EXHIBIT E

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"),

The City of Portsmouth

is authorized to discharge from the Wastewater Treatment Plant located at

Peirce Island
Portsmouth, New Hampshire

and from Combined Sewer Overflows located at

010A & 010B (Parrot Avenue), 012 (Marcy Street), 013 (Deer Street)

to receiving water(s) named

Piscataqua River and South Mill Pond (to the Piscataqua River)

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

This permit shall become effective on the first day of the calendar month following 60 days after signature.

This permit and the authorization to discharge shall expires at midnight, five (5) years from the last day of the month preceding the effective date.

This permit supersedes the permit issued on January 18, 1985.

This permit consists of 15 pages in Part I including effluent limitations, monitoring requirements; Whole Effluent Toxicity Protocol in Attachment A (7 pages); 1 page in Attachment B; Sludge Compliance Guidance (48 pages); and 25 pages in Part II including General Conditions and Definitions.

Signed this 10th day of APRIL, 2007

Stephen S. Perkins, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency (EPA)
Boston, Massachusetts

PART I.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge from outfall serial number 001 (treated wastewater effluent) to the Piscataqua River. Such discharge shall be limited and monitored by the permittee as specified below. Samples taken in compliance with the monitoring requirements specified below shall be taken at a location that is representative of the discharge.

Effluent Characteristic	Discharge Limitations			Monitoring Requirements	
	Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type
Flow[1], MGD	Report	---	Report	Continuous	Recorder
BOD_5, Effluent[2], mg/l (lbs/day)	30 (1201)	45 (1801)	50 (2002)	2/Week	24-Hour Composite
BOD_5, Influent[2], mg/l	Report	---	---	2/Month	24-Hour Composite
TSS, Effluent[2], mg/l (lbs/day)	30 (1201)	45 (1801)	50 (2002)	2/Week	24-Hour Composite
TSS, Influent[2], mg/l	Report	---	---	2/Month	24-Hour Composite
pH Range[3], Standard Units	6.0 - 8.0			1/Day	Grab
Total Residual Chlorine[4, 5], mg/l	0.33	---	0.57	Continuous	Recorder
Fecal Coliform[3, 4, 6], %	---	---	Report[6]	1/Day	Grab
Fecal Coliform[3, 4, 6], MPN/100 ml	14	---	---	1/Day	Grab
Enterococci Bacteria[4, 7], Colonies/100 ml	Report	---	Report	2/Week	Grab

See pages 4 and 5 for explanation of superscripts

Part I.A.1, Continued

Effluent Characteristic		Monitoring Requirements	
	Maximum Daily	Measurement Frequency	Sample Type
Whole Effluent Toxicity[8, 9], LC_{50}, % Effluent	100	1/Quarter	24-Hour Composite
Ammonia Nitrogen as Nitrogen[10]; mg/l	Report	1/Quarter	24-Hour Composite
Total Recoverable Aluminum[10]; mg/l	Report	1/Quarter	24-Hour Composite
Total Recoverable Cadmium[10]; mg/l	Report	1/Quarter	24-Hour Composite
Total Recoverable Chromium[10]; mg/l	Report	1/Quarter	24-Hour Composite
Total Recoverable Copper[10]; mg/l	Report	1/Quarter	24-Hour Composite
Total Recoverable Lead[10]; mg/l	Report	1/Quarter	24-Hour Composite
Total Recoverable Nickel[10]; mg/l	Report	1/Quarter	24-Hour Composite
Total Recoverable Zinc[10]; mg/l	Report	1/Quarter	24-Hour Composite

See pages 4, 5 and 6 for explanation of superscripts

PART I.

EXPLANATION OF SUPERSCRIPTS TO PART I.A.1:

[1]The effluent flow shall be continuously measured and recorded using a flow meter and totalizer.

[2]The influent concentrations of both BOD_5 and TSS shall be monitored at a minimum of two times per month (2/month) for outfall 001 using a 24-Hour composite sample. The influent 24-Hour composite sample should be initiated prior to the 24-Hour composite sample required for effluent monitoring. The effluent concentrations of both BOD_5 and TSS shall be monitored at a minimum of two times per week (2/week) for outfall 001 using a 24-Hour composite sample. The start of the effluent 24-Hour composite sample shall take into account the resident time of the treatment works. A monthly average shall be calculated for both influent and effluent and reported for each.

[3]State certification requirement.

[4]Samples for Fecal Coliform bacteria, Enterococci bacteria and Total Residual Chlorine shall be collected concurrently.

[5] Total Residual Chlorine shall be measured using any one of the following three methods listed in 40 Code of Federal Regulations (CFR) Part 136:

a. Amperometric direct.
b. DPD–FAS.
c. Spectrophotometric, DPD.

[6]Fecal Coliform shall be tested using test method 9221 C and E found in Standard Methods for the Examination of Water and Wastewater, 18th or subsequent Edition(s), as approved in 40 CFR Part 136.

The Average Monthly value for Fecal Coliform shall be determined by calculating the geometric mean using the daily sample results. Not more than 10 percent of the collected samples shall exceed a Most Probable Number (MPN) of 43 per 100 ml for a 5-tube decimal dilution test. Furthermore, all Fecal Coliform data collected must be submitted with the monthly Discharge Monitoring Reports (DMRs).

The permittee is required to report two (2) statistics each month. One is the geometric mean Fecal Coliform value expressed in terms of "MPN per 100 ml" (reported as average monthly), and the other is the "percentage" of collected samples that exceeds a MPN of 43 per 100 milliliters for the 5-tube decimal dilution test referenced immediately above (reported as maximum daily). The latter statistic will be used to judge compliance with

that part of the limit that reads "Not more than 10 percent of the collected samples shall exceed a MPN of 43 per 100 milliliters for a 5-tube decimal dilution test." referenced above.

[7]Enterococci shall be tested using an EPA approved test method (see 40 C.F.R. Part 136, Table 1A).

[8]The permittee shall conduct acute survival toxicity testing on effluent samples following the protocol in Attachment A (dated September1996). The two species for these tests are *Menidia beryllina* and *Mysidopsis bahia*. Toxicity test samples shall be collected and tests completed four (4) times per year during the calendar quarters ending March 31st, June 30th, September 30th and December 31st. Toxicity test results are to be reported by the 15th day of the month following the end of that quarter tested.

[9]"LC50" is defined as the concentration of wastewater that causes mortality to 50 percent (%) of the test organisms. The "100 %" is defined as a sample which is composed of 100 % effluent (See A.1. on page 3 of Part I and Attachment A of Part I). Therefore, a 100 % limit means that a sample of 100 % effluent (no dilution) shall cause no greater than a 50 % mortality in that effluent sample.

[10]For each Whole Effluent Toxicity test the permittee shall report on the appropriate DMR, the concentrations of the Ammonia Nitrogen as Nitrogen, and Total Recoverable Aluminum, Cadmium, Chromium, Copper, Lead, Nickel and Zinc found in the 100 percent effluent sample. All these aforementioned chemical parameters shall be determined to at least the MLs shown in Attachment A on page A-8, or as amended. Also the permittee should note that all chemical parameter results must still be reported in the appropriate toxicity report. This permit shall be modified, or alternatively, revoked and reissued to incorporate additional toxicity testing requirements, including chemical specific limits, if the results of these toxicity tests indicate that the discharge causes an exceedance of any water-quality criterion. Results from these toxicity tests are considered "New Information" and the permit may be modified as provided in 40 CFR §122.62(a)(2).

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

2. The discharge shall not cause or contribute to a violation of the water quality standards of the receiving water.

3. The permittee's treatment facility shall maintain a minimum of 85 percent removal of both BOD_5 and TSS when discharging thru outfall 001. The percent removal shall be based on a comparison of average monthly influent concentration versus average monthly effluent concentration.

4. The discharge shall be adequately treated to insure that the surface water remains free from pollutants in concentrations or combinations that settle to form harmful deposits, float as foam, debris, scum or other visible pollutants. It shall be adequately treated to insure that the surface waters remain free from pollutants which produce odor, color, taste or turbidity in the receiving waters which is not naturally occurring, and would render it unsuitable for its designated uses.

5. The permittee shall not discharge into the receiving water any pollutant or combination of pollutants in toxic amounts.

6. All Publicly Owned Treatment Works (POTWs) must provide adequate notice to both EPA and the NHDES-WD of the following:

   a. Any new introduction of pollutants into the POTW from an indirect discharger in a primary industry category (See 40 CFR Part 122, Appendix A as amended) discharging process water; and

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

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

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

      (2) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

7. Limitations for Industrial Users

   a. A user may not introduce into a POTW any pollutant(s) which cause Pass Through or Interference with the operation or performance of the treatment works. The terms "user", "pass through" and "interference" are defined in 40 CFR Section 403.3.

   b. The permittee shall submit to EPA-New England and NHDES-WD the name of any Industrial User (IU) subject to Categorical Pretreatment Standards under 40 CFR §403.6 and 40 CFR Chapter I, Subchapter N (Parts 405-415, 417-436, 439-440, 443, 446-447, 454-455, 457-461, 463-469, and 471 as amended) **who commences discharge to the POTW after the effective date of this permit.** This reporting requirement also applies to any other IU that discharges an average of 25,000 gallons per day or more of process wastewater into the POTW (excluding sanitary, noncontact cooling and boiler blowdown wastewater);

contributes a process wastewater which makes up five (5) percent or more of the average dry-weather hydraulic or organic capacity of the POTW; or is designated as such by the Control Authority as defined in 40 CFR §403.12(a) on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR §403.8(f)(6)].

c. In the event that the permittee receives reports (baseline monitoring reports, 90-day compliance reports, periodic reports on continued compliance, etc.) from industrial users subject to Categorical Pretreatment Standards under 40 CFR §403.6 and 40 CFR Chapter I, Subchapter N, (Parts 405-415, 417-436, 439-440, 443, 446-447, 454-455, 457-461, 463-469, and 471 as amended) the permittee shall forward all copies of these reports within ninety (90) days of their receipt to EPA-New England and NHDES-WD.

8. When the effluent discharged for a period of 3 consecutive months exceeds 80 percent of the 4.8 MGD design flow (3.84 MGD), the permittee shall submit to the permitting authorities a projection of loadings up to the time when the design capacity of the treatment facility will be reached, and a program for maintaining satisfactory treatment levels consistent with approved water quality management plans. Before the design flow will be reached, or whenever treatment necessary to achieve permit limits cannot be assured, the permittee may be required to submit plans for facility improvements.

B. SLUDGE CONDITIONS

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

2. The permittee shall comply with the more stringent of either the state (Env-Ws 800) or federal (40 CFR Part 503) requirements.

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

   c. Placement of sludge in a municipal solid waste landfill (See 40 CFR Section 503.4).

   d. Sewage sludge incineration in a sludge only incinerator.

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

5. The permittee shall use and comply with the attached Sludge Compliance Guidance document to determine appropriate conditions. Appropriate conditions contain the following elements.

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

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

6. The permittee shall monitor the pollutant concentrations, pathogen reduction and vector attraction reduction for the permittee's chosen sewage sludge use or disposal practices 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 plus	1/Month

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

8. The permittee shall submit an annual report containing the information specified in the attached Sludge Compliance Guidance document. Reports are **due annually by February 19th**. Reports shall be submitted to both addresses (EPA-New England and NHDES-WD) contained in the reporting section of the permit.

C. COMBINED SEWER OVERFLOW CONDITIONS

1. Effluent Limitations

a. During wet-weather periods, the permittee is authorized to discharge storm water/wastewater from combined sewer overflows (CSOs) to receiving waters (see Attachment B), subject to the following effluent limitations.

(1) The discharges may not cause or contribute to violations of Federal or State water-quality standards.

(2) The discharges shall receive treatment at a level providing Best Practicable Control Technology Currently Available (BPT), Best Conventional Pollutant Control Technology (BCT) to control and abate conventional pollutants and Best Available Technology Economically Achievable (BAT) to control and abate non-conventional and toxic pollutants. The EPA-New England has made a Best Professional Judgement (BPJ) determination that BPT, BCT and BAT for CSOs include the implementation of the nine Minimum Technology-Based Limitations (MTBLs) specified below otherwise know as Nine Minimum Controls (NMC):

(a) Proper operation and regular maintenance programs for the sewer system and the combined sewer overflow points;

(b) Maximum use of the collection system for storage;

(c) Review and modification of industrial pretreatment program requirements to assure CSO impacts are minimized;

(d) Maximization of flow to the POTW for treatment;

(e) Prohibition of dry-weather overflows from CSOs;

(f) Control of solid and floatable materials in CSO discharges;

(g) Pollution prevention programs that focus on contaminant reduction activities;

(h) Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts; and

(i) Monitoring to effectively characterize CSO impacts and the efficacy of CSO controls.

(3) The Permittee must implement the activities identified in its nine minimum controls documentation titled "Report on Nine Minimum

Control Measures" dated May 1995, submitted on May 8, 1995, and any amendments thereto.

2. Unauthorized Discharges

The permittee is authorized to discharge only in accordance with the terms and conditions of this permit and only from those outfalls listed in **Attachment B** of this permit. Discharges of wastewater from any other point source not described elsewhere in this permit are not authorized under this permit. Dry-weather overflows are prohibited (NMC at **Part C.1.a.(2)(e)**). All dry-weather sanitary and/or industrial discharges from any CSO must be reported to EPA-New England and the State within 24 hours in accordance with the reporting requirements for plant bypass (See Paragraph D.1.e of Part II of this permit).

3. Records and Reporting

The permittee shall quantify and record all CSO discharges from outfalls listed in **Attachment B** of this permit. Quantification may be performed either through direct measurement or through an estimation technique. When an estimation technique is used, such as an updated version of the SWMM model already developed for the City's Long-Term Control Plan (LTCP), the permittee shall make reasonable efforts (e.g., gaging, measurements, visual observations, tell-tale monitorings, etc.) to verify the validity of the estimation technique. If the SWMM model is used, it must be updated to reflect current conditions in the City's collection and treatment systems used for CSO abatement. The following information must be recorded for each combined sewer outfall for each discharge event:

- Estimated date of discharge;
- Estimated duration (hours) of discharge;
- Estimated volume (gallons) of discharge; and
- Precipitation data from the City of Portsmouth gage (daily (24-hour) intervals and one-hour intervals). Cumulative precipitation per discharge event shall be calculated.

The permittee shall maintain all records of discharges for at least five (5) years after the effective date of this permit.

Annually, no later than January 15th, the permittee shall submit a written certification to EPA-New England and the State which states that all the discharges from combined sewer outfalls were recorded, and all other appropriate reports and records maintained for the previous calendar year. A summary of modifications (if any) to the approved NMC program which have been evaluated, and a description of those which will be implemented during the upcoming year shall be included with the annual certification.

4. Reopener/Additional CSO Control Measures

This permit may be modified or reissued upon the completion of a long-term CSO control plan. Such modification may include performance standards for the selected controls, post construction water quality assessment program, monitoring for compliance with water quality standards, and a reopener clause to be used in the event that the selected CSO controls fail to meet water quality standards. Section 301(b)(1)(C) requires that a permit include limits that may be necessary to protect Federal and State water quality standards.

D. SPECIAL CONDITIONS

1. Whole Effluent Toxicity Test Frequency Adjustment

The permittee may submit a written request to the EPA requesting a reduction in the frequency (to not less than twice per year) of the toxicity testing requirements contained in Part I.A.1 of this permit, after completion of a minimum of four (4) successive toxicity tests as required in Part I.A.1. All toxicity tests must be valid tests and must demonstrate compliance with the whole effluent toxicity limits as specified in Part I.A.1 of this permit. Until written notice is received by certified mail from the EPA indicating that a reduction in the Whole Effluent Testing requirement has been allowed, the permittee is required to continue testing at the frequency specified in the permit.

The permittee shall also provide a copy of any such request for a frequency adjustment to the Conservation Law Foundation, 27 North Main Street, Concord, NH 03301-4930.

EPA reserves the right to return to the original toxicity testing schedule if subsequent testing results warrant it. Notification of any such requirement will be provided to the permittee by certified mail.

2. pH Limit Adjustment

The permittee may submit a written request to the EPA requesting a change in the permitted pH limit range to be not less restrictive than 6.0 to 9.0 Standard Units. The permittee's written request must include the State's approval letter containing an original signature (no copies). The State's letter shall state that the permittee has demonstrated to the State's satisfaction that as long as discharges to the receiving water from a specific outfall are within a specific numeric pH range the naturally occurring receiving water pH will be unaltered. That letter must specify for each outfall the associated numeric pH limit range. Until written notice is received by certified mail from the EPA indicating the pH limit range has been changed, the permittee is required to meet the permitted pH limit range in the respective permit.

E. MONITORING AND REPORTING CONDITIONS

Monitoring results shall be summarized for each calendar month and reported on separate Discharge Monitoring Report Form(s) (DMRs) postmarked no later than the 15th day of the month following the completed reporting period.

Signed and Dated original 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 (SEW)
P.O. Box 8127
Boston, Massachusetts 02114-8127

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

New Hampshire Department of Environmental Services
Water Division
Wastewater Engineering Bureau
P.O. Box 95
Concord, New Hampshire 03302-0095

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

F. STATE PERMIT CONDITIONS

1. The permittee shall comply with the following conditions which are included as State Certification requirements.

   a. The pH range of 6.0-8.0 Standard Units (S.U.) must be achieved in the final effluent unless the permittee can demonstrate to NHDES-WD: (1) that the range should be widened due to naturally occurring conditions in the receiving water or (2) that the naturally occurring receiving water pH is not significantly altered by the permittee's discharge. The scope of any demonstration project must receive prior approval from NHDES-WD. In no case, shall the above procedure result in pH limits outside of the range of 6.0 to 9.0 S.U., which is the federal effluent limitation guideline regulation for pH for secondary treatment and is found in 40 CFR §133.102(c).

   b. Pursuant to State Law NH RSA 485-A:13 and the New Hampshire Code of Administrative Rules, Env-Wq 703.07(a) and Env-Ws 904.10 the following submissions shall be made to the NHDES-WD by a municipality proposing to

accept into its POTW (including sewers and interceptors):

(1) An "Application for Sewer Connection Permit" for any proposal to construct or modify any of the following:

(a) Any extension of a collector or interceptor, whether public or private, regardless of flow;

(b) Any wastewater connection or other discharge in excess of 5,000 gpd;

(c) Any wastewater connection or other discharge to a wastewater treatment facility operating in excess of 80 percent design flow capacity for 3 consecutive months;

(d) Any industrial wastewater connection or change in existing discharge of industrial wastewater, regardless of quality or quantity; and

(e) Any sewage pumping station greater than 50 gpm or serving more than one building.

(2) An "Industrial Wastewater Discharge Request Application" for new or increased loadings of industrial waste, in accordance with Env-Ws 904.10.

c. The permittee shall not at any time, either alone or in conjunction with any person or persons, cause directly or indirectly the discharge of waste into said receiving water unless it has been treated in such a manner as will not lower the legislated water quality classification or interfere with the uses assigned to said water by the New Hampshire Legislature (RSA 485-A:12).

d. Any modifications of the Permittee's Sewer Use Ordinance, including local limitations on pollutant concentrations, shall be submitted to the NHDES-WD for approval prior to adoption by the permittee.

e. Within 90 days of the effective date of this permit, the permittee shall submit to NHDES-WD a copy of its current sewer use ordinance if it has been revised since any previously approved submittal.

f. Within 120 days of the effective date of this permit, the permittee shall submit to NHDES-WD a current list of all industries discharging industrial waste to the municipal wastewater treatment plant. As a minimum, the list shall indicate the

name and address of each industry, along with the following information: telephone number, contact person, products manufactured, industrial processes used, existing level of pretreatment, and list of existing industrial discharge permits with effective dates.

2. This NPDES Discharge Permit is issued by the EPA-New England under Federal and State law. Upon final issuance by the EPA-New England, the NHDES-WD may adopt this permit, including all terms and conditions, as a State permit pursuant to RSA 485-A:13.

   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 the Permit as issued by the other Agency, unless and until each Agency has concurred in writing with such modification, suspension or revocation.

3. If chlorine is used for disinfection, a recorder which shall continuously record the chlorine residual prior to dechlorination shall be provided. The minimum, maximum and average daily residual chlorine values, measured prior to dechlorination, shall be submitted with monthly Discharge Monitoring Reports. Charts from the recorder, showing the continuous chlorine residual shall be maintained by the permittee for a period no less than (5) years.

4. The Portsmouth Wastewater Treatment Facility is responsible for immediately notifying the New Hampshire Department of Environmental Services, Watershed Management Bureau, Shellfish Section of possible high bacteria/virus loading events from the facility or its sewage collection infrastructure. Such events include:

   a. Any lapse or interruption of normal operation of the WWTF disinfection system, or other event that results in discharge of sewage from the WWTF or sewer infrastructure (pump stations, sewer lines, manholes, combined sewer overflows, etc.) that has not undergone full treatment as specified in the NPDES permit, or

   b. Daily flows in excess of the facility's average daily design flow of 4.8 MGD, or

   c. Daily post-disinfection effluent sample result of 43 fecal coliform/100ml or greater.

   Notification shall also be made for instances where NPDES-required bacteria sampling is not completed, or where the results of such sampling are invalid.

   Notification to the NHDES Shellfish Program shall be made using the program's 24-hour pager. Upon initial notification of a possible high bacteria/virus loading event, NHDES Shellfish Program staff will determine the most suitable interval for continued notification and updates on an event-by-event basis.

G. REOPENER CLAUSE

1. This permit may be modified in the event that a Total Maximum Daily Load (TMDL) is developed for the receiving water resulting in the need for new permit limits for this discharge.

ATTACHMENT A

MARINE ACUTE TOXICITY TEST PROCEDURE AND PROTOCOL

I. GENERAL REQUIREMENTS

The permittee shall conduct acceptable acute toxicity tests in accordance with the appropriate test protocols described below:

- **Mysid Shrimp (Mysidopsis bahia) definitive 48 hour test.**
- **Inland Silverside (Menidia beryllina) definitive 48 hour test.**

Acute toxicity data shall be reported as outlined in Section VIII.

II. METHODS

Methods to follow are those recommended by EPA in:

Weber, C.I. et al. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, Fourth Edition. Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Cincinnati, OH. August 1993, EPA/600/4-90/027F.

Any exceptions are stated herein.

III. SAMPLE COLLECTION

A discharge sample shall be collected. Aliquots shall be split from the sample, containerized and preserved (as per 40 CFR Part 136) for the chemical and physical analyses. The remaining sample shall be dechlorinated (if detected) in the laboratory using sodium thiosulfate for subsequent toxicity testing. (Note that EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection.) Grab samples must be used for pH, temperature, and total residual oxidants (as per 40 CFR Part 122.21).

Standard Methods for the Examination of Water and Wastewater describes dechlorination of samples (APHA, 1992). Dechlorination can be achieved using a ratio of 6.7 mg/L anhydrous sodium thiosulfate to reduce 1.0 mg/L chlorine. A thiosulfate control (maximum amount of thiosulfate in lab control or receiving water) should also be run.

All samples held overnight shall be refrigerated at 4°C.

IV. DILUTION WATER

A grab sample of dilution water used for acute toxicity testing shall be collected at a point away from the discharge which is free from toxicity or other sources of contamination. Avoid collecting near areas of obvious road or agricultural runoff, storm sewers or other point source discharges. An additional control (0% effluent) of a standard laboratory water of known quality shall also be tested.

If the receiving water diluent is found to be, or suspected to be toxic or unreliable, an alternate standard dilution water of known quality with a conductivity, salinity, total suspended solids, and pH similar to that of the receiving water may be substituted **AFTER RECEIVING WRITTEN APPROVAL FROM THE PERMIT ISSUING AGENCY(S).** Written requests for use of an alternative dilution water should be mailed with supporting documentation to the following address:

Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency, Region 1
One Congress Street
Suite 1100 (CAA)
Boston, MA 02114-2023

It may prove beneficial to have the proposed dilution water source screened for suitability prior to toxicity testing. EPA strongly urges that screening be done prior to set up of a full definitive toxicity test any time there is question about the dilution water's ability to support acceptable performance as outlined in the 'test acceptability' section of the protocol.

V. TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA

EPA New England requires tests be performed using four replicates of each control and effluent concentration because the non-parametric statistical tests cannot be used with data from fewer replicates. The following tables summarize the accepted Mysid and Menidia toxicity test conditions and test acceptability criteria:

EPA NEW ENGLAND RECOMMENDED EFFLUENT TOXICITY TEST CONDITIONS FOR THE MYSID, MYSIDOPSIS BAHIA 48 HOUR TEST[1]

1. Test type	Static, non-renewal
2. Salinity	25ppt ± 10 percent for all dilutions by adding dry ocean salts
3. Temperature (°C)	20°C ± 1°C or 25°C ± 1°C

4. Light quality	Ambient laboratory illumination
5. Photoperiod	16 hour light, 8 hour dark
6. Test chamber size	250 ml
7. Test solution volume	200 ml
8. Age of test organisms	1-5 days
9. No. Mysids per test chamber	10
10. No. of replicate test chambers per treatment	4
11. Total no. Mysids per test concentration	40
12. Feeding regime	Light feeding using concentrated Artemia nauplii while holding prior to initiating the test
13. Aeration[2]	None
14. Dilution water	Natural seawater, or deionized water mixed with artificial sea salts
15. Dilution factor	≥ 0.5
16. Number of dilutions[3]	5 plus a control. An additional dilution at the permitted effluent concentration (% effluent) is required if it is not included in the dilution series.
17. Effect measured	Mortality - no movement of body appendages on gentle prodding
18. Test acceptability	90% or greater survival of test organisms in control solution
19. Sampling requirements	For on-site tests, samples are used within 24 hours of the time that they are removed from the sampling device. For off-site tests, samples must be first used within 36 hours of collection.

20. Sample volume required	Minimum 1 liter for effluents and 2 liters for receiving waters

Footnotes:

1 Adapted from EPA/600/4-90/027F.

2 If dissolved oxygen falls below 4.0 mg/L, aerate at rate of less than 100 bubbles/min. Routine D.O. checks are recommended.

3 When receiving water is used for dilution, an additional control made up of standard laboratory dilution water (0% effluent) is required.

EPA NEW ENGLAND RECOMMENDED TOXICITY TEST CONDITIONS FOR THE INLAND SILVERSIDE, MENIDIA BERYLLINA 48 HOUR TEST[1]

1. Test Type	Static, non-renewal
2. Salinity	25 ppt ± 2 ppt by adding dry ocean salts
3. Temperature	20°C ± 1°C or 25°C ± 1°C
4. Light Quality	Ambient laboratory illumination
5. Photoperiod	16 hr light, 8 hr dark
6. Size of test vessel	250 mL (minimum)
7. Volume of test solution	200 mL/replicate (minimum)
8. Age of fish	9-14 days; 24 hr age range
9. No. fish per chamber	10 (not to exceed loading limits)
10. No. of replicate test vessels per treatment	4
11. Total no. organisms per concentration	40
12. Feeding regime	Light feeding using concentrated Artemia nauplii while holding prior to initiating the test
13. Aeration[2]	None
14. Dilution water	Natural seawater, or deionized water mixed with artificial sea salts.

15. Dilution factor	≥ 0.5
16. Number of dilutions[3]	5 plus a control. An additional dilution at the permitted concentration (% effluent) is required if it is not included in the dilution series.
17. Effect measured	Mortality-no movement on gentle prodding.
18. Test acceptability	90% or greater survival of test organisms in control solution.
19. Sampling requirements	For on-site tests, samples must be used within 24 hours of the time they are removed from the sampling device. Off-site test samples must be used within 36 hours of collection.
20. Sample volume required	Minimum 1 liter for effluents and 2 liters for receiving waters.

Footnotes:

1 Adapted from EPA/600/4-90/027F.

2 If dissolved oxygen falls below 4.0 mg/L, aerate at rate of less than 100 bubbles/min. Routine D.O. checks recommended.

3 When receiving water is used for dilution, an additional control made up of standard laboratory dilution water (0% effluent) is required.

VI. CHEMICAL ANALYSIS

At the beginning of the static acute test, pH, salinity, and temperature must be measured at the beginning and end of each 24 hour period in each dilution and in the controls. The following chemical analyses shall be performed for each sampling event.

Parameter	Effluent	Diluent	Minimum Quantification Level (mg/L)
pH	x	x	---
Salinity	x	x	PPT(o/oo)
Total Residual Oxidants [1*]	x	x	0.05
Total Solids and Suspended Solids	x	x	---
Ammonia	x	x	0.1
Total Organic Carbon	x	x	0.5
Total Metals			
Cd	x	x	0.001
Cr	x	x	0.005
Pb	x	x	0.005
Cu	x	x	0.0025
Zn	x	x	0.0025
Ni	x	x	0.004
Al	x	x	0.02

Superscript:

*1 Total Residual Oxidants

Either of the following methods from the 18th Edition of the APHA Standard Methods for the Examination of Water and Wastewater must be used for these analyses:

-Method 4500-Cl E Low Level Amperometric Titration (the preferred method);
-Method 4500-CL G DPD Photometric Method.

or use USEPA Manual of Methods Analysis of Water or Wastes, Method 330.5.

VII. TOXICITY TEST DATA ANALYSIS

LC50 Median Lethal Concentration

An estimate of the concentration of effluent or toxicant that is lethal to 50% of the test organisms during the time prescribed by the test method.

Methods of Estimation:

- Probit Method
- Spearman-Karber
- Trimmed Spearman-Karber
- Graphical

See flow chart in Figure 6 on page 77 of EPA 600/4-90/027F for appropriate method to use on a given data set.

No Observed Acute Effect Level (NOAEL)

See flow chart in Figure 13 on page 94 of EPA 600/4-90/027F.

VIII. TOXICITY TEST REPORTING

The following must be reported:

- Description of sample collection procedures, site description;
- Names of individuals collecting and transporting samples, times and dates of sample collection and analysis on chain-of-custody; and
- General description of tests: age of test organisms, origin, dates and results of standard toxicant tests; light and temperature regime; other information on test conditions if different than procedures recommended. Reference toxicity test data must be included.
- Raw data and bench sheets.
- All chemical/physical data generated. (Include minimum detection levels and minimum quantification levels.)
- Provide a description of dechlorination procedures (as applicable).
- Any other observations or test conditions affecting test outcome.
- Statistical tests used to calculate endpoints.

ATTACHMENT B

CSO OUTFALLS UNDER THE JURISDICTION OF THE CITY OF PORTSMOUTH

DISCHARGE SERIAL NO.	LOCATION	TYPE OF DISCHARGE	COMPOSITION OF DISCHARGE	RECEIVING WATER
010A	Parrot Avenue	Combined Overflow	Untreated Sanitary/Storm Water	South Mill Pond to Piscataqua River
010B	Parrot Avenue	Combined Overflow	Untreated Sanitary/Storm Water	South Mill Pond to Piscataqua River
012	Marcy Street	Combined Overflow	Untreated Sanitary/Storm Water	Piscataqua River
013	Deer Street	Combined Overflow	Untreated Sanitary/Storm Water	Piscataqua River