44(d)(1)(ii)). If EPA concludes, after using the procedures found at 40 CFR § 122.44(d)(1)(ii), toxicity testing data, or other available information, that a discharge causes or has the reasonable potential to cause or contribute to an in-stream excursion above a numeric criterion within an applicable state water quality standard, effluent limitations must be included in NPDES discharge permits to ensure that water quality standards in the receiving water are met (40 CFR § 122.44(d)(1)(v)).

The Massachusetts Surface Water Quality Standards include requirements for the regulation and control of toxic constituents and also require that EPA-recommended criteria established pursuant to Section 304(a) of the CWA be used unless site-specific criteria are established (314 CMR § 4.05(5)(e)). Massachusetts has not adopted site-specific criteria for aluminum. Therefore, the freshwater criteria for aluminum found in the *National Recommended Water Quality Criteria*: *2002* (US EPA 2002 [EPA-822-R-02-047]), which are an acute concentration of 750 µg/l and a chronic concentration of 87 µg/l, apply in Massachusetts.

The potential for discharges of aluminum from the Concord WWTP to cause or contribute to an excursion above water quality criteria was determined by statistically projecting the maximum concentration of the pollutant in the discharge assuming a lognormal distribution. A histogram of the effluent data verified this assumption. EPA projected the maximum effluent concentration as 4,411 µg/l (4.4 mg/l) by calculating the 99th percentile measurement of the existing effluent data

set from January 2009 through January 2011 (n=25). The 95th percentile concentration, 2,720 µg/l (2.7 mg/l), was also calculated for comparison with the chronic WQC (see Appendix C).

The projected pollutant level was then inserted into a steady-state mixing equation to determine if it could cause or contribute to an excursion from water quality standards under critical conditions. The median aluminum level reported in the 2008-2010 WET test dilution samples, 75 µg/l, was used in this analysis.

As shown in the boxes below, the projected maximum aluminum effluent of 4,411 µg/l results in a receiving water concentration of 303 µg/l during critical conditions, below the acute criterion of 750 µg/l. A concentration of 2,720 µg/l, the 95th percentile concentration, results in a receiving water concentration of 215 µg/l, above the chronic criterion of 87 µg/l. Therefore, there is reasonable potential for the discharge to cause or contribute to an excursion of the chronic water quality standard for aluminum.

Reasonable Potential Analysis for Aluminum

$$Q_rC_r = Q_dC_d + Q_sC_s$$

Where

C_r	=	Concentration below outfall		
Q_d	=	Discharge flow	=	1.2 MGD
C_d	=	Discharge concentration	=	4,411 µg/l
Q_s	=	Upstream flow	=	21.9 MGD
C_s	=	Upstream concentration	=	75 µg/l
Q_r	=	Streamflow below outfall	=	23.1 MGD (effluent + upstream)

Therefore,

$$Cr = \frac{(1.2\ \text{MGD} \times 4{,}411\ \mu\text{g/l}) + (21.9\ \text{MGD} \times 75\ \mu\text{g/l})}{23.1\ \text{MGD}}$$

= **300 µg/l** < 750 µg/l (acute criterion)

Therefore, there is **no reasonable potential** for the discharge to cause or contribute to an excursion from the acute water quality criterion for aluminum.

Reasonable Potential Analysis for Aluminum

$$Q_rC_r = Q_dC_d + Q_sC_s$$

Where

C_r	=	Concentration below outfall		
Q_d	=	Discharge flow	=	1.2 MGD
C_d	=	Discharge concentration	=	2,720 µg/l
Q_s	=	Upstream flow	=	21.9 MGD
C_s	=	Upstream concentration	=	75 µg/l
Q_r	=	Streamflow below outfall	=	23.1 MGD (effluent + upstream)

Therefore,

$$C_r = \frac{(1.2\ \text{MGD} \times 2{,}720\ \mu\text{g/l}) + (21.9\ \text{MGD} \times 75\ \mu\text{g/l})}{23.1\ \text{MGD}}$$

= **212 µg/l** > 87 µg/l (chronic criterion)

Therefore, there **is reasonable potential** for the discharge to cause or contribute to an excursion from the chronic water quality criterion for aluminum.

The effluent limits calculated below will result in attainment of water quality criteria downstream of the facility during critical conditions. The limit was calculated using the same steady state model that was used in determining reasonable potential, but setting the downstream concentration equal to the applicable water quality criteria and solving for the effluent concentration.

Monthly Average Aluminum Limit

$$C_d = \frac{(Q_rC_r - Q_sC_s)}{Q_d}$$

Where

C_d	=	Discharge concentration	=	?
C_r	=	Concentration below outfall	=	87 µg/l (chronic criterion)
Q_d	=	Discharge flow	=	1.2 MGD
Q_s	=	Upstream flow	=	21.9 MGD
C_s	=	Upstream concentration	=	75 µg/l
Q_r	=	Streamflow below outfall (effluent + upstream)	=	23.1 MGD

$$C_d = \frac{(23.1\ \text{MGD})(87\ \mu\text{g/l}) - (21.9\ \text{MGD})(75\ \mu\text{g/l})}{1.2\ \text{MGD}}$$

= 306 µg/l

The draft permit therefore includes an average monthly limit of 306 µg/l and a requirement to report the maximum daily effluent concentration. The proposed monitoring frequency is once per month. If the facility monitors at this frequency, the single sample must be reported as both the monthly average and the daily maximum. If Concord WWTP chooses to sample more often than once per month, the average of the samples must be reported as the monthly average, and the highest sample of the month reported as the daily maximum.

Ammonia Nitrogen

High levels of ammonia in the water column can be toxic to fish by making it more difficult for fish to excrete this chemical via passive diffusion from gill tissues. Ammonia toxicity varies with pH and temperature. Ammonia can also lower dissolved oxygen levels by conversion to nitrate/nitrate, which consumes oxygen.

The current permit does not contain a limit for ammonia. DMR data show that effluent ammonia levels range from 0.49 mg/l to 2.81 mg/l (see Appendix A).

EPA ammonia criteria recommend using the 30Q10 conditions (the lowest 30-day average daily flow with a 10-year expected recurrence interval) rather than the 7Q10 for setting ammonia limits. Interpolation of flow records for USGS Gages in Maynard and Lowell indicates that the 30Q10 is 49 cfs. The 30Q10 and dilution factor calculations are presented in Appendix D.

Given the dilution factor of 27 during 30Q10 conditions, no reasonable potential for an exceedance of water quality standards exists (see Appendix E for calculations). The draft permit carries forward the monitoring requirements of once per week from June 1- September 30 and twice per month from October 1 – May 31.

Copper

Copper is an abundant naturally occurring trace element in the earth's crust that is also found in surface waters. Copper is a micronutrient at low concentrations and is essential to virtually all plants and animals. At higher concentrations copper can become toxic to aquatic life.

An examination of Concord WWTP's whole effluent toxicity (WET) testing data shows effluent copper concentrations ranging from non-detect to 16 µg/l (see Appendix A).

The *National Recommended Water Quality Criteria*: *2002* (US EPA 2002 [EPA-822-R-02-047]) includes copper criteria for the protection of aquatic life. These criteria are hardness-based. The calculations below estimate hardness in the receiving water downstream of the facility, which is then used to establish the applicable copper criteria. The hardness data used in the calculations are from Concord WWTP's Whole Effluent Toxicity (WET) test reports from March 2008 through December 2010. The hardness values used in this calculation are the median hardness values measured in the treatment plant discharge and the upstream receiving water during this period. Hardness data used to calculate the criteria are included in Appendix F.

Hardness Analysis

$$Q_rC_r = Q_dC_d + Q_sC_s$$

Where

C_r	=	Concentration below outfall		
Q_d	=	Discharge flow	=	1.2 MGD
C_d	=	Discharge concentration	=	86 mg/l
Q_s	=	Upstream flow	=	21.9 MGD
C_s	=	Upstream concentration	=	55 mg/l
Q_r	=	Streamflow below outfall (effluent + upstream)	=	23.1 MGD

Therefore,

$$C_r = \frac{(1.2 \text{ MGD} \times 87 \text{ mg/l}) + (21.9 \text{ MGD} \times 50 \text{ mg/l})}{23.1 \text{ MGD}}$$

$$= 56 \text{ mg/l}$$

1. Acute Criteria (Total Recoverable) = $\exp\{m_a [\ln(h)] + b_a\}$ = **8.11 µg/l**

Where:

m_a = Pollutant-specific coefficient = 0.9422
b_a = Pollutant-specific coefficient = -1.700
ln = Natural logarithm
h = hardness of the receiving water = 56 mg/l

---

2. Chronic Criteria (Total Recoverable) = $\exp\{m_c [\ln(h)] + b_c\}$ = **5.68 µg/l**

Where:

m_c = Pollutant-specific coefficient = 0.8545
b_c = Pollutant-specific coefficient = -1.702
ln = Natural logarithm
h = hardness of the receiving water = 56 mg/l

EPA used information from the quarterly WET tests to perform a Reasonable Potential Analysis to determine the potential for discharges of copper from the Concord WWTP to cause or contribute to an excursion above water quality criteria. First, EPA projected the maximum effluent concentration as 46.40 µg/l by calculating the 99th percentile measurement the effluent data from March 2008 through December 2010. EPA then calculated the 95th percentile concentration, 27.82 µg/l, to characterize the maximum monthly average concentration (see Appendix F).

Background conditions in the Concord River were determined from the median of the WET chemistry dilution water samples from March 2008 through December 2010. The projected pollutant levels were then inserted into a steady-state mixing equation to determine if the discharge could cause or contribute to an excursion from water quality criteria under critical conditions.

As shown in the box below, the projected maximum copper effluent concentration of 46.40 µg/l results in a downstream receiving water concentration of 5.25 µg/l, below the acute criteria of 8.11 µg/l. A concentration of 27.82 µg/l, the 95th percentile concentration, results in a receiving water concentration of 4.29 µg/l, below the chronic criterion of 5.68 µg/l. Therefore, there is no reasonable potential for the discharge to cause or contribute to an excursion of either the acute or chronic water quality standard for copper.

Reasonable Potential Analysis for Copper – Acute

$$Q_rC_r = Q_dC_d + Q_sC_s$$

Where

C_r	=	Concentration below outfall		
Q_d	=	Discharge flow	=	1.2 MGD
C_d	=	Discharge concentration	=	46.40 µg/l
Q_s	=	Upstream flow	=	21.9 MGD
C_s	=	Upstream concentration	=	3 µg/l
Q_r	=	Streamflow below outfall (effluent + upstream)	=	23.1 MGD

Therefore,

$$C_r = \frac{(1.2 \text{ MGD} \times 46.40 \text{ µg/l}) + (21.9 \text{ MGD} \times 3 \text{ µg/l})}{4.1 \text{ MGD}}$$

$$= \mathbf{5.25} < 8.11 \text{ µg/l (acute criterion)}$$

Therefore, there is **no reasonable potential** for the discharge to cause or contribute to an excursion from the acute water quality criterion for copper.

Reasonable Potential Analysis for Copper – Chronic

$$Q_rC_r = Q_dC_d + Q_sC_s$$

Where

C_r	=	Concentration below outfall		
Q_d	=	Discharge flow	=	1.2 MGD
C_d	=	Discharge concentration	=	27.82 µg/l
Q_s	=	Upstream flow	=	21.9 MGD
C_s	=	Upstream concentration	=	3 µg/l
Q_r	=	Streamflow below outfall (effluent + upstream)	=	23.1 MGD

Therefore,

$$C_r = \frac{(1.2 \text{ MGD} \times 27.82 \text{ µg/l}) + (21.9 \text{ MGD} \times 3 \text{ µg/l})}{23.1 \text{ MGD}}$$

= **4.29 µg/l** < 5.68 µg/l (chronic criterion)

Therefore, there is **no reasonable potential** for the discharge to cause or contribute to an excursion from the chronic water quality criterion for copper.

Because there is no reasonable potential for an excursion from water quality standards from copper discharges from Concord WWTP, the draft permit does not contain copper limits. The permittee will continue to monitor for copper as part of the quarterly whole effluent toxicity testing.

Di(2-ethylhexyl) Phthalate

Di(2-ethylhexyl) phthalate (also known as DEHP) is used in the production of polyvinyl chloride (PVC). It is commonly detected in the environment due to the widespread use of plastic products, though it is only slightly soluble in water and is broken down quickly in the presence of oxygen. For more information on this chemical, see Appendix G for a fact sheet on DEHP produced by the Agency for Toxic Substances and Disease Registry (ATSDR).

DEHP was detected in pollutant scans of Concord WWTP effluent conducted for the NPDES reissuance application.

Table 1. DEHP Levels in Concord WWTP Effluent

Date	Concentration
4/19/2010	<10 µg/l *
6/21/2010	11 µg/l
8/22/2010	19 µg/l
5/31/2011	6.6 µg/l

* not detected in laboratory analysis

The human health criteria for DEHP are 1.2 µg/L for consumption of water and organism, and 2.2 µg/L for organism only. The water and organism criterion applies when the water body is used for drinking water and animals from the water body are consumed. The organism-only criterion applies when animals from the water body are consumed. The drinking water MCL (Maximum Contaminant Level) for DEHP is 6 µg/L. The reason for the apparent discrepancy in these numbers is that cost and laboratory detection limits are considered in the determination of MCLs, while human health criteria do not account for either.

As of 2010 (the most recent report available online), the Town of Billerica, which uses the Concord River as a drinking water source, did not detect DEHP in its drinking water. Because the Concord River is a drinking water source for towns downstream, the water and organism criterion was used to determine whether an effluent limit would be needed under the Massachusetts Water Quality Standards and the Clean Water Act.

To determine whether an effluent limit is necessary, EPA conducted a Reasonable Potential Analysis to assess the likelihood that the effluent caused or contributed to an exceedance of water quality standards under critical conditions. Critical conditions are considered to be 7Q10 streamflow with the facility operating at design capacity. EPA could not project the 99% or 95% percentile concentration, because at least ten samples are necessary to confirm that the data are lognormally distributed. Therefore, EPA used the highest observed effluent concentration. Finally, because DEHP breaks down quickly in the presence of oxygen, EPA assumes that the upstream concentration of DEHP is zero.

Reasonable Potential Analysis for DEHP

Where

C_r	=	Concentration below outfall		
Q_d	=	Discharge flow	=	1.2 MGD
C_d	=	Discharge concentration	=	19 µg/l
Q_s	=	Upstream flow	=	21.9 MGD
C_s	=	Upstream concentration	=	0 µg/l
Q_r	=	Streamflow below outfall	=	23.1 MGD (effluent + upstream)

Therefore,

$$Cr = \frac{(1.2\ MGD \times 19\ \mu g/l) + (21.9\ MGD \times 0\ \mu g/l)}{23.1\ MGD}$$

$$= \mathbf{0.99\ \mu g/l} < 1.2\ \mu g/l \text{ (water and organism criterion)}$$

Therefore, there is **no reasonable potential** for the discharge to cause or contribute to an exceedance of the water and organism human health criterion for DEHP.

Because there is not reasonable potential at this time for the effluent to cause or contribute to an exceedance of the human health criteria for DEHP, the draft permit does not include a limit for this pollutant. However, the permittee is required to monitor for and report DEHP concentrations in the effluent. Monitoring frequency will be once per quarter, in the same months as the Whole Effluent Toxicity tests. Because the detection level of DEHP can vary widely, if DEHP is not detected in the effluent, Concord WWTP must report the detection level of the analysis with the DMR. This requirement will help EPA determine if water quality standards are being met and assist in future permit limit development, if needed.

Outfall 001 – Whole Effluent Toxicity

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 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.

National studies conducted by the EPA have demonstrated that domestic sources contribute toxic constituents to POTWs. These constituents include metals, chlorinated solvents, aromatic hydrocarbons and others. Pursuant to EPA Region 1 and MassDEP policy, discharges having a dilution ratio between 10:1 and 20:1 require an acute toxicity limit of LC50 >100% and chronic toxicity testing four times per year. (See also "Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants", 49 Fed. Reg. 9016 March 9, 1984, and EPA's "Technical Support Document for Water Quality-Based Toxics Control", September, 1991.)

The current permit requires acute and chronic toxicity tests to be performed four times each year; in March, June, September, and December. The current permit also requires that the LC50 concentration exceed 100% effluent (i.e. 100% of effluent not cause mortality in more than 50% of test organisms), and that the Chronic C-NOEC (concentration of effluent that produces significant chronic effects in the test organism) be reported. From March 2008 through December 2010, there was one violation of the acute toxicity limit in June 2008, when the LC50 was 62% effluent.

The draft permit carries forward the requirements for quarterly chronic and acute toxicity tests using the species *Ceriodaphnia dubia*, only. The acute toxicity endpoint, expressed as LC50, must equal or exceed 100% effluent. The reporting requirement for chronic toxicity is carried forward into the draft permit. The tests must be performed in accordance with the test procedures and protocols specified in **Permit Attachment A**. The tests will be conducted four times a year, during the following months: March, June, September and December.

The draft permit also requires reporting of certain metals in the 100% effluent sample. These are parameters that the permittee already measures and reports as part of the quarterly WET test. The requirement to report the parameters on the DMR will add these data to the compliance database and facilitate reasonable potential analyses for future permits.

VI. OPERATION AND MAINTENANCE OF THE COLLECTION SYSTEM

EPA regulations set forth a standard condition for "Proper Operation and Maintenance" that is included in all NPDES permits. *See* 40 CFR § 122.41(e). This condition is specified in Part II.B.1 (Standard Conditions) of the draft permit and it requires the proper operation and maintenance of all wastewater treatment systems and related facilities installed or used to achieve permit conditions.

EPA regulations also specify a standard condition to be included in all NPDES permits that specifically imposes on permittees a "duty to mitigate." *See* 40 CFR § 122.41(d). This condition is specified in Part II.B.3 of the draft permit and it requires permittees to take all reasonable steps – which in some cases may include operations and maintenance work - to minimize or prevent any discharge in violation of the permit which has the reasonable likelihood of adversely affecting human health or the environment.

Proper operation of collection systems is critical to prevent blockages and equipment failures that would cause overflows of the collection system (sanitary sewer overflows, or SSOs), and to limit the amount of non-wastewater flow entering the collection system (inflow and infiltration or I/I). I/I in a collection system can pose a significant environmental problem because it may displace wastewater flow and thereby cause, or contribute to causing, SSOs. Moreover, I/I could reduce the capacity and efficiency of the treatment plant and cause bypasses of secondary treatment. Therefore, reducing I/I will help to minimize any SSOs and maximize the flow receiving proper treatment at the treatment plant. There is presently estimated to be approximately 198,075 gpd of (I/I) in the sewer system. MassDEP has stated that the inclusion in NPDES permits of I/I control conditions is a standard State Certification requirement under Section 401 of the CWA and 40 CFR § 124.55(b).

Therefore, specific permit conditions have been included in Part I.B., and I.C. and I.D. of the draft permit. These requirements include mapping of the wastewater collection system, preparing and implementing a collection system operation and maintenance plan, reporting unauthorized discharges including SSOs, maintaining an adequate maintenance staff, performing preventative maintenance, controlling infiltration and inflow to the extent necessary to prevent SSOs and I/I related-effluent violations at the wastewater treatment plant, and maintaining alternate power where necessary. These requirements are intended to minimize the occurrence of permit violations that have a reasonable likelihood of adversely affecting human health or the environment.

Several of the requirements in the draft permit are not included in the current permit, including collection system mapping, and preparation of a collection system operation and maintenance plan. EPA has determined that these additional requirements are necessary to ensure the proper operation and maintenance of the collection system and has included schedules for completing these requirements in the draft permit.

VII. SLUDGE INFORMATION AND REQUIREMENTS

Concord WWTP transports its sludge to the Upper Blackstone Water Pollution Abatement District for final treatment and disposal. Concord WWTP generates approximately 200 dry metric tons of sludge each year.

In February 1993, the Environmental Protection Agency (EPA) promulgated standards for the use and disposal of sewage sludge. The regulations were promulgated under the authority of

§405(d) of the Clean Water Act (CWA). Section 405(f) of the CWA requires that these regulations be implemented through permits. This permit is intended to implement the requirements set forth in the technical standards for the use and disposal of sewage sludge, commonly referred to as the Part 503 regulations.

Section 405(d) of the CWA requires that sludge conditions be included in all municipal permits. The sludge conditions in the draft permit satisfy this requirement and are taken from EPA's proposed Standards for the Disposal of Sewage Sludge to be codified at 40 CFR Part 503 (February 19, 1993 - Volume 58, pp 9248-9415). These conditions are outlined in the draft permit.

VIII. ESSENTIAL FISH HABITAT (EFH)

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 Marine Fisheries Services (NMFS) if EPA's action or proposed actions that it funds, permits, or undertakes may adversely impact any essential fish habitat as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. § 1802 (10)). Adversely impact means any impact which reduces the quality and/or quantity of EFH (50 C.F.R. § 600.910 (a)). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

EFH 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.

Concord WWTP discharges to the Concord River, which is a tributary of the Merrimack River. The Merrimack River system has been designated as EFH for Atlantic salmon. Although EFH has been designated for this general location, EPA has concluded that this activity is not likely to affect EFH or its associated species for the following reasons:

- The quantity of the discharge from the WWTP is 1.2 MGD and the effluent receives advanced treatment;
- The facility withdraws no water from the Concord River; therefore no life stages of Atlantic salmon are vulnerable to impingement or entrainment from this facility;
- Limits specifically protective of aquatic organisms have been established for phosphorus and aluminum based on EPA water quality criteria;
- The facility uses ultra-violet disinfection; therefore the effluent is free from chlorine.
- Acute and chronic toxicity testing on *Ceriodaphnia dubia* is required four (4) times per year and the recent toxicity results are in compliance with permit limits;
- The permit prohibits any violation of state water quality standards.

EPA believes that the conditions and limitations contained within the draft permit adequately protect all aquatic life, including those species with EFH designation. Impacts associated with issuance of this permit to the EFH species, their habitat and forage, have been minimized to the extent that no significant adverse impacts are expected. Further mitigation is not warranted.

IX. ENDANGERED SPECIES

Section 7(a) of the Endangered Species Act of 1973, as amended (ESA) grants authority to and imposes requirements upon Federal agencies regarding endangered or threatened species of fish, wildlife, or plants ("listed species") and habitat of such species that has been designated as critical (a "critical habitat"). The ESA requires every Federal agency, in consultation with and with the assistance of the Secretary of Interior, to insure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. The United States Fish and Wildlife Service (USFWS) typically administers Section 7 consultations for bird, terrestrial, and freshwater aquatic species. The National Marine Fisheries Service (NMFS) typically administers Section 7 consultations for marine species and anadromous fish.

EPA has reviewed the federal endangered or threatened species of fish and wildlife to determine if any listed species might potentially be impacted by the re-issuance of this NPDES permit. The review revealed that one federally protected species, the small whirled pogonia (*Isotria medeoloides*), an orchid, merited further discussion.

The small whirled pogonia orchid has been identified in Groton, Massachusetts, which is three towns away from the Concord WWTP. In addition, the small whorled pogonia is found in "forests with somewhat poorly drained soils and/or a seasonally high water table," according to the USFWS website. This species is not aquatic; therefore it is unlikely that it would come into contact with the facility discharge.

EPA is coordinating a review of this finding with USFWS and NMFS through the Draft Permit and Fact Sheet, and consultation under Section 7 of the ESA with USFWS and NMFS is not required.

X. MONITORING AND REPORTING

The effluent monitoring requirements have been established to yield data representative of the discharge under authority of Section 308 (a) of the CWA in accordance with 40 CFR §§122.41 (j), 122.44 (l), and 122.48.

The Draft Permit includes new provisions related to Discharge Monitoring Report (DMR) submittals to EPA and the State. The Draft Permit requires that, no later than one year after the effective date of the permit, the permittee submit all monitoring data and other reports required by the permit to EPA using NetDMR, unless the permittee is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for submitting DMRs and reports ("opt-out request").

In the interim (until one year from the effective date of the permit), the permittee may either submit monitoring data and other reports to EPA in hard copy form, or report electronically using NetDMR.

NetDMR is a national web-based tool for regulated Clean Water Act permittees to submit discharge monitoring reports (DMRs) electronically via a secure Internet application to U.S. EPA

through the Environmental Information Exchange Network. NetDMR allows participants to discontinue mailing in hard copy forms under 40 CFR § 122.41 and § 403.12. NetDMR is accessed from the following url: http://www.epa.gov/netdmr. Further information about NetDMR, including contacts for EPA Region 1, is provided on this website.

EPA currently conducts free training on the use of NetDMR, and anticipates that the availability of this training will continue to assist permittees with the transition to use of NetDMR. To participate in upcoming trainings, visit http://www.epa.gov/netdmr for contact information for Massachusetts.

The Draft Permit requires the permittee to report monitoring results obtained during each calendar month using NetDMR, no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA and will no longer be required to submit hard copies of DMRs to MassDEP. **However, permittees must continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP.**

The Draft Permit also includes an "opt-out" request process. Permittees who believe they cannot use NetDMR due to technical or administrative infeasibilities, or other logical reasons, must demonstrate the reasonable basis that precludes the use of NetDMR. These permittees must submit the justification, in writing, to EPA at least sixty (60) days prior to the date the facility would otherwise be required to begin using NetDMR. Opt-outs become effective upon the date of written approval by EPA and are valid for twelve (12) months from the date of EPA approval. The opt-outs expire at the end of this twelve (12) month period. Upon expiration, the permittee must submit DMRs and reports to EPA using NetDMR, unless the permittee submits a renewed opt-out request sixty (60) days prior to expiration of its opt-out, and such a request is approved by EPA.

Until electronic reporting using NetDMR begins, or for those permittees that receive written approval from EPA to continue to submit hard copies of DMRs, the Draft Permit requires that submittal of DMRs and other reports required by the permit continue in hard copy format. Hard copies of DMRs must be postmarked no later than the 15th day of the month following the completed reporting period.

XI. STATE PERMIT CONDITIONS

The NPDES Permit is issued jointly by the U. S. Environmental Protection Agency and the Massachusetts Department of Environmental Protection under federal and state law, respectively. As such, all the terms and conditions of the permit are, therefore, incorporated into and constitute a discharge permit issued by the MassDEP Commissioner.

XII. GENERAL CONDITIONS

The general conditions of the permit are based on 40 CFR Parts 122, Subparts A and D and 40 CFR 124, Subparts A, D, E, and F and are consistent with management requirements common to other permits.

XIII. STATE CERTIFICATION REQUIREMENTS

The staff of MassDEP has reviewed the draft permit. EPA has requested permit certification by the State pursuant to 40 CFR Part 124.53 and expects that the draft permit will be certified.

XIV. PUBLIC COMMENT PERIOD AND PROCEDURES FOR FINAL DECISION

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to the U.S. EPA, Office of Ecosystem Protection, 5 Post Office Square, Suite 100, Boston, Massachusetts 02109-3912. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues proposed to be raised in the hearing. Public hearings may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates a significant public interest. In reaching a final decision on the draft permit, the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston office.

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

XV. EPA CONTACT

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

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5 Post Office Square, Suite 100
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Kathleen Keohane, Massachusetts Department of Environmental Protection
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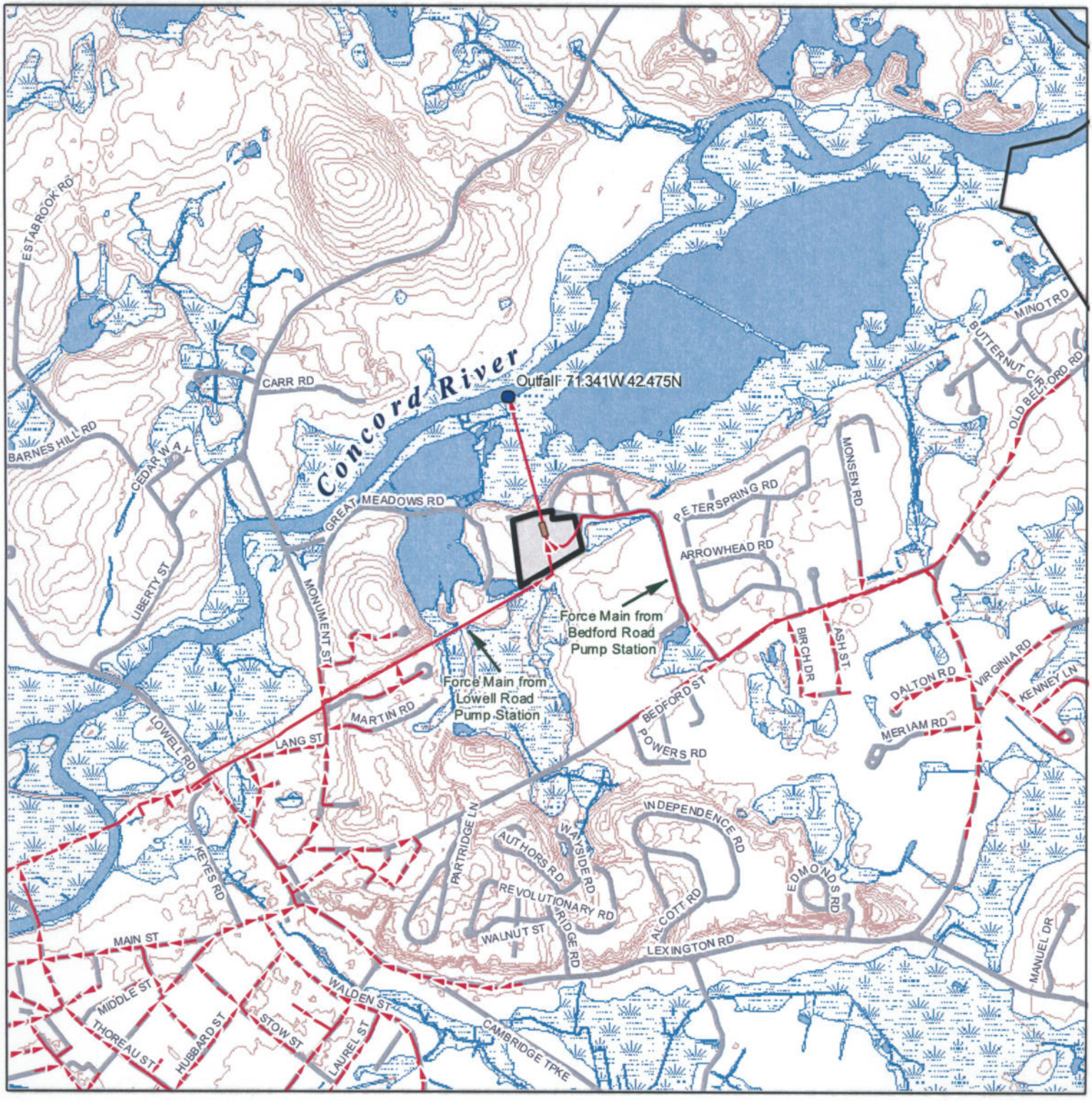
Telephone: (508) 767-2856 FAX: (508) 791-4131
kathleen.keohane@state.ma.

_____
Date

Stephen Perkins, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency

Town of Concord, Massachusetts



WWTP Site

WWTP Building

WWTP Outfall 001

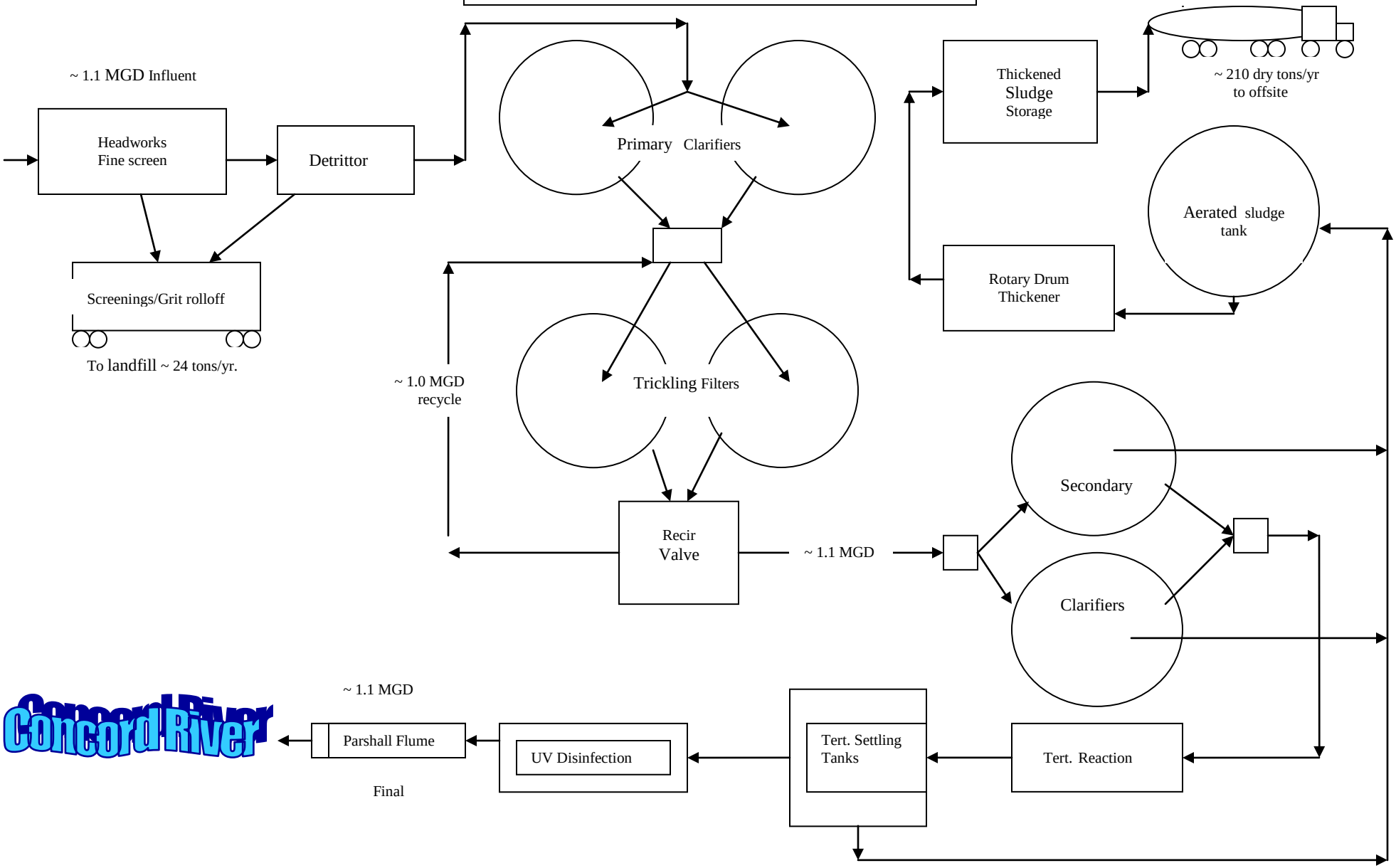
Sanitary Sewer

Concord WWTP
MA0100668
Location Map

July 2010

0 0.1 0.2 Miles

Concord, Mass. Wastewater Treatment Facility
Process Flow Diagram



Appendix A

DMR SUMMARY - Concord WWTF

1/1/2009 - 12/31/2010

Monitoring Period End Date	Flow Max	Flow avg*	pH Min	pH Max	BOD, avg monthly loading	BOD, max daily loading	BOD, monthly avg	BOD, weekly avg	BOD, daily max	TSS, avg monthly loading	TSS, max daily loading	TSS, avg monthly	TSS, avg weekly	TSS, max daily
	MGD	MGD	s.u.	s.u.	lb/day	lb/day	mg/l	mg/l	mg/l	lb/day	lb/day	mg/l	mg/l	mg/l
01/31/2009	1.559	1.278	6.3	7.3	59.	79.	5.	7.	7.	95.	159.	9.	12.	13.
02/28/2009	1.24	1.1179	6.2	7.	45.	56.	5.	6.	6.	77.	116.	8.	10.	12.
03/31/2009	1.417	1.2382	6.2	7.04	40.	51.	4.	5.	5.	75.	104.	7.	10.	10.
04/30/2009	1.3583	1.1688	6.01	6.98	29.	33.	3.	4.	3.	15.	39.	2.	5.	4.
05/31/2009	1.131	.974	6.31	8.3	32.	47.	4.	5.	5.	13.	26.	2.	2.	3.
06/30/2009	.92	.82	6.	7.8	52.	75.	4.	5.	6.	25.	48.	2.	4.	4.
07/31/2009	1.19	.96	6.15	8.63	27.	34.	3.	4.	4.	26.	42.	3.	5.	5.
08/31/2009	1.134	.919	6.28	7.08	25.	37.	3.	4.	4.	22.	41.	3.	4.	5.
09/30/2009	.95	.839	6.32	6.78	50.	148.	3.	6.	10.	31.	92.	2.	4.	6.
10/31/2009	.947	.849	6.3	7.3	20.	29.	3.	4.	4.	15.	22.	2.	3.	3.
11/30/2009	1.097	.931	6.31	9.62	40.	62.	5.	6.	7.	80.	97.	10.	13.	13.
12/31/2009	1.224	1.096	6.38	6.93	41.	57.	4.	5.	6.	81.	144.	9.	16.	16.
01/31/2010	1.278	1.032	6.36	6.66	43.	67.	5.	6.	8.	63.	94.	7.	8.	9.
02/28/2010	2.09	1.12	6.11	7.66	40.	53.	5.	5.	6.	75.	135.	9.	10.	13.
03/31/2010	3.76	2.4	6.06	6.78	136.	269.	6.	9.	9.	283.	847.	12.	24.	25.
04/30/2010	3.213	1.89	6.28	6.8	58.	107.	4.	4.	4.	34.	65.	2.	6.	3.
05/31/2010	1.147	1.02	6.31	6.72	26.	38.	3.	4.	4.	14.	35.	2.	2.	4.
06/30/2010	.97	.83	6.15	6.71	20.	24.	3.	3.	3.	16.	25.	2.	3.	3.
07/31/2010	.753	.6731	6.16	6.47	18.	24.	3.	4.	4.	13.	24.	2.	3.	4.
08/31/2010	.979	.799	6.08	6.64	23.	51.	3.	5.	7.	20.	58.	3.	5.	8.
09/30/2010	1.	.82	6.08	6.76	16.	22.	2.	3.	3.	11.	21.	2.	2.	3.
10/31/2010	.972	.869	6.4	7.16	17.	23.	2.	2.	3.	11.	22.	2.	2.	3.
11/30/2010	1.02	.895	6.31	7.07	28.	38.	4.	4.	5.	56.	100.	7.	10.	13.
12/31/2010	1.093	.958	6.25	6.85	35.	43.	4.	5.	5.	88.	254.	11.	18.	30.
Jan 2006 limits	Report	1.2	6	8.3	300	450	30	45	Report	300	450	30	45	Report
Minimum	.753	.6731	6.	6.47	16.	22.	2.	2.	3.	11.	21.	2.	2.	3.
Maximum	3.76	2.4	6.4	9.62	300.	269.	6.	9.	10.	283.	847.	12.	24.	30.
Average	1.35	1.06	6.22	7.21	48.80	61.13	3.75	4.79	5.33	51.63	108.75	5.00	7.54	8.83
Standard Deviation	0.71	0.37	0.12	0.73	57.54	52.83	1.03	1.44	1.93	57.45	167.16	3.55	5.79	7.15
#measurement	24	24	24	24	25	25	25	24	24	24	25	25	25	24
#exceed 2006 limits	N/A	0	0	2	0	0	0	0	N/A	0	1	0	0	N/A

Appendix A
DMR SUMMARY - Concord WWTF
1/1/2009 - 12/31/2010

Monitoring Period End Date	Fecal coliform, geo avg	Fecal coliform, daily max	Dissolved oxygen	Total Phosphorus, monthly avg	Total Phosphorus, daily max	Ortho-phosphate, max daily	Ortho-phosphate, avg monthly	Ammonia, monthly avg	Ammonia, daily max	Aluminum, daily max	Aluminum, monthly avg
	#/100 ml	#/100 ml	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	µg/l
01/31/2009	2.	20.	9.5	.79	1.52	.05	.07	.96	1.01	2270.	2270.
02/28/2009	1.	2.	7.9	.98	1.28	.06	.11	1.03	1.51	2270.	2270.
03/31/2009	1.	4.	10.1	.51	.76	.05	.09	.87	.95	1510.	1510.
04/30/2009	1.	1.	9.2	.11	.18			.85	1.08	444.	444.
05/31/2009	1.	1.	9.8	.15	.28			.55	.91	737.	737.
06/30/2009	1.	1.	8.2	.2	.3			1.34	1.54	375.	375.
07/31/2009	2.	10.	8.5	.19	.32			.62	1.13	598.	598.
08/31/2009	1.	1.	8.3	.18	.25			.93	1.21	415.	415.
09/30/2009	1.	1.	8.	.2	.25			1.05	1.21	625.	625.
10/31/2009	1.	1.	8.6	.19	.39			1.24	1.67	283.	283.
11/30/2009	1.	2.	9.5	.76	.81	.38	.64	1.29	1.66	870.	870.
12/31/2009	2.	22.	9.6	.68	.91	.09	.12	1.88	2.21	1840.	1840.
01/31/2010	1.	4.	9.9	.66	.84	.16	.33	.55	.97	1260.	1260.
02/28/2010	1.	2.	10.	.96	1.02	.09	.12	.71	.76	1370.	1370.
03/31/2010	2.	9.	10.	.66	.99	.05	.07	1.36	1.81	1360.	1360.
04/30/2010	1.	6.	10.	.2	.28			.62	.67	577.	577.
05/31/2010	1.	1.	9.2	.19	.28			1.14	1.3	893.	893.
06/30/2010	1.	1.	8.7	.19	.26			.49	.61	662.	662.
07/31/2010	1.	1.	8.	.16	.27			.75	.92	329.	329.
08/31/2010	1.	2.	8.3	.19	.3			.98	1.48	1280.	1280.
09/30/2010	1.	2.	8.4	.19	.24			1.49	1.88	1210.	1210.
10/31/2010	1.	4.	7.8	.17	.28			.95	1.13	191.	191.
11/30/2010	1.	4.	9.2	.5	.75	.09	.28	2.81	4.18	609.	609.
12/31/2010	2.	36.	9.	.61	.78	.02	.02	.67	.78	2170.	2170.
Jan 2006 limits	200	400	5	Varies	Report	Report	Report	Report	Report	Report	Report
Minimum	1.	1.	7.8	.11	.18	.02	.02	.49	.61	191.	191.
Maximum	2.	36.	10.1	.98	1.52	.38	.64	2.81	4.18	2270.	2270.
Average	1.21	5.75	8.99	0.40	0.56	0.10	0.19	1.05	1.36	1006.17	1006.17
Standard Deviation	0.41	8.59	0.77	0.29	0.38	0.10	0.19	0.51	0.73	643.45	643.45
#measurement	24	25	24	24	24	10	10	24	24	24	24
#exceed 2006 limits	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix A
DMR SUMMARY - Concord WWTF
1/1/2009 - 12/31/2010

Whole Effluent Toxicity							
Date	LC50	C-NOEC	Copper (mg/l)	Zinc (mg/l)	Lead (mg/l)	Cadmium (mg/l)	Nickel (mg/l)
March-08	100	12.5	0.0116	0.0061	<0.0005	<0.0002	0.0019
June-08	60.2	100.	0.0099	0.0223	<0.0005	<0.0002	0.0022
September-08	100	100.	0.0069	0.0211	<0.0005	<0.0002	0.0024
December-08	100	100.	0.0081	0.0174	<0.0005	<0.0002	0.0023
March-09	100	100.	0.0076	0.0238	<0.0005	<0.0002	0.0053
June-09	100	100.	0.0055	0.0045	<0.001	<0.0002	0.0045
September-09	100	100.	<0.01	0.023	<0.04	<0.004	<0.01
December-09	100	100.	0.009	0.025	<0.0005	<0.0002	<0.01
March-10	100	100.	0.009	0.027	<0.0005	<0.0002	0.007
June-10	100	100.	0.008	0.015	<0.001	<0.0002	0.005
September-10	100	100.	0.006	0.016	<0.001	<0.0002	0.005
December-10	100	100.	0.016	0.035	<0.001	<0.0002	0.005
Limit	100.	Report	Report	Report	Report	Report	Report
Minimum	60.2	12.5	.0055	.0045	N/A	N/A	.0019
Maximum	100.	100.	.016	.035	N/A	N/A	.007
# measurements	21.	21.	21.	22.	23.	24.	25.
#exceed limit	1	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX B – 7Q10 AND DILUTION CALCULATIONS

To obtain an estimate of a 7Q10 flow at a point between the two USGS gages listed below, the drainage areas (DA) between them must be calculated and other flows included or excluded as explained below. All drainage area values for the locations below are estimated from USGS topographic maps and the USGS gazetteer of 1984 for the Merrimack River in which the SUASCO (Sudbury-Assabet-Concord) river basin is included. The streamflows were determined using DFlow 3.1b, a streamflow modeling computer program.

Lowell, MA USGS gage (01099500), 7Q10 for the period 1971 - 2000: **38 cfs**
Maynard, MA USGS gage (01097000), 7Q10 for the period 1971 - 2000: **14 cfs**(1)

Flow factor calculation for main stretch of river between Maynard and Lowell gages:

400 square miles -116 square miles = 284 sq. mi. (Lowell gage DA) (Maynard gage DA) (DA between Maynard and Lowell)

Low flow attributable to this stretch of river:

38 cfs -14 cfs -1.5 cfs(2) = 22.5 cfs (7Q10 @ Lowell) (7Q10 @ Maynard)

Flow factor for this stretch of river:

22.5 cfs / 284 square miles = **0.079 cfs/sq. mile**

Estimated 7Q10 flow at Concord MCI:

14 cfs + 1.5 cfs + (168 mi^2 - 116 mi^2) 0.079 = **20 cfs** (DA between Maynard gage and Concord MCI discharge)

Estimated 7Q10 flow at Concord POTW:

20 cfs + (345 mi^2 -168 mi^2) 0.079 = **34 cfs** (DA between Concord MCI and Concord POTW)

(1). This is the estimated 7Q10 at the Maynard USGS gage.
(2). This is the average effluent flow from the Maynard WWTP from the period of June to Sept of 2009-2010, reflecting the low flow season over that period. This discharge is just downstream of the Maynard gage.

Design Flow Dilution:

Design Flow = 1.2 MGD x 1.55[(3)] cfs/MGD = 1.9 cfs

$$\frac{\text{Design flow + 7Q10 flow}}{\text{Design flow}} = \frac{\text{1.9 cfs + 34 cfs}}{\text{1.9 cfs}} = \mathbf{19} = \text{Dilution Factor}$$

(3). This is the conversion factor between cubic feet per second and million gallons per day.

Appendix C
Aluminum Calculations

Background Al (from WET chemistry)	
3/10/2008	183
6/18/2008	154
9/8/2008	235
12/8/2008	118
3/18/2009	76
6/10/2009	29.4
9/14/2009	50
12/7/2009	72
3/8/2010	62
6/7/2010	75
9/13/2010	73
12/13/2010	565
Average	141.0333333
Median	75.5

originally non-detect. Changed to 1/2 detection level for this analysis

Appendix C
Aluminum Calculations

Aluminum RP Analysis
Al, no ND, >10 samples, Lognormal distribution

Date	Al (ug/L)	Yi lnAl (ug/L)	$(y_i - u_y)^2$
01/31/2009	2270.	7.7275	0.972854
02/28/2009	2270.	7.7275	0.972854
03/31/2009	1510.	7.3199	0.334852
04/30/2009	444.	6.0958	0.416511
05/31/2009	737.	6.6026	0.019214
06/30/2009	375.	5.9269	0.663044
07/31/2009	598.	6.3936	0.120833
08/31/2009	415.	6.0283	0.508259
09/30/2009	625.	6.4378	0.092082
10/31/2009	283.	5.6454	1.200678
11/30/2009	870.	6.7685	0.000745
12/31/2009	1840.	7.5175	0.602672
01/31/2010	1260.	7.1389	0.158138
02/28/2010	1370.	7.2226	0.231712
03/31/2010	1360.	7.2152	0.224713
04/30/2010	577.	6.3578	0.146964
05/31/2010	893.	6.7946	0.00285
06/30/2010	662.	6.4953	0.060484
07/31/2010	329.	5.7961	0.893296
08/31/2010	1280.	7.1546	0.170911
09/30/2010	1210.	7.0984	0.127574
10/31/2010	191.	5.2523	2.216906
11/30/2010	609.	6.4118	0.108493
12/31/2010	2170.	7.6825	0.88601
01/31/2011	2250.	7.7187	0.955475

Aluminum- (Lognormal distribution, no ND)

Daily Maximum Limit Derivation

u_y = Avg of Nat. Log of daily Discharge (lbs/day) =	6.74120
σ_y = Std Dev. of Nat Log of daily discharge =	0.70970
$\Sigma (y_i - u_y)^2$ =	12.08812
k = number of daily samples =	25
σ_y^2 = estimated variance = $(\Sigma[(y_i - u_y)^2]) / (k-1)$ =	0.50367

Daily Max Limit = exp (u_y + 2.326*σ_y)

Daily Max Limit = 4411.45 ug/L
(Lognormal distribution, 99th percentile)

Average Monthly Limit Derivation

Number of samples per month, n =	1
E(x) = Daily Avg = $\exp(u_y + 0.5\sigma_y^2)$ =	1089.02403
V(x) = Daily Variance = $\exp(2u_y + \sigma_y^2) * [\exp(\sigma_y^2) - 1]$ =	776559.07235
σ_n^2 = Monthly Average variance = $\ln\{ V(x) / (n[E(x)]^2) + 1\}$ =	0.50367
σ_n = Monthly Average standard deviation = σ_n^2^(0.5) =	0.70970
u_n = n-day monthly average = $\ln(E(x)) - 0.5\sigma_n^2$ =	6.74120

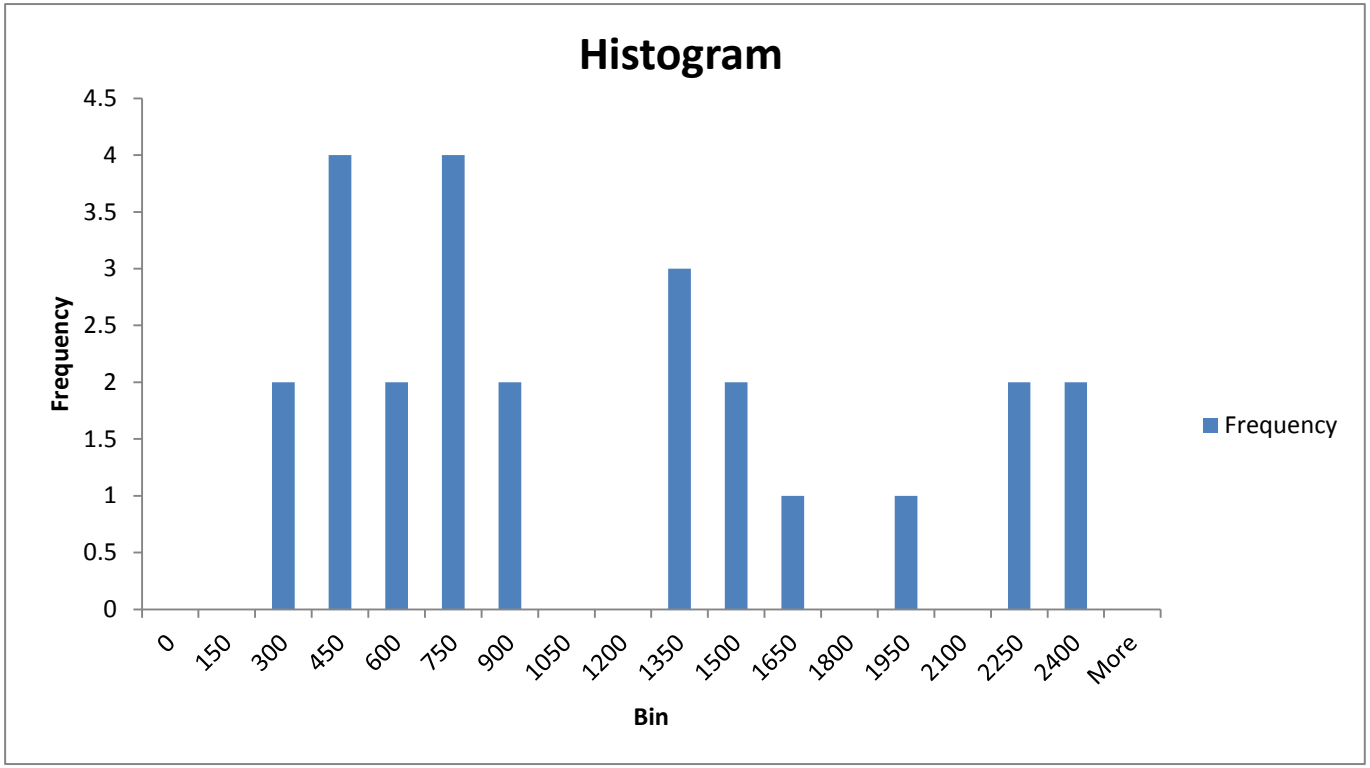
Monthly Average Limit = exp (u_n + 1.645*σ_n)

Monthly Avg Limit* = 2720.73 ug/L
(Lognormal distribution, 95th percentile of average monthly values)

*Based on sampling frequency of 1 time per month

Appendix C
Aluminum Calculations

Bin	*Frequency*
0	0
150	0
300	2
450	4
600	2
750	4
900	2
1050	0
1200	0
1350	3
1500	2
1650	1
1800	0
1950	1
2100	0
2250	2
2400	2
More	0



APPENDIX D – 30Q10 LOW FLOW AND DILUTION FACTOR CALCULATIONS

Summer (April 1st – October 31st) 30Q10 Calculations

Lowell, MA USGS gage (01099500), 30Q10 for the period 1981 - 2000: **55.3 cfs**
Maynard, MA USGS gage (01097000, 30Q10 for the period 1981 - 2000: **19.8 cfs** (1)

Flow factor calculation for main stretch of river between Maynard and Lowell gages:

400 square miles -116 square miles = 284 sq. mi. (Lowell gage DA) (Maynard gage DA) (DA between Maynard and Lowell)

Low flow attributable to this stretch of river:

55.3 cfs -19.8 cfs -1.7 cfs(b) = 33.8 cfs (30Q10 @ Lowell) (30Q10 @ Maynard)

Flow factor for this stretch of river:

33.8 cfs / 284 square miles = **0.12 cfs/sq. mile**

Estimated 30Q10 flow at Concord MCI:

19.8 cfs(a)+ 1.7 cfs(b) + (168 mi^2 - 116 mi^2) 0.12 = **28 cfs** (DA between Maynard gage and Concord MCI discharge)

Estimated 30Q10 flow at Concord WWTP:

28 cfs + (345 mi^2 -168 mi^2) 0.12 = **49 cfs** (DA between Concord MCI and Concord WWTP)

(a) This is the estimated 30Q10 at the Maynard USGS gage.

(b) This is the average effluent flow from the Maynard WWTP from the period of 2009-2010, reflecting the low flow season over that period. This discharge is just downstream of the Maynard gage.

(c) This is the conversion factor between cubic feet per second and million gallons per day.

Design Flow Dilution:

Design Flow = 1.2 MGD x 1.55[(c)] cfs/MGD = 1.9 cfs

$$\frac{\text{Design flow + 30Q10 flow}}{\text{Design flow}} = \frac{\text{1.9 cfs + 49 cfs}}{\text{1.9 cfs}} = \mathbf{27} = \text{Dilution Factor}$$

APPENDIX E
AMMONIA CALCULATIONS

Summer Ammonia Criteria (at 22° C and pH 7.2, salmonids present, early fish life stages present)[1]

Acute: 19.7 mg/l
Chronic: 3.33 mg/l

Ambient Data (from OARS 2009-2010 data, Concord at Lowell Road, Station ABT-010[2])

Date	pH	Temperature
6/21/2009	7.09	19.86
7/19/2009	7.14	22.91
8/16/2009	7.26	23.51
6/13/2010	7.16	18.51
7/18/2010	7.43	26.17
8/22/2010	7.59	21.37
Median	7.21	22.14

Reasonable Potential Analysis for Summer Ammonia Discharges

$$C_r = \frac{Q_d C_d + Q_s C_s}{Q_r}$$

Q_d = effluent flow, i.e. facility design flow = 1.2 MGD
C_d = effluent pollutant concentration = 2.47 mg/l (projected highest data point)
Q_s = 30Q10 flow of receiving water = 49 cfs = 31.6 MGD
C_s = upstream concentration = 0 mg/l
Q_r = receiving water flow = $Q_s + Q_d$ = 1.2 MGD + 31.6 MGD = 32.8 MGD
C_r = receiving water concentration = ?

$$C_r = \frac{(1.2 \text{ MGD} \times 2.47 \text{ mg/l}) + (31.6 \text{ MGD} \times 0 \text{ mg/l})}{32.8 \text{ MGD}}$$

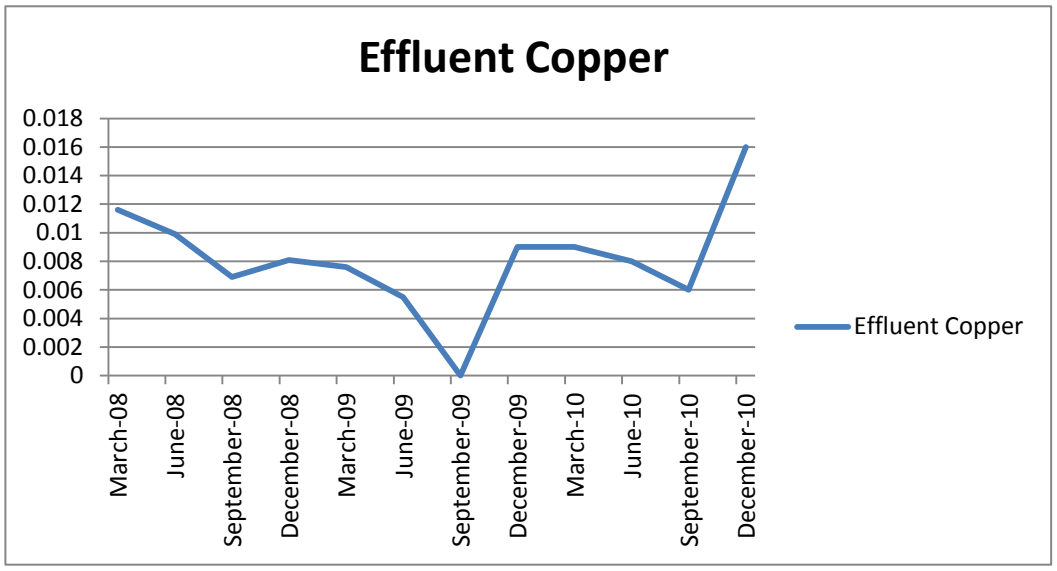
C_r = 0.09 mg/l < 3.33 mg/l (summer chronic criterion)

There is no reasonable potential for the discharge to cause or contribute to an exceedance of the acute or chronic water quality criterion.

1 Pages 86-87 of 1999 Update of Ambient Water Quality Criteria for Ammonia (EPA-822-R-99-014)
2 http://www.oars3rivers.org/sites/default/files/Data-2009-2010-Appendix-II.pdf

Appendix F
Copper Calculations

	Effluent		Upstream	
	mg/l	ug/l		
March-08	0.0116	11.6	0.00445	0.00445
June-08	0.0099	9.9	0.0034	0.0034
September-08	0.0069	6.9	0.0041	0.0041
December-08	0.0081	8.1	0.0017	0.0017
March-09	0.0076	7.6	0.0013	0.0013
June-09	0.0055	5.5	0.0093	0.0093
September-09	<0.01		<0.01	0.0005
December-09	0.009	9	0.003	0.003
March-10	0.009	9	0.003	0.003
June-10	0.008	8	0.004	0.004
September-10	0.006	6	0.002	
December-10	0.016	16	0.001	
	0.008873	mean	0.003386	0.003475
		median	0.0034	



Freshwater Metals Criteria and Limits

Step 1: Input the following values (highlighted in green)

7Q10	21.90	MGD
Design flow	1.2	MGD
Hardness =	56	mg/L

Step 2: The spreadsheet calculates the Total Recoverable Limits

Step 3: Input background metals values (if available)

Metal	m_A	b_A	m_C	b_C	CF acute	CF chronic	Background (ug/l)	Dissolved Criteria	
								Acute Criteria (CMC) (ug/L)	Chronic Criteria (CCC) (ug/L)
Hardness Dependent Metals									
Cadmium	1.0166	-3.9240	0.7409	-4.7190	0.968	0.933	0.000	1.15	0.16
Chromium III	0.8190	3.7256	0.8190	0.6848	0.316	0.860	0.000	354.37	46.10
Copper	0.9422	-1.7000	0.8545	-1.7020	0.960	0.960	3.000	7.78	5.46
Lead	1.2730	-1.4600	1.2730	-4.7050	0.875	0.875	0.000	34.17	1.33
Nickel	0.8460	2.2550	0.8460	0.0584	0.998	0.997	0.000	286.70	31.84
Silver	1.7200	-6.5900	---	---	0.850	---	0.000	1.19	---
Zinc	0.8473	0.8840	0.8473	0.8840	0.978	0.986	0.000	71.70	72.28
Non-Hardness Dependent Metals									
Arsenic					1.000	1.000	0.000	340.00	150.00
Chromium VI					0.982	0.962	0.000	16.00	11.00
Mercury					0.850	0.850	0.000	1.40	0.77
Aluminum					---	---	75.000	---	---

Source: National Recommended Water Quality Criteria 2002
http://www.epa.gov/waterscience/criteria/wqctable/

Step 4: Identifiy the limit (highlighted in blue)

Total Recoverable Criteria		Total Recoverable Limit	
Acute Criteria (CMC) (ug/L)	Chronic Criteria (CCC) (ug/L)	Maximum Daily Limit (ug/L)	Monthly Ave Limit (ug/L)
1.18	0.18	22.8	3.4
1121.43	53.60	21587.6	1031.8
8.11	5.68	101.3	54.7
39.03	1.52	751.3	29.3
287.28	31.94	5530.1	614.8
1.40	---	26.9	
73.31	73.31	1411.2	1411.2
340.00	150.00	358.6	2887.5
16.29	11.43	17.2	220.1
1.65	0.91	1.7	17.4
750.00	87.00	13068.8	306.0

Hardness (mg/l)

	Background	Effluent
March-08	23.8	81.2
June-08	60.6	83.3
September-08	30.8	77
December-08	42.6	78.2
March-09	44.2	89.4
June-09	63.8	97.2
September-09	54.9	96
December-09	42.2	89.4
March-10	40.5	88.9
June-10	60.3	86
September-10	81.3	86
December-10	58.7	84.2
median	54.9	86
average	52.71818182	86.87273

Hardness Analysis

Conc downstream = (QeCe+QsCs)/(Qe+Qs) 56.51311

Qe	1.2	MGD	Design flow
Ce	86.00	mg/l	Effluent Hardness
Qs	21.93548	MGD	7Q10 Stream flow
Cs	54.9	mg/l	Background concentration

Reasonable Potential Analysis
data with ND, >10 samples, lognormal distribution

Dilution Factor:	19

Date	Cu* (ug/l)	ln/Cu (ug/l)	$(y_i - u_y)^2$
March-08	11.6	2.4510	0.0968339
June-08	9.9	2.2925	0.0233207
September-08	6.9	1.9315	0.0433898
December-08	8.1	2.0919	0.0023001
March-09	7.6	2.0281	0.0124714
June-09	5.5	1.7047	0.1892908
September-09	0*		4.5788454
December-09	9	2.1972	0.0032949
March-10	9	2.1972	0.0032949
June-10	8	2.0794	0.003646
September-10	6	1.7918	0.1211487
December-10	16	2.7726	0.4003916

Cu- (Lognormal distribution, ND)

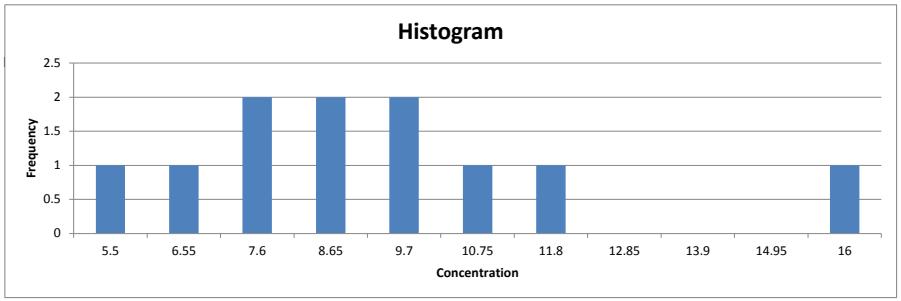
Daily Maximum Effluent Derivation (some measurements < detection limit)	
Detection Limit** =	10.0
u_y = Avg of Nat. Log of daily Discharge (mg/L) =	2.13982
S $(y_i - u)^2$ =	5.47823
k = number of daily samples =	12
r = number of non-detects =	1
s_y^2 = estimated variance = $(S[(y_i - u_y)^2]) / (k-r-1)$ =	0.54782
s_y = standard deviation = square root s_y^2 =	0.74015
δ = number of nondetect values/number of samples =	0.08333
z 99th percentile=z-score[(0.99-δ)/(1-δ)] =	2.29352
z 95th percentile=z-score[(0.95-δ)/(1-δ)] =	1.602292655
Daily Max = exp (u_y + z-score*s_y)	
99th Percentile Daily Max Estimate=	**46.4034 ug/l**
99th Percentile Daily Max Estimate including dilution factor=	**2.4423 ug/l**
95th Percentile Daily Max Estimate =	**27.8202 ug/l**
95th Percentile Daily Max Estimate including dilution factor=	**1.4642 ug/l**

** Detection limit here is the detection limit that resulted in the greatest number of Non Detects in the dataset

Histogram 1

max	16	
min	5.5	*not including NDs
number of bins	10	*not including min bin -
bin separation	1.05	

Bin		count
0	5.5	1
1	6.55	1
2	7.6	2
3	8.65	2
4	9.7	2
5	10.75	1
6	11.8	1
7	12.85	0
8	13.9	0
9	14.95	0
10	16	1

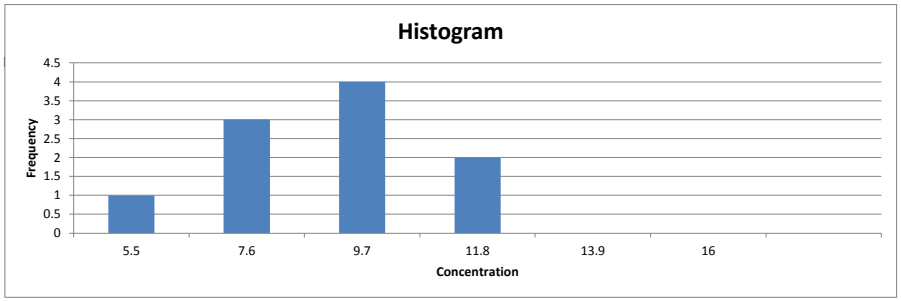


*ND values not plotted

Histogram 2

max	16	
min	5.5	*not including NDs
number of bins	5	*not including min bin -
bin separation	2.1	

Bin		count
0	5.5	1
1	7.6	3
2	9.7	4
3	11.8	2
4	13.9	0
5	16	0



*ND values not plotted

Acute			
Conc downstream = (QeCe+QsCs)/(Qe+Qs)			5.251263
Qe	1.2	MGD	Design flow
Ce	46.40	ug/l	Projected copper
Qs	21.93548	MGD	7Q10 Stream flow
Cs	3	ug/l	Background concentration

Chronic			
Conc downstream = (QeCe+QsCs)/(Qe+Qs)			4.287382
Qe	1.2	MGD	Design flow
Ce	27.82	ug/l	Projected copper
Qs	21.93548	MGD	7Q10 Stream flow
Cs	3	ug/l	Background concentration

(calculations also in Fact Sheet)

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Di(2-ethylhexyl) phthalate (DEHP)

CAS # 117-81-7

Division of Toxicology ToxFAQs™ **September 2002**

This fact sheet answers the most frequently asked health questions (FAQs) about di(2-ethylhexyl) phthalate (DEHP). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Di(2-ethylhexyl) phthalate (DEHP) is found in many plastics. Exposure to DEHP is generally very low. Increased exposures may come from intravenous fluids delivered through plastic tubing, and from ingesting contaminated foods or water. DEHP is not toxic at the low levels usually present in the environment. In animals, high levels of DEHP damaged the liver and kidney and affected the ability to reproduce. DEHP has been found in at least 733 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is di(2-ethylhexyl) phthlate?

Di(2-ethylhexyl) phthlate (DEHP) is a manufactured chemical that is commonly added to plastics to make them flexible. DEHP is a colorless liquid with almost no odor.

DEHP is present in plastic products such as wall coverings, tablecloths, floor tiles, furniture upholstery, shower curtains, garden hoses, swimming pool liners, rainwear, baby pants, dolls, some toys, shoes, automobile upholstery and tops, packaging film and sheets, sheathing for wire and cable, medical tubing, and blood storage bags.

What happens to DEHP when it enters the environment?

❏ DEHP is everywhere in the environment because of its use in plastics, but it does not evaporate easily or dissolve in water easily.
❏ DEHP can be released in small amounts to indoor air from plastic materials, coatings, and flooring.
❏ It dissolves faster in water if gas, oil, or paint removers are present.
❏ It attaches strongly to soil particles.
❏ DEHP in soil or water can be broken down by microorganisms into harmless compounds.
❏ DEHP does not break down easily when it is deep in the soil or at the bottom of lakes or rivers.
❏ It is in plants, fish, and other animals, but animals high on the food chain are able to break down DEHP, so tissue levels are usually low.

How might I be exposed to DEHP?

DEHP is usually present at very low levels in:
❏ Medical products packaged in plastic such as blood products.
❏ Some foods packaged in plastics, especially fatty foods like milk products, fish or seafood, and oils.
❏ Well water near waste sites.
❏ Workplace air or indoor air where DEHP is released, but usually not at levels of concern.
❏ Fluids from plastic intravenous tubing if used extensively as for kidney dialysis.

How can DEHP affect my health?

At the levels found in the environment, DEHP is not expected to cause harmful health effects in humans. Most of what we know about the health effects of DEHP comes from studies of rats and mice given high amounts of DEHP.

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Harmful effects in animals generally occurred only with high amounts of DEHP or with prolonged exposures. Moreover, absorption and breakdown of DEHP in humans is different than in rats or mice, so the effects seen in rats and mice may not occur in humans.

Rats that breathed DEHP in the air showed no serious harmful effects. Their lifespan and ability to reproduce were not affected.

Brief oral exposure to very high levels of DEHP damaged sperm in mice. Although the effect reversed when exposure ceased, sexual maturity was delayed in the animals.

High amounts of DEHP damaged the liver of rats and mice. Whether or not DEHP contributes to human kidney damage is unclear.

Skin contact with products containing DEHP will probably cause no harmful effects because it cannot be taken up easily through the skin.

How likely is DEHP to cause cancer?

The Department of Health and Human Services (DHHS) has determined that DEHP may reasonably be anticipated to be a human carcinogen. The EPA has determined that DEHP is a probable human carcinogen. These determinations were based entirely on liver cancer in rats and mice. The International Agency for Research on Cancer (IARC) has stated that DEHP cannot be classified as to its carcinogenicity to humans.

How can DEHP affect children?

Children can be exposed to DEHP in the same manner as adults. In addition, small children can be exposed by sucking on or skin contact with plastic toys and pacifiers that contain DEHP, but there is no conclusive evidence of adverse health effects after such exposures. Nonetheless, because of concern for children's health, many toy manufacturers have discontinued use of DEHP in their products. In pregnant rats and mice exposed to high amounts of DEHP, researchers observed birth defects and fetal deaths.

How can families reduce the risk of exposure to DEHP?

❑ It is almost impossible to completely avoid contact with some DEHP because it is commonly found in plastics.
❑ Prevent babies and small children from chewing on plastic objects not designed for that purpose.

Is there a medical test to show whether I've been exposed to DEHP?

There is a test available that measures a breakdown product of DEHP called mono(2-ethylhexyl) phthalate (MEHP) in your urine or blood. This test can only detect recent exposure because DEHP is rapidly broken down and eliminated from your body. This test is not routinely available at the doctor's office because it requires special equipment.

Has the federal government made recommendations to protect human health?

The EPA limits the amount of DEHP that may be present in drinking water to 6 parts of DEHP per billion parts of water (6 ppb).

The Occupational Safety and Health Administration (OSHA) sets a maximum average of 5 milligrams of DEHP per cubic meter of air (5 mg/m^3) in the workplace during an 8-hour shift. The short-term (15-minute) exposure limit is 10 mg/m^3.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for Di(2-ethylhexyl) phthlate (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.