

**AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)**

In compliance with the provisions of the Federal Clean Water Act, as amended, (33 U.S.C. §§1251 et seq.; the "CWA"),

Newington Energy, L.L.C.

is authorized to discharge from the facility located at

**Newington Energy Facility
200 Shattuck Way
Newington, NH 03801**

to receiving waters named: **Piscataqua River
(USGS Hydrologic Basin Code 01060003)**

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

This permit shall become effective on the date of signature.

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

This permit supersedes the permit issued on July 7, 2000.

This permit consists of: 11 pages in Part I which includes effluent limitations, monitoring and reporting requirements and conditions; Attachment A - Marine Acute Toxicity Test Procedure and Protocol (7 pages); as well as 25 pages in Part II which includes General Conditions and Definitions.

Signed this 15th day of August, 2007

/S/ SIGNATURE ON FILE

Stephen S. Perkins, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency
Region I - New England
Boston, Massachusetts

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. The term "Regional Administrator" means the Regional Administrator of Region I of the U.S. Environmental Protection Agency and the term "Director" means the Director of the Water Division of the New Hampshire Department of Environmental Services, (NH DES-WD) or their respective designee.
2. All procedures used for the purpose of collecting, preserving, and analyzing wastewater samples shall be in conformance with 40 C.F.R. Part 136 unless alternative procedures are specified in this NPDES permit.
 - a. Alternate analytical methods may be approved by EPA at the permittee's written request should the permittee demonstrate to EPA's satisfaction that it will utilize equally sensitive test methods. Such a request will be considered a minor modification to the permit.
 - b. The Whole Effluent Toxicity (WET) test required by this permit is a 48-Hour Static Acute test on effluent samples using two species, Mysid Shrimp (*Mysidopsis bahia*) and Inland Silverside (*Menidia beryllina*) following the protocol in Attachment A (Marine Acute Toxicity Test Procedure and Protocol dated September 1996).
 - i. LC50 (Lethal Concentration 50 Percent) is the concentration of wastewater (effluent) causing mortality to 50 percent (%) of the test organisms. The "50 % or greater limit" is defined as a sample which is composed of 50 % effluent. This limit is considered to be a maximum daily limit.
 - ii. A-NOAEL (Acute No-Observed-Adverse-Effect Level) 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 effects (in this case, death) at a specific time of observation as determined from hypothesis testing where the test results exhibit a linear dose-response relationship. However, where the test results do not exhibit a linear dose-response relationship, report the lowest concentration where there is no observable effect.
 - iii. All pollutant parameters shall be determined to at least the Minimum Quantification Level shown in Attachment A, page A-6, or as amended.

3. During the period beginning on the effective date and lasting through the expiration date, the permittee is authorized to discharge from outfall number **001: cooling tower blowdown and low volume waste**¹ to the Piscataqua River. Such discharges shall be limited and monitored by the permittee as specified below.

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Average Monthly	Maximum Daily	Frequency	Sample Type
Flow Rate (million gallons/day - MGD)	4.0	4.0	Continuous	Recorder
Minimum Flow Rate (MGD) ²	Report Minimum Monthly		Continuous	Recorder
Salinity (parts per million - ppm)	Report	66,000	1/day	Grab
Free Available Chlorine (mg/L)	0.2 ³	0.5	1/day	Grab
Total Residual Oxidants (mg/L)	No detectable amount	No detectable amount	1/day - as required ⁴	Grab
The 126 priority pollutants contained in chemicals added for cooling tower maintenance (except Cr and Zn)	No detectable amount	No detectable amount	1/year	Composite
Total Recoverable Chromium (mg/L)	0.2	0.2	2/month	Composite
Total Recoverable Zinc (mg/L)	1.0	1.0	2/month	Composite
Temperature (°F)	Report	95 ⁵	Continuous	Recorder
pH (standard units)	–	≥6.5 and ≤9.0	Continuous	Recorder
<u>Whole Effluent Toxicity</u> LC50 (%)		≥50	4/year	24 hour
A-NOAEL (%)		Report	"	Composite
Total Residual Oxidants (mg/L)		Report	"	"
Ammonia (mg/L)		Report	"	"
Total Aluminum (mg/L)		Report	"	"
Total Cadmium (mg/L)		Report	"	"
Total Chromium (mg/L)		Report	"	"
Total Copper (mg/L)		Report	"	"
Total Lead (mg/L)		Report	"	"
Total Nickel (mg/L)		Report	"	"
Total Zinc (mg/L)		Report	"	"

¹ low volume wastes are those included as outfalls 004 and 005.

² see Part I.A.3.b below.

³ this limit is the average of analyses made over a single period of chlorine release (<2 hours); not an average monthly limit.

⁴ see Part I.A.3.c below.

⁵ the 95°F temperature limit shall not to be exceeded at any time (instantaneous maximum).

- a. Effluent samples shall be taken from the cooling tower basin at the intake side of the recirculation pumps during the discharge of effluent to the Piscataqua River through the diffuser.
 - b. For the duration of the permit, the minimum flow limit is 0.65 MGD (451 gpm) during effluent discharge. The permittee shall not discharge below this limit except for the approximately two minute time period each time that it takes for the pipe section between the outfall and the control valve to drain.
 - c. Free available chlorine shall be monitored within the first five minutes of resuming discharge of the cooling tower circulation water after daily chlorination. If detectable levels of free available chlorine occur in the discharge, total residual oxidants samples shall be taken two (2) hours after the commencement of discharging.
 - d. Neither free available chlorine nor total residual chlorine may be discharged for more than two hours in any one day unless the facility can demonstrate to the Regional Administrator that the unit in this particular location cannot operate at or below this level of chlorination.
 - e. Within this permit term, the permittee may demonstrate through engineering calculations that each of the 126 priority pollutants in 40 CFR Part 423.15(j)(1) is not detectable in the final discharge by the analytical methods in 40 CFR part 136. If this approach is taken, each chemical additive and low volume waste stream must be tested for priority pollutants at least once to determine the basis of the engineering calculations. Reliable information supplied by the manufacturer relative to the priority pollutants in a product may be substituted for actual tests. Dilution for such engineering calculations must be based on lowest projected cooling tower blowdown flow. The chemical concentrations used in such engineering calculations shall be based on anticipated (or manufacturer's suggested) feed rates. Upon receipt of written approval from EPA and/or the New Hampshire Department of Environmental Services, Water Division (NH DES-WD), the permittee is not required to sample/analyze for the demonstrated pollutants. Every December Discharge Monitoring Report (DMR) thereafter, the permittee shall certify that no new chemicals or waste streams have been added and that the engineering demonstration is still valid.
 - f. Whole Effluent Toxicity (WET) 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 submitted by the 15th day of the month following the end of the quarter tested. For example, test results for the calendar quarter January through March are due April 15th.
4. During the period beginning on the effective date of the permit and lasting through the expiration date, the permittee is authorized to discharge from outfall number **003: intake screen wash water**.

- a. All live fish, shellfish, and other aquatic organisms collected or trapped on the intake screens shall be returned to their natural habitat with minimal stress. All other material, except natural debris (e.g. leaves, grass and twigs), shall be removed from the intake screens and recycled or disposed of in accordance with all existing Federal, State, and/or Local laws and regulations that apply to waste disposal. Such material shall not be returned to the receiving waters.
 - b. For the duration of the permit, the permittee shall rotate and visually inspect the intake screens of the cooling water intake structure at least every eight hours for dead and live fish when the intake pumps are in operation. A log shall be maintained that documents the screen wash visual inspections. Logs shall be kept on the property of the Station for at least five (5) years and shall be made available for review by permitting agencies upon request.
 - c. If the permittee observes on the cooling water intake screens, or estimates, based on temporally-limited observations: 40 or more dead fish within any 8 hour period, the permittee shall:
 - i. Initiate continuous screen washing;
 - ii. Report to the Regional Administrator and the Director within 24 hours by telephone. A written confirmation report is to be provided within five business days. These oral and written reports shall include the species, size ranges, and approximate number and/or weight of organisms involved in the incident.
5. During the period beginning on the effective date and lasting through the expiration date, the permittee is authorized to discharge from internal outfall number **004: wastewater from the boiler blowdown sump**. Such discharges shall be limited and monitored by the permittee as specified below.

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Average Monthly	Maximum Daily	Frequency	Sample Type
Flow (gallons per day)	Report	Report	Continuous	Record
Total Suspended Solids (mg/L)	30.0	100.0	1/month	Composite
Oil and Grease (mg/L)	15.0	20.0	1/month	Grab

- a. Samples shall be collected from a spigot on the discharge line to the cooling tower prior to mixing with other waste streams.
6. During the period beginning on the effective date and lasting through the expiration date, the permittee is authorized to discharge from internal outfall number **005: wastewater from the neutralization sump**. Such discharges shall be limited and monitored by the permittee as specified below.

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Average Monthly	Maximum Daily	Frequency	Sample Type
Flow (gallons per day)	Report	Report	Continuous	Record
Total Suspended Solids (mg/L)	30.0	100.0	1/month	Composite
Oil and Grease (mg/L)	15.0	20.0	1/month	Grab

- a. Samples shall be collected from a spigot on the discharge line to the cooling tower prior to mixing with other waste streams.

7. Water Quality Requirements

- a. Discharges and water withdrawals shall not either cause a violation of the water quality standards or jeopardize any Class B use of the Piscataqua River.
- b. The thermal plumes from the station shall: (a) not block zones of fish passage, (b) not interfere with spawning of indigenous populations, (c) not change the balanced indigenous population of the receiving water, and (d) have minimal contact with surrounding shorelines.
- c. The effluent shall not contain metals and/or materials in concentrations or in combinations which are hazardous or toxic to aquatic life or which would impair the uses designated by the classification of the receiving water.
- d. Discharges to the Piscataqua River 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. They shall be adequately treated to insure that the surface waters remain free from pollutants which produce odor, color, taste, or turbidity in the receiving water which is not naturally occurring and would render it unsuitable for its designated uses.
- e. Pollutants which are not limited by the permit, but have been specifically disclosed in the last permit application, may be discharged at the frequency and level disclosed in the application, provided that such discharge does not violate sections 307 and 311 of the Act or applicable water quality standards.

8. Cooling Water Intake Structure Requirements

- a. No change in the location, design or capacity of the present structure can be made without prior approval of the Regional Administrator and the Director.

- b. Heated backwash of the intake for biofouling, ice control or any other purpose is prohibited without prior approval of the Regional Administrator and the Director.
- c. The intake bays' cross-over sluice gate shall remain open to the maximum extent practicable.

9. Other Requirements

- a. There shall be no discharge of polychlorinated biphenyl (PCB) compounds such as those commonly used for transformer fluid. The permittee shall dispose of all known PCB equipment, articles, and wastes in accordance with 40 CFR 761.
- b. Water drawn from fuel oil tanks shall not be discharged into the Piscataqua River.
- c. Chlorine only may be used as a biocide. No other biocide shall be used without explicit approval from EPA and the Director.
- d. There will be no discharge as a result of chemical metal cleaning wastes, including washing of air precipitators, preheaters, boilers, or other types of process equipment.
- e. The permittee shall comply with all existing federal, state, and local laws and regulations that apply to the reuse or disposal of solids, such as those which may be removed from maintenance of the cooling towers or water and waste treatment operations and equipment cleaning. At no time shall these solids be discharged to the Piscataqua River.
- f. All existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Regional Administrator as soon as they know or have reason to believe (40 CFR §122.42):
 - i. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
 - (1) One hundred micrograms per liter (100 ug/l);
 - (2) Two hundred micrograms per liter (200 ug/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
 - (3) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR §122.21(g)(7); or
 - (4) Any other notification level established by the Regional Administrator in accordance with 40 CFR §122.44(f).

- ii. That any activity has occurred or will occur which would result in the discharge, on a non-routine or infrequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
 - (1) Five hundred micrograms per liter (500 ug/l);
 - (2) One milligram per liter (1 mg/l) for antimony;
 - (3) Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR §122.21(g)(7); or
 - (4) Any other notification level established by the Regional Administrator in accordance with 40 CFR §122.44(f).

10. Water Treatment Chemicals

The permittee may add and/or change chemicals containing pollutants not currently approved for water discharge (See Part I.A.7.e) only (1) if the permittee can demonstrate through engineering calculations that each of the 126 priority pollutants in 40 CFR Part 423.15(j)(1) is not detectable in the final discharge (See Part I.A.3.e) and (2) when the effluent successfully passes an acute toxicity test within 7 days of any changes in the water treatment chemicals and/or their concentrations occurs. The Regional Administrator or the Director may require additional feasibility studies.

11. Mixing Zone Requirements

- a. The mixing zone is defined as 100 feet upstream (flood tide) and 100 feet downstream (ebb tide) of the discharge diffuser (outfall 001) with a width of 100 feet and a height of 20 feet from the bottom.
- b. The mixing zone criteria for the plume are such that at no time shall the temperature of the receiving water outside the mixing zone be raised more than 1°F nor the salinity raised more than 1 part per thousand (ppt). The increase in temperature and salinity of the receiving water body shall be determined by comparing the temperature and salinity at the edge of the mixing zone with the water immediately outside the intake structure, unless a more appropriate method is agreed upon by the permittee, the EPA, and the NH DES-WD.
- c. Outside the mixing zone, the natural seasonal cycle of the receiving water shall remain unchanged by the discharge, the annual spring and fall temperature and salinity changes shall be gradual, and large day to day temperature and salinity fluctuations shall be avoided.
- d. Within this permit period, the permittee shall conduct at least two mixing zone

characterization studies for temperature and salinity. These studies shall correspond to: 1) peak summer differences between the discharge temperature at maximum flow /load and the Piscataqua River water temperature, and; 2) all tidal conditions. The permittee shall use the same protocol as the previous thermal/salinity mixing zone study as accepted by EPA and NHDES-WD.

12. Discharge Diffuser Requirements

- a. The submerged, offshore, multi-port diffuser shall be maintained when necessary to ensure proper operation. Proper operation means that the plumes from each nozzle will be balanced relative to each other and that they all have unobstructed flow. Maintenance may include dredging in the vicinity of the diffuser, removal of marine growth or other solids on the interior surfaces of the diffuser nozzles or repair and/or replacement of the nozzle structures.
- b. Any necessary maintenance dredging must be performed only during the marine construction season authorized by the New Hampshire Fish and Game Department and only after receiving all necessary permits from the DES Wetlands Bureau, U.S. Coast Guard, U.S. Army Corps of Engineers, and any other agency required.
- c. To determine if maintenance is necessary/required, the diffuser shall be inspected by a licensed diver or licensed marine contractor within the first year of issuance of this permit and every third year thereafter. The as-found or pre-maintenance condition of the diffuser nozzles will be documented on videotape. The maintenance performed on any nozzle and the as-left or post-maintenance conditions will be documented in a written report prepared by the diver or marine contractor.
- d. Copies of the videotape and written report of the maintenance provided on the diffuser will be submitted to EPA and NH DES-WD within 60 days of each inspection. Where it is determined that additional maintenance will be necessary, the permittee shall provide the proposed scope and schedule for the maintenance to EPA and NH DES-WD within 60 days of the determination.

13. Storm Water Requirements

The permittee shall maintain storm water coverage under the facility's Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activities #NHR05A704.

14. Possible Permit Requirement Changes

a. 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 once per year) of required toxicity testing, after completion of a minimum of four (4) consecutive, valid, toxicity tests that demonstrate compliance with the permit limits for whole effluent toxicity. Until written notice is received by

certified mail from the EPA indicating that the Whole Effluent Testing requirement has been changed, the permittee is required to continue testing at the frequency specified in this permit.

- b. This permit shall be modified, or alternatively, revoked and reissued to comply with any applicable standard or limitation promulgated or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
 - (1) contains different conditions or is otherwise more stringent than any effluent limitation in this permit; or
 - (2) controls any pollutant not limited by this permit.
- c. This permit may be modified, or alternatively, revoked and reissued to incorporate additional testing requirements, including chemical specific limits if any testing result required by this permit indicates that the discharge causes or has reasonable potential to cause or contribute to an exceedance of any State water quality criterion. Results of the analyses required by this Permit are considered "New Information" and the permit may be modified as provided in 40 CFR Section 122.62(a)(2).

B. MONITORING AND REPORTING

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. The permittee shall provide written explanations of all violations in DMR cover letters.

Newington Energy, L.L.C. may assert a business confidentiality claim with respect to part or all of the information submitted to EPA in the manner described at 40 CFR Part 2.203(b). Information covered by such a claim will be disclosed by EPA only to the extent, and by means, of the procedures set forth in 40 CFR Part 2, Subpart B. If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA without further notice to Newington Energy. Effluent information shall not be regarded as confidential.

Signed and dated originals of the DMRs, and all other reports required herein or in Part II, shall be submitted to the Regional Administrator at the following addresses:

U.S. Environmental Protection Agency
Water Technical Unit (SEW)
P.O. Box 8127
Boston, Massachusetts 02114-8127

All permit change requests shall be directed to the Industrial Permits Branch, One Congress Street, Suite 1100 (CIP), Boston, Massachusetts 02114.

In addition, duplicate signed copies of all DMRs and all other notifications and reports required by this permit shall be submitted to the State at:

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

C. STATE PERMIT CONDITIONS

This NPDES Discharge Permit is issued by the U.S. Environmental Protection Agency under Federal and State law. Upon final issuance by the EPA, the NH DES-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.

**CORRECTIONS
REGARDING THE REISSUANCE OF THE
NEWINGTON ENERGY 2007 NPDES PERMIT
Permit No. NH0023361**

Introduction:

The U.S. Environmental Protection Agency (EPA) solicited public comments from June 26, 2007 through July 25, 2007 on the draft National Pollutant Discharge Elimination System (NPDES) to be issued to Newington Energy. During the public notice (comment) period, EPA- New England received no formal comments. EPA is however correcting two typographical errors which were found in the draft permit. These corrections are summarized below and reflected in the final permit.

Corrections:

1. The language in Part I.A.4.a (page 5) has been modified from “recycled and disposed...” to read “recycled *or* disposed of...”
2. The language in Part I.B (page 11) has been modified from “shall be submitted to the Director...” to read “shall be submitted to the *Regional Administrator...*”

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 TEST¹

1. Test type	Static, non-renewal
2. Salinity	25ppt \pm 10 percent for all dilutions by adding dry ocean salts
3. Temperature ($^{\circ}$ C)	20 $^{\circ}$ C \pm 1 $^{\circ}$ C or 25 $^{\circ}$ C \pm 1 $^{\circ}$ 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 <u>Artemia</u> 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 TEST¹

1. Test Type	Static, non-renewal
2. Salinity	25 ppt \pm 2 ppt by adding dry ocean salts
3. Temperature	20°C \pm 1°C or 25°C \pm 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 <u>Artemia</u> 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.

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|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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. |
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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.

<u>Parameter</u>	<u>Effluent</u>	<u>Diluent</u>	<u>Minimum Quantification Level (mg/L)</u>
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
<u>Total Metals</u>			
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.