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),

The Swansea Water District

is authorized to discharge from the facility located at

Swansea Water District Desalination Facility
240 Vinnicum Road
Swansea, MA 02777

to receiving water named

Palmer River
Narragansett Bay Watershed

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

This permit will become effective on the first day of the calendar month immediately following sixty days after signature.*

This permit and the authorization to discharge expire at midnight five years from the last day of the month preceding the effective date.

This permit supersedes the permit issued on February 21st, 2008.

This permit consists of **Part I (**12 pages including effluent limitations and monitoring requirements); **Attachment A** (USEPA Region 1 Marine Acute Toxicity Test Procedure and Protocol, July 2012, 10 pages); **Attachment B** (USEPA Region 1 Marine Chronic Toxicity Test Procedure and Protocol, November 2013, 12 pages), and **Part II (**25 pages, NPDES Part II Standard Conditions).

Signed this day of

_____	_____
Director Office of Ecosystem Protection Environmental Protection Agency Boston, MA	Director Massachusetts Wastewater Management Program Department of Environmental Protection Commonwealth of Massachusetts Boston, MA

* Pursuant to 40 CFR 124.15(b)(3), if no comments requesting a change to the draft permit are received, the permit will become effective upon the date of signature.

DRAFT

PART I

A.1. During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge **treated reverse osmosis (RO) brine concentrate and reject (backwash) from the three microfiltration (MF) systems, as well as strainer flushings, and cleaning solutions** from outfall serial number **001** to the Palmer River. Such discharges shall be limited and monitored as specified below.

EFFLUENT CHARACTERISTIC	**EFFLUENT LIMITS**			**MONITORING REQUIREMENTS** [1]	
PARAMETER	**AVERAGE MONTHLY** [2]	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE**
EFFLUENT FLOW [3]	2.71 MGD	*********	Report MGD	CONTINUOUS	RECORDER
SALINITY [4, 5]	32 ppt	*********	*********	CONTINUOUS	RECORDER
TSS [6]	20 mg/l	30 mg/l	Report mg/l	2/WEEK	COMPOSITE [7]
pH [8]	Within the range 6.5 to 8.5 standard units (See Part I.A.1.b.)			1/DAY	GRAB
DISSOLVED OXYGEN [4, 8, 9]	Minimum of 5.0 mg/l (See Part I.A.1.g.)			1/DAY	GRAB
TOTAL RESIDUAL CHLORINE [10]	70.2 ug/l	*********	121.7 ug/l	1/DISCHARGE CYCLE	GRAB
TOTAL RECOVERABLE COPPER [11]	*********	*********	54.3 ug/l	2/MONTH	COMPOSITE [7]
AMMONIA - NITROGEN	Report lb/d	*********	*********	1/MONTH	COMPOSITE [7]
TOTAL KJELDAHL NITROGEN	Report lb/d	*********	*********	1/MONTH	COMPOSITE [7]
NITRITE / NITRATE	Report lb/d	*********	*********	1/MONTH	COMPOSITE [7]
BIS (2-ETHYLHEXYL) PHTHALATE	*********	*********	Report ug/l	1/QUARTER	COMPOSITE [7]

CONTINUED FROM PREVIOUS PAGE

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

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITS			MONITORING REQUIREMENTS [1]	
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE**
WHOLE EFFLUENT TOXICITY [12, 13, 14, 15]	Acute $LC_{50} \geq 100\%$ Chronic C-NOEC $\geq 11\%$			1/QUARTER	COMPOSITE [7]
Hardness [16]	*********	*********	Report mg/l	1/QUARTER	COMPOSITE [7]
Alkalinity [16]	*********	*********	Report mg/l	1/QUARTER	COMPOSITE [7]
pH [16]	*********	*********	Report mg/l	1/QUARTER	Grab
Specific Conductance [16]	*********	*********	Report mg/l	1/QUARTER	COMPOSITE [7]
Total Solids [16]	*********	*********	Report mg/l	1/QUARTER	COMPOSITE [7]
Total Dissolved Solids [16]	*********	*********	Report mg/l	1/QUARTER	COMPOSITE [7]
Total Ammonia Nitrogen [16]	*********	*********	Report mg/l	1/QUARTER	COMPOSITE [7]
Total Organic Carbon [16]	*********	*********	Report mg/l	1/QUARTER	COMPOSITE [7]
Total Residual Chlorine [16]	*********	*********	Report mg/l	1/QUARTER	Grab
Total Recoverable Aluminum [16]	*********	*********	Report mg/l	1/QUARTER	COMPOSITE [7]
Total Recoverable Cadmium [16]	*********	*********	Report mg/l	1/QUARTER	COMPOSITE [7]
Total Recoverable Copper [16]	*********	*********	Report mg/l	1/QUARTER	COMPOSITE [7]
Total Recoverable Nickel [16]	*********	*********	Report mg/l	1/QUARTER	COMPOSITE [7]
Total Recoverable Lead [15]	*********	*********	Report mg/l	1/QUARTER	COMPOSITE [7]
Total Recoverable Zinc [16]	*********	*********	Report mg/l	1/QUARTER	COMPOSITE [7]

CONTINUED FROM PREVIOUS PAGE

A.1. During the period beginning the effective date and lasting through expiration, the permittee is authorized to discharge treated effluent from outfall serial number **001** to the Palmer River. The receiving water shall be monitored as specified below.

AMBIENT CHARACTERISTIC	AMBIENT REPORTING REQUIREMENTS		MONITORING REQUIREMENTS [1]		
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE**
Hardness [16]	*********	*********	Report mg/l	1/QUARTER	Grab
Alkalinity [16]	*********	*********	Report mg/l	1/QUARTER	Grab
pH [16]	*********	*********	Report mg/l	1/QUARTER	Grab
Specific Conductance [16]	*********	*********	Report mg/l	1/QUARTER	Grab
Total Ammonia Nitrogen [16]	*********	*********	Report mg/l	1/QUARTER	Grab
Total Organic Carbon [16]	*********	*********	Report mg/l	1/QUARTER	Grab
Total Recoverable Aluminum [16]	*********	*********	Report mg/l	1/QUARTER	Grab
Total Recoverable Cadmium [16]	*********	*********	Report mg/l	1/QUARTER	Grab
Total Recoverable Copper [16]	*********	*********	Report mg/l	1/QUARTER	Grab
Total Recoverable Nickel [16]	*********	*********	Report mg/l	1/QUARTER	Grab
Total Recoverable Lead [16]	*********	*********	Report mg/l	1/QUARTER	Grab
Total Recoverable Zinc [16]	*********	*********	Report mg/l	1/QUARTER	Grab

Footnotes:

1. Effluent samples taken in compliance with monitoring requirements specified in this permit shall be taken at a representative point prior to mixing with the receiving water. Final effluent samples shall be representative of the brine effluent that is discharged to the Palmer River. Any change in sampling location must be reviewed and approved in writing by EPA and MassDEP.

   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.

2. In calculating and reporting the average monthly concentration when the pollutant is not detected, assign zero to the non-detected sample result if the pollutant was not detected for all monitoring periods in the prior twelve months. If the pollutant was detected in at least one monitoring period in the prior twelve months, then assign each non-detected sample result a value that is equal to one half of the detection limit for the purposes of calculating averages.

3. Report intake and effluent flow for each operating date and include as a separate attachment to the DMR. The limit is a monthly average effluent limit.

   The effluent shall be discharged to the Palmer River through a two-port diffuser during no longer than a six (6) hour period beginning no more than three (3) hours before high tide and ending no more than three (3) hours after high tide. For each monthly DMR, the permittee shall submit an electronic attachment detailing the timing of each discharge cycle and confirming that the start and end time of the discharge was within 3 hours of high tide.

4. Sampling required for intake and effluent. Intake samples for dissolved oxygen and salinity shall be grab samples taken within thirty minutes of the end of an intake cycle. Effluent samples shall be composite samples collected from the discharge following the sampled intake cycle.

5. The salinity of the final effluent shall be less than or equal to 32 parts per thousand (ppt) measured using a salinometer.

   The permittee shall report the average intake and effluent salinity concentrations on its discharge monitoring report, and record the number of times the effluent limit was violated during the month in the “No. Ex” column of the row containing the effluent sampling data.

   For each monthly DMR, the permittee shall submit an electronic attachment summarizing the average ambient salinity concentrations for each discharge cycle and the effluent salinity data collected during the month.

6. Effluent monitoring for TSS only shall be sampled at a location representative of the effluent from the sludge drying beds before blending with any other waste stream.

7. A composite sample will consist of one grab sample per hour taken during the discharge cycle and shall be combined proportional to flow.

8. State certification requirement.

9. The dissolved oxygen (DO) concentration of the final effluent shall be greater than or equal to 5.0 mg/l. The DO concentration of the effluent shall also be equal to or greater than concentration in the receiving water.

   The permittee shall report the minimum daily intake and effluent concentrations on its discharge monitoring report, and record the number of times the effluent limit was violated during the month (i.e., the number of times the effluent concentration was less than the intake concentration) in the "No. Ex" column of the row containing the effluent sampling data. The permittee shall submit an electronic attachment summarizing all of the intake and effluent DO data collected during the month.

10. Liquid chlorine or cleaning solutions that contain chlorine shall be neutralized and dechlorinated prior to final discharge. Whenever chlorine is added to wastewater flow, the effluent shall be sampled for total residual chlorine (TRC) at the frequency required by the permit.

    When chlorine sampling is required, the permittee shall collect at least one TRC grab sample per day. For every day that more than one grab sample is taken, the monthly DMR shall include an attachment documenting the individual grab sample results for that day, the date and time of each sample, the method used for analysis, and a summary of any operational modifications implemented in response to the sample results. All test results using EPA approved methods shall be used in the calculation and reporting of maximum daily data submitted on the DMR (see Part II. Section D.1.d.(2)).

11. The minimum level (ML) for copper is defined as 3 ug/l. This value is the minimum level for copper using the Furnace Atomic Absorption analytical method (EPA Method 220.2). This method or other EPA-approved method with an equivalent or lower ML shall be used. Sampling results less than the ML shall be reported as "< [ML]" on the Discharge Monitoring Report.

12. The permittee shall conduct acute and chronic toxicity tests four times per year. The permittee shall test the inland silverside, *Menidia beryllina*, only. At least two of the toxicity tests each year shall be conducted when the effluent is a mix of brine from the RO units and the treated cleaning in place (CIP) and strainer wastewater. The permittee must indicate which toxicity tests include this mix.

    Toxicity test samples shall be collected during the months of March, June, September and December. The test results shall be electronically submitted to EPA using NetDMR as an attachment to the DMR submittal in the month following the completion of the test (i.e., April, July, October and January, respectively). The tests must be performed in accordance with test procedures and protocols specified in **Attachments A and B** of this permit.

Test Dates in:	**Submit Results by:**	**Test Species**	**Acute Limit LC_{50}**	**Chronic Limit C-NOEC**
March June September December	April 15 July 15 October 15 January 15	*Menidia beryllina* (inland silverside)	100%	11%

After submitting a minimum of four consecutive sets of WET test results, all of which demonstrate compliance with the WET permit limits, the permittee may request a reduction in the frequency of testing requirements. The permittee is required to continue testing at the frequency specified in the permit until notice is received by certified mail from the EPA that the WET testing requirement has been changed.

13. The LC_{50} 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.

14. 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. As described 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 accordance with EPA guidance on the evaluation of the concentration-response relationship. The "11% or greater" limit is defined as a sample which is composed of 11% (or greater) effluent, the remainder being dilution water.

15. If toxicity test(s) using receiving water as diluent show the receiving water to be toxic or unreliable, the permittee shall either follow procedures outlined in **Attachment A (Toxicity Test Procedure and Protocol**) **Section IV., DILUTION WATER** in order to obtain an individual approval for use of an alternate dilution water, or the permittee shall follow the Self-Implementing Alternative Dilution Water Guidance, which may be used to obtain automatic approval of an alternate dilution water, including the appropriate species for use with that water. This guidance is found in Attachment G of *NPDES Program Instructions for the Discharge Monitoring Report Forms (DMRs),* which may be found on the EPA Region I web site at http://www.epa.gov/Region1/enforcementandassistance/dmr.html. If this guidance is revoked, the permittee shall revert to obtaining individual approval as outlined in **Attachment A**. Any modification or revocation to this guidance will be transmitted to the permittees. However, at any time, the permittee may choose to contact EPA-Region 1 directly using the approach outlined in **Attachment A**.

16. For each whole effluent toxicity test, the permittee shall report on the appropriate discharge monitoring report (DMR) the concentrations of each parameter found in the 100 percent effluent and ambient samples. All these aforementioned chemical parameters shall be determined to at least the minimum quantification level shown in **Attachment A**. Also the permittee should note that all chemical parameter results must still be reported in the appropriate toxicity report.

Part I.A.1. (Continued)

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

b. The pH of the effluent shall not be less than 6.5 or greater than 8.5 at any time.

c. The discharge shall not cause objectionable discoloration or turbidity of the receiving water.

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

e. Wastewater from the pretreatment system strainer and microfiltration membranes shall be treated in the dewatering sludge drying beds prior to mixing with the final effluent. Reverse osmosis brine and the clarified liquid from the drying beds shall be combined in a concentrate equalization tank and discharged to the Palmer River through a diffuser during no longer than a six (6) hour period beginning no more than three (3) hours before high tide and ending no more than three (3) hours after high tide.

f. The results of sampling for any parameter conducted in accordance with EPA approved methods above its required frequency must also be reported on the monthly discharge monitoring report.

g. The dissolved oxygen of the effluent shall not be less than 5 mg/l at any time. The permittee shall report the minimum dissolved oxygen value for each month on the discharge monitoring report.

h. In accordance with 40 C.F.R. § 122.44(i)(1)(iv), the Permittee shall use sufficiently sensitive test procedures (i.e., methods) approved under 40 C.F.R. Part 136 or required under 40 C.F.R. Chapter I, Subchapter N or O, for the analysis of pollutants or pollutant parameters limited in this permit (except WET limits). A method is considered "sufficiently sensitive" when either (*1*) The method minimum level (ML) is at or below the level of the effluent limit established in this permit for the measured pollutant or pollutant parameter; or (*2*) The method has the lowest ML of the analytical methods approved under 40 C.F.R. Part 136 or required under 40 C.F.R. Chapter I, Subchapter N or O for the measured pollutant or pollutant parameter. The ML is not the minimum level of detection, but rather the lowest level at which the test equipment produces a recognizable signal and acceptable calibration point for a pollutant or pollutant parameter, representative of the lowest concentration at which a pollutant or pollutant parameter can be measured with a known level of confidence. For the purposes of this permit, the detection limit is the lowest concentration that can be reliably measured within specified limits of precision and accuracy for a specific laboratory analytical method during routine laboratory operating conditions (i.e., the level above which an actual value is reported for an analyte, and the level

below which an analyte is reported as non-detect).

2. Toxics Control

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

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

3. 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, and may modify the permit accordingly.

B. UNAUTHORIZED DISCHARGES

This permit authorizes discharges only from the outfall listed in Part I.A.1 in accordance with the terms and conditions of this permit. Discharges of wastewater from any other point sources are not authorized by this permit and shall be reported to EPA and MassDEP in accordance with Section D.1.e.(1) of the General Requirements of this permit (Twenty-four hour reporting).

C. OPERATION AND MAINTENANCE OF THE DESALINATION PLANT

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

1. Maintenance Staff

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

2. Preventative Maintenance Program

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

D. MONITORING AND REPORTING

The monitoring program in the permit specifies sampling and analysis, which will provide continuous information on compliance and the reliability and effectiveness of the installed pollution abatement equipment. The approved analytical procedures found in 40 CFR Part 136 are required unless other procedures are explicitly required in the permit. The permittee is obligated to monitor and report sampling results to EPA and the MassDEP within the time specified within the permit.

Unless otherwise specified in this permit, the permittee shall submit reports, requests, and information and provide notices in the manner described in this section.

1. Submittal of DMRs Using NetDMR

   The permittee shall continue to submit its monthly monitoring data in discharge monitoring reports (DMRs) to EPA and MassDEP no later than the 15th day of the month electronically using NetDMR. When the permittee submits DMRs using NetDMR, it is not required to submit hard copies of DMRs to EPA or MassDEP.

2. Submittal of Reports as NetDMR Attachments

   Unless otherwise specified in this permit, the permittee shall electronically submit all reports to EPA as NetDMR attachments rather than as hard copies. Permittees shall continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP. (See Part I.D.5. for more information on state reporting.) Because the due dates for reports described in this permit may not coincide with the due date for submitting DMRs (which is no later than the 15th day of the month), a report submitted electronically as a NetDMR attachment shall be considered timely if it is electronically submitted to EPA using NetDMR with the next DMR due following the particular report due date specified in this permit.

3. Submittal of Requests and Reports to EPA/OEP

   The following requests, reports, and information described in this permit shall be submitted to the EPA/OEP NPDES Applications Coordinator in the EPA Office Ecosystem Protection (OEP).

   A. Transfer of Permit notice
   B. Request for changes in sampling location
   C. Request for reduction in testing frequency
   D. Request for reduction in WET testing requirement
   E. Request for alternative dilution water for WET testing

   These reports, information, and requests shall be submitted to EPA/OEP electronically at R1NPDES.Notices.OEP@epa.gov or by hard copy mail to the following address:

U.S. Environmental Protection Agency
Office of Ecosystem Protection
EPA/OEP NPDES Applications Coordinator

5 Post Office Square - Suite 100 (OEP06-03)
Boston, MA 02109-3912

4. Submittal of Reports in Hard Copy Form

The following notifications and reports shall be submitted as hard copy with a cover letter describing the submission. These reports shall be signed and dated originals submitted to EPA.

A. Written notifications required under Part II
B. Notice of unauthorized discharges

This information shall be submitted to EPA/OES at the following address:

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

5. State Reporting

Unless otherwise specified in this permit, duplicate signed copies of all reports, information, requests or notifications described in this permit, including the reports, information, requests or notifications described in Parts I.D.3 and I.D.4 also shall be submitted to the State at the following addresses:

MassDEP – Southeast Region
Bureau of Air and Waste
20 Riverside Drive
Lakeville, MA 02347

Massachusetts Department of Environmental Protection
Bureau of Water Resources
1 Winter St.
Boston, MA 02108

Copies of toxicity tests only shall be submitted to:

Massachusetts Department of Environmental Protection
Watershed Planning Program
8 New Bond Street
Worcester, MA 01606

6. Verbal Reports and Verbal Notifications

Any verbal reports or verbal notifications, if required in Parts I and/or II of this permit,

shall be made to both EPA and to MassDEP. This includes verbal reports and notifications which require reporting within 24 hours. (As examples, see Part II.B.4.c. (2), Part II.B.5.c. (3), and Part II.D.1.e.) Verbal reports and verbal notifications shall be made to EPA's Office of Environmental Stewardship at:

617-918-1510

E. 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.

4. As required in MassDEP's Section 401 certification, the permittee shall conduct a Biological and Hydrological Monitoring Plan as approved by MassDEP. Results shall be reported to MassDEP and EPA to the addresses in section D above.

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:

- **2007.0 - Mysid Shrimp (Americamysis bahia) definitive 48 hour test.**
- **2006.0 - Inland Silverside (Menidia beryllina) definitive 48 hour test.**

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

II. METHODS

The permittee shall use the most recent 40 CFR Part 136 methods. Whole Effluent Toxicity (WET) Test Methods and guidance may be found at:

http://water.epa.gov/scitech/methods/cwa/wet/index.cfm#methods

The permittee shall also meet the sampling, analysis and reporting requirements included in this protocol. This protocol defines more specific requirements while still being consistent with the Part 136 methods. If, due to modifications of Part 136, there are conflicting requirements between the Part 136 method and this protocol, the permittee shall comply with the requirements of the Part 136 method.

III. SAMPLE COLLECTION

A discharge and receiving water sample shall be collected. The receiving water control sample must be collected immediately upstream of the permitted discharge's zone of influence. 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 holding time extension. 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[1] (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

[1] For this protocol, total residual chlorine is synonymous with total residual oxidants.

prior to sample use for toxicity testing. If performed on site the results should be included on the chain of custody (COC) presented to WET laboratory.

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 mg/L chlorine. If dechlorination is necessary, a thiosulfate control consisting of the maximum concentration of thiosulfate used to dechlorinate the sample in the toxicity test control water must also be run in the WET test.

All samples submitted for chemical and physical analyses will be analyzed according to Section VI of this protocol. Grab samples must be used for pH, temperature, and total residual chlorine (as per 40 CFR Part 122.21).

All samples held for use beyond the day of sampling shall be refrigerated and maintained at a temperature range of 0-6^{o} C.

IV. DILUTION WATER

Samples of receiving water must be collected from a reasonably accessible location in the receiving water body immediately upstream of the permitted discharge's zone of influence. 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 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 is found to be, or suspected to be toxic or unreliable, 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 case is when repeating a test due to toxicity in the site dilution water requires an **immediate decision** for ADW use by the permittee and toxicity testing laboratory. The second is when two of the most recent documented incidents of unacceptable site dilution water toxicity require 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, Region 1
Five Post Office Square, Suite 100
Mail Code OEP06-5
Boston, MA 02109-3912

and

Manager
Water Technical Unit (SEW)
U.S. Environmental Protection Agency
Five Post Office Square, Suite 100
Mail Code OES04-4
Boston, MA 02109-3912

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

EPA Region 1 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 Americamysis and Menidia toxicity test conditions and test acceptability criteria:

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

1. Test type	48hr Static, non-renewal
2. Salinity	25ppt ± 10 percent for all dilutions by adding dry ocean salts
3. Temperature (^{o}C)	20^{o}C ± 1^{o}C or 25^{o}C ± 1^{o}C, temperature must not deviate by more than 3^{o}C during test
4. Light quality	Ambient laboratory illumination
5. Photoperiod	16 hour light, 8 hour dark
6. Test chamber size	250 ml (minimum)
7. Test solution volume	200 ml/replicate (minimum)
8. Age of test organisms	1-5 days, < 24 hours age range
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 naupli while holding prior to initiating the test
13. Aeration [2]	None
14. Dilution water	5-30 ppt, +/- 10%; 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 821-R-02-012.

[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 TOXICITY TEST CONDITIONS FOR THE INLAND SILVERSIDE, MENIDIA BERYLLINA 48 HOUR TEST[1]

1. Test Type	48 hr Static, non-renewal
2. Salinity	25 ppt ± 10 % by adding dry ocean salts
3. Temperature	20°C ± 1°C or 25°C ± 1°C, temperature must not deviate by more than 3°C during test
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	5-32 ppt, +/- 10% ; 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 821-R-02-012.

[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.

V.1. Test Acceptability Criteria

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.2. Use of Reference Toxicity Testing

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

In general, 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 as prescribed below.

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.2.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.

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 Level for effluent[*1] (mg/L)
pH	x	x	---
Salinity	x	x	ppt(o/oo)
Total Residual Chlorine [*2]	x	x	0.02
Total Solids and Suspended Solids	x	x	---
Ammonia	x	x	0.1
Total Organic Carbon	x	x	0.5
Total Metals			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005

Superscript:

[*1] These are the minimum levels for effluent (fresh water) samples. Tests on diluents (marine waters) shall be conducted using the Part 136 methods that yield the lowest MLs.

[*2] 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.

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 73 of EPA 821-R-02-012 for appropriate method to use on a given data set.

No Observed Acute Effect Level (NOAEL)

See flow chart in Figure 13 on page 87 of EPA 821-R-02-012.

VIII. TOXICITY TEST REPORTING

A report of results must include the following:

- Toxicity Test summary sheet(s) (Attachment F to the DMR Instructions) 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
    - Permit limit and toxicity test results
    - Summary of any test sensitivity and concentration response evaluation that was conducted

Please note: The NPDES Permit Program Instructions for the Discharge Monitoring Report Forms (DMRs) are available on EPA's website at http://www.epa.gov/NE/enforcementandassistance/dmr.html

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 levels (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; and
- Any further discussion of reported test results, statistical analysis and concentration-response relationship and test sensitivity review per species per endpoint.

MARINE CHRONIC

TOXICITY TEST PROCEDURE AND PROTOCOL

I. GENERAL REQUIREMENTS

The permittee shall be responsible for the conduct of acceptable silverside chronic and sea urchin chronic toxicity tests in accordance with the appropriate test protocols described below:

- Inland Silverside (Menidia beryllina) Larval Growth and Survival Test
- Sea Urchin (Arbacia punctulata) 1 Hour Fertilization Test

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

II. METHODS

The permittee shall use 40 CFR Part 136 methods. Methods and guidance may be found at:

http://water.epa.gov/scitech/swguidance/methods/wet/index.cfm#methods

The permittee shall also meet the sampling, analysis and reporting requirements included in this protocol. Where there are conflicting requirements between the Part 136 method and this protocol, the permittee shall comply with the requirements of the Part 136 method.

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 marine, 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 fresh 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 fresh 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.

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.

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. For TRC analysis performed on site the results must be included on the chain of custody (COC) presented to WET laboratory. For the purpose of sample preparation, i.e. eliminating chlorine prior to toxicity testing, if called for by the permit, TRC analysis may also be performed by the toxicity testing laboratory and the samples must be dechlorinated, as necessary, using sodium thiosulfate prior to sample use for toxicity testing. According to 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 mg/L chlorine.

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.

All samples submitted for chemical and physical analyses will be analyzed according to Section VI of this protocol. Grab samples must be used for pH, temperature, and total residual oxidants (as per 40 CFR Part 122.21).

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 test acceptability criteria (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 the receiving water diluent is found to be, or suspected to be toxic or unreliable, an alternatedilution water (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
U.S. Environmental Protection Agency, Region 1
Five Post Office Square, Suite 100
Mail Code OEP06-5
Boston, MA 02109-3912

and

Manager
Water Technical Unit (SEW)
U.S. Environmental Protection Agency
Five Post Office Square, Suite 100
Mail Code OES04-4
Boston, MA 02109-3912

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.

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.

V. TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA

EPA New England requires that if a reference toxicant test was being performed concurrently with an effluent or receiving water test and fails, both tests must be repeated.

The following tables summarize the accepted Menidia and Arbacia toxicity test conditions and

test acceptability criteria:

EPA NEW ENGLAND RECOMMENDED TEST CONDITIONS FOR THE SEA URCHIN, ARBACIA PUNCTULATA, FERTILIZATION TEST[1]

1. Test type	Static, non-renewal
2. Salinity	30 o/oo ± 2 o/oo by adding dry ocean salts
3. Temperature	20 ± 1°C temperature must not deviate by more than 3°C during test
4. Light quality	Ambient laboratory illumination
5. Light intensity	10-20 uE/m^2/s, or 50-100 ft-c (Ambient Laboratory Levels)
6. Test vessel size	Disposal (glass) liquid scintillation vials (20 ml capacity), presoaked in control water
7. Test solution volume	5 ml
8. Number of sea urchins	Pooled sperm from four males and pooled eggs from four females are used per test
9. Number of egg and sperm cells	About 2000 eggs per chamber and 5,000,000 sperm cells per vial
10. Number of replicate chambers	4 per treatment
11. Dilution water	Uncontaminated source of natural seawater or deionized water mixed with artificial sea salts
12. Dilution factor	Approximately 0.5, must bracket the permitted RWC
13. Test duration	1 hour and 20 minutes
14. Effects measured	Fertilization of sea urchin eggs
15. Number of treatments per test[2]	5 and a control. (receiving water and laboratory water control) An additional dilution at the permitted effluent concentration (% effluent) is required.

16. Acceptability of test	70% - 90% egg fertilization in all controls. Minimum of 70% fertilization in dilution water control. Effluent concentrations exhibiting greater than 70% fertilization, flagged as statistically significantly different from the controls, will not be considered statistically different from the controls for NOEC reporting.
17. Sampling requirements	For on-site tests, samples are to be 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.
18. Sample volume required	Minimum 1 liter

Footnotes:

[1] Adapted from EPA 821-R-02-014

EPA NEW ENGLAND RECOMMENDED TEST CONDITIONS FOR THE INLAND SILVERSIDE, MENIDIA BERYLLINA, GROWTH AND SURVIVAL TEST[1]

1. Test type	Static, renewal
2. Salinity	5 o/oo to 32 o/oo +/- 2 o/oo of the selected salinity by adding artificial sea salts
3. Temperature	25 ± 1°C, temperature must not deviate by more than 3°C during test
4. Light quality	Ambient laboratory light
5. Light intensity	10-20 uE/m^2/s, or 50-100 ft-C (Ambient Laboratory Levels)
6. Photoperiod	16 hr light, 8 hr darkness
7. Test vessel size	600 - 1000 mL beakers or equivalent (glass test chambers should be used)
8. Test solution volume	500-750 mL/replicate loading and DO restrictions must be met)
9. Renewal of test solutions	Daily using most recently collected sample
10. Age of test organisms	Seven to eleven days post hatch; 24 hr range in age
11. Larvae/test chamber	15 (minimum of 10)
12. Number of replicate chambers	4 per treatment
13. Source of food	Newly hatched and rinsed Artemia nauplii less than 24 hr old
14. Feeding regime	Feed once a day 0.10 g wet wt Artemia nauplii per replicate on days 0 – 2 feed 0.15 g wet wt Artemia nauplii per replicate on days 3-6
15. Cleaning	Siphon daily, immediately before test solution renewal and feeding
16. Aeration[2]	None
17. Dilution water	Uncontaminated source of natural seawater; or deionized water mixed with artificial sea salts

18. Effluent concentrations	5 and a control (receiving water and laboratory water control) An additional dilution at the permitted effluent concentration (% effluent) is required
19. Dilution factor	$\geq$ 0.5, must bracket the permitted RWC
20. Test duration	7 days
21. Effects measured	Survival and growth (weight)
22. Acceptability of test	The average survival of dilution water control larvae is a minimum of 80%, and the average dry wt of unpreserved control larvae is a minimum of 0.5 mg, or the average dry wt of preserved control larvae is a minimum of 0.43 mg if preserved not more than 7 days in 4% formalin or 70% ethanol
23. Sampling requirements	For on-site tests, samples are collected daily and used within 24 hours of the time they are removed from the sampling device. For off-site tests, samples must be first used within 36 hours of collection.
24. Sample Volume Required	Minimum of 6 liters/day.

Footnotes:

[1] Adapted from EPA 821-R-02-014

[2] If dissolved oxygen (D.O.) falls below 4.0 mg/L, aerate all chambers at a rate of less than 100 bubbles/min. Routine D.O. checks are recommended.

V.1. Test Acceptability Criteria

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.2. Use of Reference Toxicity Testing

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

In general, 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 as prescribed below.

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.2.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. $\geq$3 standard deviations for IC25s values and $\geq$ two concentration intervals for NOECs, and even though the primary test meets TAC, the primary test will be considered unacceptable and must be repeated.

VI. CHEMICAL ANALYSIS

The toxicity test requires measurement of pH, salinity, and temperature at the beginning and end of each 24 hour period in each dilution and controls for both daily test renewal and waste. The following chemical analyses shall be performed for each initial sample as well as any renewal samples, if necessary pursuant to the requirement of Part III above.

Parameter	Effluent	Diluent	Minimum Level for effluent[*1] (mg/L)
pH	x	x	---
Salinity	x	x	ppt(o/oo)
Total Residual Chlorine [*2]	x	x	0.02
Total Solids and Suspended Solids	x	x	---
Ammonia	x	x	0.1
Total Organic Carbon	x	x	0.5
Total Metals			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005

Superscript:

[*1] These are the minimum levels for effluent (fresh water) samples. Tests on diluents (marine waters) shall be conducted using the Part 136 methods that yield the lowest MLs.

[*2] 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.

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-02-014. Guidance for this review can be found at http://water.epa.gov/scitech/methods/cwa/wet/upload/2007_07_10_methods_wet_disk1_ctm.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 endpoint growth for *Menidia beryllina* 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-02-014.

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 marine tests in Section 10.2.8.3, p. 54, Table 6 of EPA-821-R-02-014. 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 document can be located under Guidance Documents

at the following website location http://water.epa.gov/scitech/methods/cwa/wet/index.cfm#guidance. 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-02-014, page 45

For discussion on Hypothesis Testing, refer to EPA 821-R-02-014, Section 9.6

For discussion on Point Estimation Techniques, refer to EPA 821-R-02-014, Section 9.7

2. *Menidia beryllina*

Refer to survival hypothesis testing analysis flowchart, EPA 821-R-02-014, page 181

Refer to survival point estimate techniques flowchart, EPA 821-R-02-013, page 182

Refer to growth data statistical analysis flowchart, EPA 821-R-02-014, page 193

3. *Arbacia punctulata*

Refer to fertilization data testing flowchart, EPA 821-R-02-014, page 312

VIII. TOXICITY TEST REPORTING

A report of results must include the following:

- Toxicity Test summary sheet(s) (Attachment F to the DMR Instructions) 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)
  - Permit limit and toxicity test results
  - Summary of test sensitivity and concentration response evaluation

Please note: The NPDES Permit Program Instructions for the Discharge Monitoring Report Forms (DMRs) are available on EPA's website at http://www.epa.gov/NE/enforcementandassistance/dmr.html

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; and
- Any further discussion of reported test results, statistical analysis and concentration-response relationship and test sensitivity review.

NPDES PART II STANDARD CONDITIONS
(January, 2007)

TABLE OF CONTENTS

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.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND - REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MASSACHUSETTS 02109-3912

FACT SHEET

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

NPDES PERMIT NO: **MA0103390**

DATE OF PUBLIC NOTICE PERIOD: August 17, 2016 – September 15, 2016

NAME AND ADDRESS OF APPLICANT:

Swansea Water District
700 Wilbur Avenue
Swansea, MA 02777

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Swansea Water District Desalination Facility
240 Vinnicum Road
Swansea, MA 02777

RECEIVING WATER: **Palmer River (Narragansett Bay Watershed)**

RECEIVING WATER CLASSIFICATION(S): **SB**

TABLE OF CONTENTS

I. Proposed Action, Type of Facility and Outfall Locations

A. Proposed Action, Type of Facility and Outfall Location

The Swansea Water District (SWD) has applied to the U.S Environmental Protection Agency for a reissuance of its National Pollutant Discharge Elimination System (NPDES) permit to discharge wastewater into the Palmer River through Outfall 001. The facility is designed to supply approximately 2.18 million gallons per day (MGD) of potable water to residents and businesses in the Town and discharge approximately 2.71 MGD of wastewater into the Palmer River.

The existing NPDES permit was issued on February 21, 2008, became effective on May 1, 2008 and expired April 30, 2013. Because the applicant filed a complete application for permit reissuance in October of 2012 (within the time period prescribed in 40 Code of Federal Regulations (CFR) Section 122.6), the 2008 permit has been administratively extended until a new permit is issued. However, the facility did not begin operating until spring of 2013 (after the initial reapplication was submitted). Hence, the permittee submitted an updated reapplication on September 22, 2015 which included effluent data for EPA to use in the development of this draft permit. The location of the treatment facility, intake, Outfall 001 and the receiving water are shown in Attachment A.

B. Description of Facility

The Swansea Water District Desalination Facility (the "facility") uses microfiltration and reverse osmosis to treat brackish water from the Palmer River and groundwater from three existing wells. The facility consists of a water treatment plant, a river intake and pumping station, a two-port outfall diffuser in the Palmer River, and associated pipelines and storage tanks. The discharge is located 2.4 miles from the mouth of the Palmer River and 1,800 feet from the Massachusetts-Rhode Island state line. The intake structure is approximately 4 miles downstream of Shad Factory Dam, the upstream extent of tidal influence.

Raw water from the Palmer River and Vinnicum Wellfield groundwater wells are treated separately and the finished water is combined for distribution. Wellfield water is aerated and then filtered by microfiltration (MF). Chemicals are added prior to microfiltration to coagulate and remove organics, and to oxidize iron and manganese.

River water is treated using MF and chemical addition. Reject water from the first stage MF passes through a second stage MF. The second stage MF increases the total amount of finished water and reduces the volume of backwash sent to treatment. The permeate from each MF stage is treated by reverse osmosis filtration (RO) to remove salt. The RO permeate is disinfected, mixed with the MF permeate from the wellfield water treatment system, treated with corrosion control chemicals, fluoridated, and put into the water distribution system. See Figure 1 in Section IV of this fact sheet for a treatment and flow balance diagram.

The chemicals used for the MF systems are sulfuric acid for pH adjustment, an aluminum/ferric chloride blend as a coagulant for organics removal, and potassium permanganate to oxidize iron and manganese in the raw water. The chemicals used for the RO system may include sulfuric acid for pH adjustment, antiscalants, chlorine and soda ash to adjust alkalinity.

Membrane-specific cleaning chemicals, such as caustic soda, acid, and hypochlorite are used as necessary for each specific membrane system. The draft permit requires cleaning fluids other than hypochlorite to be discharged to a tank for off-site disposal.

The facility produces liquid waste streams including RO brine concentrate and reject (backwash) from the three MF systems. Other waste products include strainer flushings, and cleaning solutions for the membranes. The MF backwash will be discharged to sludge drying beds. RO brine, and the clarified liquid from the drying beds, are combined in a concentrate equalization tank and discharged back to the Palmer River through a diffuser during a six (6) hour period beginning three (3) hours before high tide and ending three (3) hours after high tide. The draft permit requires wastewater from the pretreatment system strainer and microfiltration membranes to be treated in the sludge drying beds prior to mixing with the final effluent. See Part I.A.1.e. of the draft permit.

The facility discharges through a two-port diffuser located approximately 4 m (13 ft) below Mean Sea Level (MSL) in a depression about 8.5 m (28 ft) deep approximately 50 feet south of the Old Providence Road Bridge spanning the Palmer River. The ports, 0.22 m (8.7 in) in diameter oriented 60° above the horizontal, are separated by 5 m (16.4 ft) in an approximate north - south orientation pointing west. The two-port diffuser is designed for a discharge flow rate of 3,700 gallons per minute (gpm).

II. Description of Discharge

A quantitative description of the discharge in terms of significant effluent parameters based on recent discharge monitoring reports (DMRs) from July 2013 through April 2016 may be found in **Attachment B** of this fact sheet. The review period begins in July of 2013 because the facility began discharging in that month.

III. Limitations and Conditions

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

IV. Permit Basis and Explanation of Effluent Limitation Derivation

A. General Requirements

The Clean Water Act (CWA) prohibits the discharge of pollutants to waters of the United States without a National Pollutant Discharge Elimination System (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. This draft NPDES permit was developed in accordance with various statutory and regulatory requirements established pursuant to the CWA and any applicable State regulations. The regulations governing the EPA NPDES permit program are generally found at 40 CFR Parts 122, 124, 125, and 136.

B. Technology-based Requirements

Technology-based requirements represent the minimum level of control that must be imposed under Sections 301(b) and 402 of the CWA (See 40 CFR §125 Subpart A). For existing sources, technology-based requirements according to best practicable control technology (BPT) currently available are applied for conventional, non-conventional, and toxic pollutants. There are no applicable technology-based effluent guidelines for this industry. In the absence of published guidelines, the permit writer is authorized under Section 402(a)(1) of the CWA to establish effluent limitations on a case-by-case basis using Best Professional Judgment (BPJ) (See 40 CFR §§125.3 (c)(2) and (c)(3)).

The factors to be considered in developing BPJ limits are set forth at 40 CFR §§ 125.3(c)(2)(i) and (ii) and 125.3(d)(3)(i) - (vi) and include, among other things, the age of the existing facility, engineering issues, process changes, non-water quality-related environmental impacts, and the costs of achieving required effluent pollutant reductions. In the development of the 2008 permit, a review of two reports written by the American Water Works Association on the management of brine from reverse osmosis systems, the Environmental Impact Report and Notice of Project Change Reports for this facility were reviewed by both Agencies to address these issues. In this fact sheet, these analyses were reevaluated and either carried forward or revised from the 2008 permit to reflect the current conditions at the facility.

C. Water Quality-Based Requirements

Under Section 301(b)(1)(C) of the CWA and EPA regulations NPDES permits must contain effluent limits more stringent than technology-based limits where more stringent limits are necessary to maintain or achieve state or federal water quality standards.

Water quality standards consist of three parts: (1) beneficial designated uses for a water-body or a segment of a water-body; (2) numeric and/or narrative water quality criteria sufficient to protect the assigned designated use(s); and (3) antidegradation requirements to ensure that once a use is attained it will not be degraded. The Massachusetts Surface Water Quality Standards, found at 314 CMR 4.00, include these elements. The state will limit or prohibit discharges of pollutants to surface waters to assure that surface water quality standards of the receiving waters are protected and maintained or attained. These standards also include requirements for the regulation and control of toxic constituents and require that EPA criteria, established pursuant to Section 304(a) of the CWA, shall be used unless a site specific criteria is established.

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 the "reasonable potential" to cause or contribute to an excursion above any water quality standard (see 40 CFR §122.44(d)). An excursion occurs if the projected or actual in-stream concentration exceeds an applicable water quality 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's reissuance application, monthly discharge monitoring reports (DMRs), and State and Federal Water Quality Reports; (3) sensitivity of the indicator species used in toxicity testing; (4) known water quality impacts of processes on wastewaters; and (5) where appropriate, dilution of the effluent in the receiving water.

EPA and MassDEP researched disposal methods at water treatment plants using reverse osmosis in other States and found surface water discharge of brine concentrate to be common. An article in the December 2004 issue of the Journal of American Water Works Association confirms that surface water discharge is the most common disposal practice for brine concentrate. The concentrate contains naturally occurring constituents that are in the RO feed water are well suited for surface water discharge. The primary ecological concern is the salinity change in the receiving water and its effect on the native habitat as a result of the concentrated brine discharge. Other pollutants/parameters present in the source water will be concentrated prior to discharge.

D. Water Quality Standards and Designated Uses

The Palmer River, at the point of discharge, is classified as a Class SB waterbody by the Massachusetts Department of Environmental Protection (MassDEP). The Massachusetts Surface Water Quality Standards (SWQS) states at 314 CMR 4.05(4)(b) that Class SB 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. In certain waters, habitat for fish, other aquatic life and wildlife may include, but is not limited to, seagrass. Where designated in the tables to 314 CMR 4.00 for shellfishing, these waters shall be suitable for shellfish harvesting with depuration (Restricted and Conditionally Restricted Shellfish Areas). These waters shall have consistently good aesthetic value. In the case of a water intake structure (IS) at a desalination facility, the Department has the authority under 33 U.S.C. § 1251 (FWPCA § 401), M.G.L. c. 21, §§ 26 through 53 and 314 CMR 3.00 to condition the IS to assure compliance of the withdrawal activity with 314 CMR 4.00, including, but not limited to, compliance with the narrative and numerical criteria and protection of existing and designated uses."

Both the intake and the discharge are located in segment MA53-03 of the Palmer River, between the Route 6 bridge and the MA/RI state line. The Massachusetts Year 2014 Integrated List of Waters[1] lists this segment as being impaired only for fecal coliform.

E. Effluent Flow

EPA may use design flow of effluent both to determine the necessity for effluent limitations in the permit that comply with the CWA, and to calculate the limits themselves. EPA practice is to use design flow as a reasonable and important worst-case condition in EPA's reasonable potential and water quality-based effluent limitations (WQBEL) calculations to ensure compliance with water quality standards under Section 301(b)(1)(C). Should the effluent discharge flow exceed the flow assumed in these calculations, the instream dilution would decrease and the calculated effluent limits may not be protective of WQS. Further, pollutants that do not have the reasonable potential to exceed WQS at the lower discharge flow may have reasonable potential at a higher flow due to the decreased dilution. In order to ensure that the assumptions underlying the Region's reasonable potential analyses and derivation of permit effluent limitations remain sound for the duration of the permit, the Region may ensure its "worst-case" effluent wastewater flow assumption through imposition of permit conditions for

1 http://www.mass.gov/eea/docs/dep/water/resources/07v5/14list2.pdf

effluent flow. Thus, the effluent flow limit is a component of WQBELs because the WQBELs are premised on a maximum level of flow. In addition, the flow limit is necessary to ensure that other pollutants remain at levels that do not have a reasonable potential to exceed WQS.

Using a facility's design flow in the derivation of pollutant effluent limitations, including conditions to limit effluent flow, is consistent with, and anticipated by NPDES permit regulations. Regarding the calculation of effluent limitations for POTWs, 40 C.F.R. § 122.45(b)(1) provides, "permit effluent limitations…shall be calculated based on design flow." POTW permit applications are required to include the design flow of the treatment facility. *Id.* § 122.21(j)(1)(vi).

The limitation on effluent flow is within EPA's authority to condition a permit in order to carry out the objectives of the CWA. *See* CWA §§ Sections 402(a)(2) and 301(b)(1)(C); 40 C.F.R. §§ 122.4(a) and (d); 122.43 and 122.44(d). A condition on the discharge designed to protect EPA's WQBEL and reasonable potential calculations is encompassed by the references to "condition" and "limitations" in 402 and 301 and implementing regulations, as they are designed to assure compliance with applicable water quality regulations, including antidegradation. Regulating the quantity of pollutants in the discharge through a restriction on the quantity of effluent flow is consistent with the overall structure and purposes of the CWA.

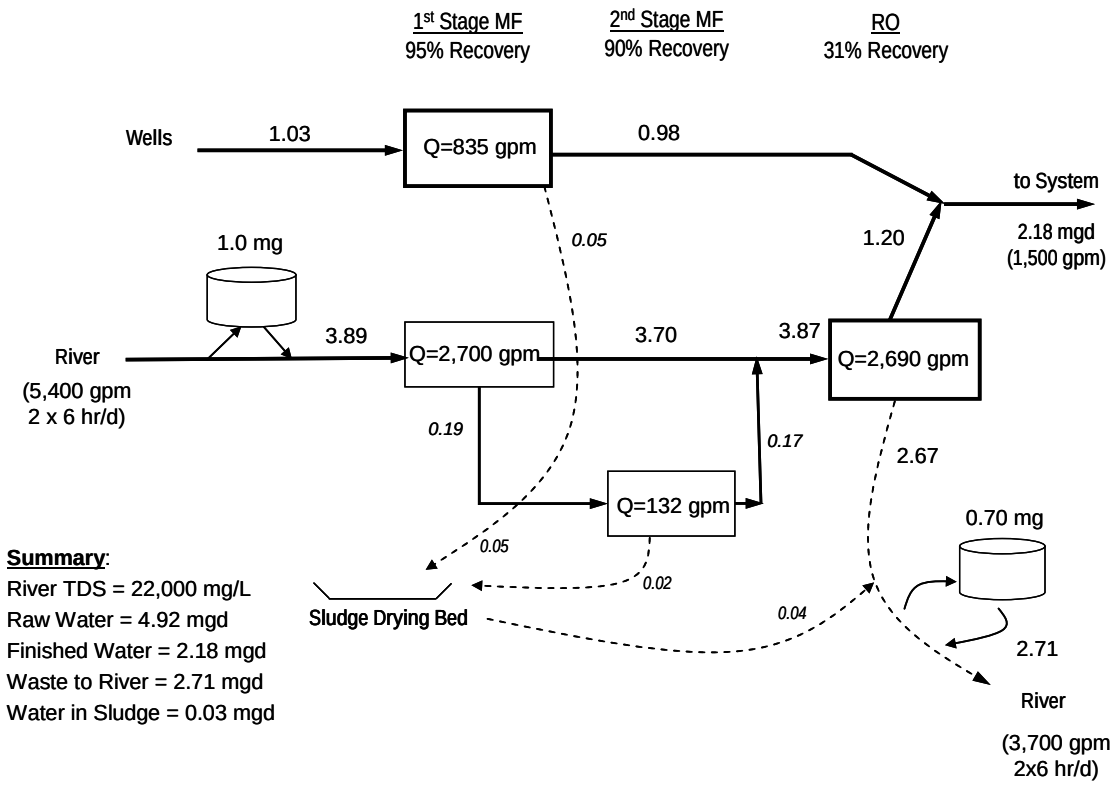
In addition, as provided in Part II.B.1 of this permit and 40 C.F.R. § 122.41(e), the permittee is required to properly operate and maintain all facilities and systems of treatment and control. Operating the facility's wastewater treatment systems as designed includes operating within the facility's design flow. Thus, the permit's effluent flow limitation is necessary to ensure proper facility operation, which in turn is a requirement applicable to all NPDES permits. *See* 40 C.F.R. § 122.41.

The flow limit in this draft permit is 2.71 MGD. The permit limits the salinity concentration of the discharge. The effluent will be batch discharged for up to six hours during each high tidal cycle when the receiving water salinity is highest.

A flow balance for the facility, under peak summer design conditions, is shown below. As can be seen, the facility is designed to produce 2.18 MGD of finished water that will go to the distribution system. The 4.92 MGD of water entering the treatment plant comes from the Vinnicum Wellfield and the Palmer River. The difference, 2.71 MGD, represents the concentrate waste streams to be returned to the Palmer River via Outfall 001.

Figure 1

Flow Balance (River TDS = 22,000 mg/L)



During the period from July 2013 to April 2016 (See Attachment B), the long term monthly average plant flow was 0.33 MGD (average of the monthly average flows for the review period), with a maximum daily average flow of 0.80 MGD (average of the maximum daily flows each month for the review period).

The effluent flow limit for the discharge from Outfall 001 is carried forward at 2.71 MGD as a monthly average limit measured at the plant's effluent flow meter. The draft permit requires reporting of both maximum and minimum daily rates and total flow for each operating date.

F. Available Dilution

The Massachusetts State Water Quality Standards define mixing zones and the criteria which must be met in 314 CMR 4.03(2) as follows.

> *4.03(2) Mixing Zones: In applying these standards the Department may recognize a limited area or volume of waterbody as a mixing zone for the initial dilution of a discharge. Waters within a mixing zone may fail to meet specific water quality criteria provided the following conditions are met:*
>
> *(a) Mixing zones shall be limited to an area or volume as small as feasible. The location, design and operation of the discharge shall minimize impacts on aquatic life and other beneficial uses.*

(b) Mixing zones shall not interfere with the migration or free movement of fish or other aquatic life. There shall be safe and adequate passage for swimming and drifting organisms with no deleterious effects on their populations.

(c) Mixing zones shall not create nuisances conditions, accumulate pollutants in sediments or biota in toxic amounts or otherwise diminish the existing or designated uses of the segment disproportionately.

Based on EPA mixing zone guidance (Technical Support Document for Water Quality Based Toxics Control, 1991) the permittee proposed a mixing zone extending approximately 9.7 meters (about 32 feet) from the outfall ports in the development of the 2008 permit.

Modeling the effects of the discharge on the hydrography of the Palmer River was accomplished in two steps. A far field model was developed to characterize ambient flow velocities in the vicinity of the discharge throughout the tidal cycle. This was accomplished by Applied Science Associates (ASA), using its boundary fitted hydrodynamic model, a component of the Water Quality Mapping and Analysis Package. The model was applied to the Palmer River and calibrated to data from the field program. Velocities from the far field model were then applied to the PLUMES® model to characterize the discharge plume.

A PLUMES® model was used to predict the salinity in the mixing zone for 10 different cases, incorporating varying effluent salinities, receiving water flows, and tide conditions. The model showed that in all cases salinity in the discharge will be reduced in the mixing zone, and in all cases a differential salinity (the difference between the plume salinity and receiving water salinity) equal to or less than 1.4 practical salinity units (psu) will be achieved less than 2.4 meters (about 8 feet) from the diffuser ports (a psu is equal to a part per thousand). EPA believes that the increase in salinity due to the discharge is not expected to adversely affect aquatic organisms, including Essential Fish Habitat (EFH) species (as discussed in Section VI. below).

The estimates of dilution used in the salinity modeling can also be used to predict the dilution of other pollutants in the discharge. In the 2008 permit, it was determined that the worst-case dilution factor was 1.3, based on Case 10. This dilution factor was used to evaluate the reasonable potential of other pollutants to cause or contribute to excursions of water quality criteria in the 2008 permit. However, a reevaluation of the ASA modeling data indicates that this dilution factor was miscalculated. The dilution factor should have been calculated by dividing the “discharge salinity above ambient” by the “end plume salinity above ambient” for each of the 10 cases. This reevaluation is shown below and results in the worst-case dilution factor of 9.36, based on Case 8.

Case	Ambient Salinity at Discharge (psu)	Discharge Salinity above Ambient (psu)	End Plume Salinity (psu)	End Plume Salinity above Ambient (psu)	Dilution
1	8.5	16.7	9.9	1.4	11.93
2	15.9	16.1	17.3	1.4	11.50
3	16.6	15.4	17.9	1.3	11.85
4	11.2	20.8	13	1.4	14.86
5	20.8	11.2	21.7	0.9	12.44
6	16.3	8.9	17.2	0.9	9.89
7	21.3	10.7	22.4	1.1	9.73
8	21.7	10.3	22.8	1.1	9.36
9	18.7	8.8	19.6	0.9	9.78
10	23.3	8.7	24.2	0.9	9.67

This revised dilution factor of 9.36 is used throughout the permit for determining reasonable potential. Any less stringent limits based on this revised dilution factor are in accordance with anti-backsliding exception found at CWA 402(o)(2)(B)(ii). The technical mistake made in the 2008 permit was miscalculating the dilution factor.

The 2008 permit also included a requirement that the permittee develop an ambient monitoring plan to verify the dilution provided by the diffuser, to confirm the size of the mixing zone, and to confirm that water quality standards are achieved at the edge of the mixing zone. Based upon this requirement, a dilution dye study was conducted by Normandeau Associates, Inc. to provide field data to characterize the size of the discharge plume and its dilution and ultimately to verify previous computer model simulations by ASA. According to ASA's report submitted to MassDEP in May of 2015, the model was successfully validated to the dye study data showing that the predictions generally matched the data well. Once validated, the model was used to predict the salinity concentrations for conditions during the dye study, the present permitted discharge salinity of 32 psu, and two potentially higher discharge salinities of 48 and 64 psu. Model results for all cases indicated that the plume will remain well within the previously established mixing zone that was based on EPA guidance.

During this permit reissuance process, MassDEP consulted with Massachusetts Coastal Zone Management (CZM) and Massachusetts Division of Marine Fisheries (DMF) on the biological and water quality monitoring, modeling and dilution study results. From a fisheries perspective, there were concerns about adequate habitat and passage for diadromous species. Though there were some concerns about how the dilution study was conducted due to conditions in the river on the day of the survey, the Agencies concurred that there was enough information gathered during the survey, as well as from additional modeling, to show that the discharge is not affecting fish habitat or passage.

G. Salinity

As stated earlier, the primary ecological concern as a result of the concentrated discharge of brine is the salinity change in the receiving water and its effect on the native habitat. Depending on the river flow and tidal stage, the salinity in this section of the Palmer River varies from 0 ppt to 32 ppt. This range has been observed under high tide conditions, with the lowest values observed in late winter and early spring when fresh water flows in the river are highest. The highest salinities were observed during low flow or 7Q10 conditions when the fresh water flow in the river is lowest.

In the 2008 permit, the SWD agreed to a maximum salinity discharge concentration of 32 ppt based on typical ambient salinity levels. During the review period, the average discharge salinity was 21.7 ppt and the facility had a single violation of 33.76 ppt in September 2014. Additionally, the permittee was required to monitor the salinity of the intake. During the review period, the average intake salinity was 13.95 ppt and the maximum was 26.76 ppt, also recorded in September 2014. It should be noted that when the ambient salinity was higher than this (closer to 32 ppt) during the review period, the facility was not able to operate because the brine would have been significantly above the salinity limit. Based on this limitation, the permittee is requesting an increased salinity limit in this permit reissuance.

As discussed in the available dilution section above, the salinity limit is established based on meeting water quality at the edge of a mixing zone. Given the seasonal variation of ambient salinity, the maximum effluent salinity concentration which would meet water quality requirements at the edge of the mixing zone depends on the season. In other words, the existing salinity limit of 32 ppt may not be stringent enough under very low ambient conditions while a salinity limit above 32 ppt may be allowable during periods of high ambient salinity. However, if the permittee requires a higher salinity limit, they must go through MA Environmental Policy Act (MEPA) review.

As described above, the salinity of the intake and effluent were monitored throughout the review period. These data are presented in the table below. The table also presents a "concentration factor", showing how much the salinity was concentrated from the intake to the effluent during each month.

Monitoring Period End Date	**Intake Salinity**	**Effluent Salinity**	**Concentration Factor**
	PPB	**PPB**	**Eff / Int**
	MO AVG	**MO AVG**	**--**
7/31/2013	13440	19310	1.44
8/31/2013	18506	25890	1.40
9/30/2013	14966	22482	1.50
10/31/2013	C	C	C
11/30/2013	C	C	C
12/31/2013	8814	14771	1.68
1/31/2014	C	C	C
2/28/2014	C	C	C
3/31/2014	3214	7425	2.31
4/30/2014	4456	4032	0.90

Monitoring Period End Date	Intake Salinity	Effluent Salinity	Concentration Factor
	PPB	PPB	Eff / Int
	MO AVG	MO AVG	--
5/31/2014	6590	8880	1.35
6/30/2014	12717	25996	2.04
7/31/2014	17441	29705	1.70
8/31/2014	20791	29197	1.40
9/30/2014	26760	**33758**	1.26
10/31/2014	24247	29738	1.23
11/30/2014	C	C	C
12/31/2014	12098	18110	1.50
1/31/2015	C	C	C
2/28/2015	C	C	C
3/31/2015	C	C	C
4/30/2015	C	C	C
5/31/2015	C	C	C
6/30/2015	12421	24257	1.95
7/31/2015	10020	21842	2.18
8/31/2015	16750	31903	1.90
9/30/2015	28899	**33713**	1.17
10/31/2015	C	C	C
11/30/2015	C	C	C
12/31/2015	C	C	C
1/31/2016	10144	16930	1.67
2/29/2016	9526	13389	1.41
3/31/2016	C	C	C
4/30/2016	C	C	C
Maximum	28899	33758.0	2.3
Minimum	3214	4032	0.9
Average	14305	21648.8	1.6

No Data Indicator Code "C" indicates the facility had no discharge during that monitoring period.

As shown in the table above, the intake (ambient) salinity ranged from 3.2 ppt to 28.899 ppt. The maximum effluent salinity was 33.758 ppt and the maximum concentration factor was 2.3. The lower range of ambient salinity (below 14 ppt) was measured during the months of December through July[2] and the higher range of ambient salinity (above 14 ppt) was measured during the months of August through October. No data were available for November during the review period.

[2] Note that July 2013 and July 2015 were below average while July 2014 was above average. Hence, July is considered to be part of the "low salinity" season as a conservative, worst-case condition.

EPA acknowledges that this analysis is based on currently available data which are quite limited. Hence, the salinity limit from the 2008 permit (32 ppt) is being carried forward in the draft permit. The salinity limit in the draft permit may be reevaluated in future permitting action pending additional salinity monitoring data gathered during the next permit term, MEPA review, and further consultation with MassDEP, CZM and DMF.

H. Conventional Pollutants

1. TSS and BOD_5

In accordance with Section 402(a)(1) of the CWA and 40 CFR 125.3, technology-based limitations for total suspended solids (TSS) based on Best Professional Judgment (BPJ) were included in the 2008 permit. These limits included an average monthly limit of 20 mg/l and an average weekly limit of 30 mg/l. These BPJ limits are consistent with BPJ limits for similar facilities in Region I and are also consistent with an article in the Journal of American Water Works Association, that identifies < 30 mg/l + raw water TSS as a representative limitation for TSS of a surface water discharge. See AWWA Residual Management Research Committee Subcommittee report on Residuals Management for Low-pressure Membranes, Journal of American Water Works Association, June 2004.

During the review period, the TSS discharge reported by the permittee was 4.8 mg/l (average of monthly averages), 8.1 mg/l (maximum of monthly averages), 6.9 mg/l (average of weekly averages) and 15.5 mg/l (maximum of weekly averages) with no violations of the effluent limits. These effluent values are well below the BPJ limits with no permit violations during the review period.

Based on performance data during the review period, the effluent from the sludge drying beds (before blending with any other waste stream) have a 95^{th} percentile of 19.5 mg/l and a 99^{th} percentile of 29.8 mg/l. Since these performance data are almost identical to the existing limits of 20 mg/l (average monthly) and 30 mg/l (average weekly), the technology-based limits will remain the same in this reissuance. However, because this limit is a technology-based limit for the sludge drying beds, the monitoring location will be changed to a representative location before blending with any other waste stream. This change is described in the draft permit.

Additionally, it was determined in the 2008 permit that wastewater from the pretreatment membrane cleaning process has the potential to increase TSS to the receiving water and that an increase in BOD_5 is likely to occur if citric acid is used to clean the membranes. An article in the Journal of American Water Works Association, titled, "Residuals Management for Low-pressure Membranes, page 75, June 2003, states, "If citric acid is used in the CIP (Cleaning in Place), the biological oxygen demand (BOD_5) of the spent cleaning solution is likely to be very high." Hence, the 2008 permit required the spent CIP solutions from the microfiltration membranes and the pretreatment strainer wastewater be sent to the sludge drying beds for treatment prior to mixing with the blended brine effluent. The amount of wastewater generated from the pretreatment strainer and the pretreatment CIP cleaning is expected to be significantly less than the amount of wastewater from the water treatment process, and both wastewater streams can be sent to the sludge drying beds for on-site treatment. The draft permit continues to require that these waste streams be sent to the sludge drying beds for treatment prior to mixing with the blended brine.

EPA notes that the effluent from the sludge drying beds will then be blended with other internal waste streams carrying lower concentrations of TSS. Therefore, the effluent to the receiving water will be even lower after blending and does not have reasonable potential to cause or contribute to water quality violations.

Limits for TSS in the sludge drying bed effluent will be maintained as described above, along with the requirement that the blended effluent (RO brine and the clarified liquid from the drying beds) be combined in a concentrate equalization tank and discharged back to the Palmer River through a diffuser during a six (6) hour period beginning three (3) hours before high tide and ending three (3) hours after high tide. See Part I.A.1.e. of the draft permit.

The 2008 permit also included TSS and BOD_5 monitoring requirements for the influent and effluent of the sludge drying beds. This sampling shows the characteristics of the wastes discharged to the system from the CIP, pretreatment strainer, and backwash and shows the systems efficiency in removing these wastes. As shown in Attachment B, the monthly average and daily max influent TSS (based on 1 sample per month) had an average of 605.4 mg/l and a maximum of 2,640 mg/l. The monthly average and daily max effluent TSS before blending with the RO brine had an average of 8.8 mg/l and a maximum of 41 mg/l. The monthly average and daily max influent BOD_5 (based on 1 sample per month) were 24.8 mg/l and 200 mg/l, respectively. Of the 19 effluent BOD_5 samples taken before blending with the RO brine, 16 were under the detection limit of 4.0 mg/l and only three (3) were above the detection limit, with a maximum of 26.4 mg/l. These data confirm that the sludge drying beds are an effective treatment process for TSS and BOD_5 removal from the CIP, pretreatment strainer, and backwash wastewater prior to mixing with the RO brine effluent. Therefore, monitoring of the TSS or BOD_5 in the influent of the sludge drying beds is no longer required.

Based on this analysis and the supporting BOD_5 and DO data found in Attachment B, the discharge does not have reasonable potential to cause or contribute to a water quality violation and a BOD_5 limit is not included in the draft permit.

2. pH

The pH limits in the draft permit are based on Massachusetts Surface Water Quality Standards, 314 CMR 4.05(4)(b)3. The pH of the final effluent shall be in the range of 6.5 to 8.5 standard units and not more than 0.2 units outside of the natural background range. There shall be no change from background conditions that would impair any use assigned to this class.

During the review period, the permittee maintained consistent compliance with these limits (See Attachment B).

3. Dissolved Oxygen (DO)

State SWQSs require at 314 CMR 4.05(4)(b)(1) that the DO in Class SB waters shall not be less than 5.0 mg/l unless natural background conditions are lower. This limit is less stringent than in the 2008 permit (6.0 mg/l) based on anti-backsliding exception found at CWA 402(o)(2)(B)(ii). The technical mistake made in the 2008 permit was characterizing the receiving water as Class SA when it should have been characterized as Class SB.

Data submitted with the permit application (for the 2008 permit) show the dissolved oxygen concentration in the Palmer River at the point of discharge has, on occasion, been as low as 5.7 mg/l. The minimum discharge concentration during the review period was 7.3 mg/l, indicating that the facility does not have reasonable potential to cause or contribute to a violation of water quality standards. In order to continue to protect the receiving water, the draft permit carries forward the requirements to monitor DO in both the intake and the discharge, as well as to limit the DO in the final effluent to no less than 5.0 mg/l.

I. Non-Conventional and Toxic Pollutants

Non-conventional pollutants present in this reverse osmosis system were identified by reviewing data from the priority pollutant scans that were conducted in support of the 2015 permit reapplication and from monitoring data submitted during the review period. The pollutants evaluated include cadmium, copper, lead, nickel, zinc, arsenic, nitrite/nitrate, total Kjeldahl nitrogen, ammonia-nitrogen, total dissolved solids, and bis (2-ethylhexyl) phthalate.

1. Total Residual Chlorine (TRC)

Periodically, liquid chlorine may be used as a cleaning solution for the membranes of the RO system. Chlorine compounds produced by the chlorination of wastewater can be extremely toxic to aquatic life. Liquid chlorine or cleaning solutions that contain chlorine shall be neutralized and dechlorinated prior to final discharge. The concentration of residual chlorine in the final effluent is expected to be minimal.

In the 2008 permit, monthly average and daily maximum TRC limits were established based on the acute and chronic marine criteria of 13 ug/l and 7.5 ug/l, respectively, without applying the dilution factor. During the review period, the facility discharged during 19 months and both the monthly average and daily maximum limits were exceeded in 8 of those months (42%).

The draft permit includes TRC limits calculated as the criteria times the dilution factor (9.36). Hence, the monthly average limit is 70.2 ug/l (7.5 x 9.36) and the daily maximum limit is 121.7 ug/l (13 x 9.36). These limits are less stringent than in the 2008 permit based on anti-backsliding exception found at CWA 402(o)(2)(B)(ii). The technical mistake made in the 2008 permit was neglecting to apply a dilution factor. Applying the updated dilution factor to the derivation of the chlorine limits in this draft permit corrects that mistake. It is expected that the permittee is able to comply with these revised effluent limits now that it has experience with this treatment system and can schedule the dosages and rates of dechlorination chemicals adequately.

2. Metals

Dissolved fractions of certain metals in water can be toxic to aquatic life. Therefore, there is a need to limit toxic metal concentrations in the effluent where aquatic life may be impacted. An evaluation of the concentration of metals in the facility's effluent was used to determine whether there is a reasonable potential for effluent discharges to cause or contribute to exceedances of the water quality criteria for aluminum, cadmium, copper, lead, nickel and zinc. For this analysis, sampling data within the draft permit review period was taken from DMRs and from Whole Effluent Toxicity (WET) test reports (see Attachment B).

Metals may be present in both dissolved and particulate forms in the water column with extensive studies suggesting that it is the dissolved fraction that is biologically available and therefore presents the greatest risk of toxicity to aquatic life inhabiting the water column. This conclusion is widely accepted by the scientific community both within and outside of EPA, and as a result, water quality criteria are established in terms of dissolved metals. *See* Water Quality Standards Handbook: Second Edition, Chapter 3.6 and Appendix J, EPA 1994 [EPA 823-B-94-05a], updated March 2012 [EPA 823-B-12-002], at http://water.epa.gov/scitech/swguidance/standards/handbook/chapter03.cfm
However, many inorganic components of wastewater, including metals, are in the particulate form, and differences in the chemical composition between the effluent and the receiving water affect the partitioning of metals. As the effluent mixes with the receiving water, the partitioning between the particulate and dissolved fractions often results in a transition from the particulate to dissolved form. *See The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion*, EPA 1996 (EPA-823-B96-007). Consequently, quantifying only the dissolved fraction of metals in the effluent prior to discharge may not accurately reflect the biologically available portion of metals in the receiving water. Regulations at 40 CFR 122.45(c) require, with limited exceptions, that metals limits in NPDES permits be expressed as total recoverable metals. The following table presents the acute and chronic total recoverable criteria for each metal. Note that based on BPJ, EPA has determined that the permittee does not have reasonable potential to violate the chronic criteria presented below due to the intermittent discharge requirement discussed above and as described in footnote 3 of the draft permit.

Metal	Dissolved Criteria		Conversion Factor (CF)	Total Recoverable Criteria	
	Acute (CMC) (ug/L)	Chronic (CCC) (ug/L)	Dissolved Criteria / CF = Total Rec. Criteria	Acute (CMC) (ug/L)	Chronic (CCC) (ug/L)
Cadmium	40.0	8.8	0.994	40.2	8.9
Copper	4.8	3.1	0.830	5.8	3.7
Lead	210.0	8.1	0.951	220.8	8.5
Nickel	74.0	8.2	0.990	74.7	8.3
Zinc	90.0	81.0	0.946	95.1	85.6

In order to determine whether the effluent has the reasonable potential to cause or contribute to an exceedance above the in-stream water quality criteria for each metal, the maximum (or 95th percentile[3]) effluent value is divided by the dilution factor and compared to the criteria above. For copper and lead, the permittee submitted monthly monitoring data during the review period. For cadmium, nickel and zinc, the permittee submitted data in quarterly WET tests. All metals data is shown in Attachment B. The expected in-stream concentration of all five (5) metals is summarized in the table below.

[3] For metals with sample sizes less than 10 (cadmium, nickel, and zinc), the maximum reported effluent value is used. For metals with sample sizes of 10 or greater (copper and lead), the 95th percentile of the effluent data is calculated and used. See Attachment C for details of the statistical approach to determine the 95th percentile.

Metal	Maximum Effluent Conc.	95th Percentile Effluent Conc.	Dilution Factor	Projected In-Stream Conc.
	ug/l	ug/l	--	ug/l
Cadmium	0	--	9.36	0.0
Copper	--	112.8	9.36	12.1
Lead	--	8.4	9.36	0.90
Nickel	3	--	9.36	0.32
Zinc	90	--	9.36	9.62

By comparing the projected in-stream concentration with the relevant total recoverable criteria, there is not a reasonable potential that the discharge of cadmium, lead, nickel or zinc will cause or contribute to an exceedance of the applicable water quality criteria. However, the copper data indicate that there is reasonable potential to exceed the acute criterion. Due to the intermittent discharge as discussed above, EPA has determined that there is no reasonable potential to exceed the chronic criterion. Hence, EPA has established a maximum daily limit for copper in the draft permit. This limit is calculated as the water quality criteria times the dilution factor, resulting in 54.3 ug/l (5.8 ug/l x 9.36). Monitoring and reporting for all metals will continue to be required as part of the quarterly WET tests (see section IV.J below).

Additionally, arsenic was monitored monthly during the review period. The 99th percentile of the arsenic data is 338.1 ug/l. Dividing this by the dilution factor of 9.36 results in 36.1 ug/l. The marine acute criterion for arsenic in EPA's *National Recommended Water Quality Criteria: 2002* is 69 ug/l. By comparing the 99th percentile concentration to the acute criterion, it is clear that the facility does not have reasonable potential to exceed the water quality criteria at the edge of the mixing zone. Hence, the draft permit does not require an arsenic limit and the monitoring requirement has been removed. Note that the chronic criterion was not considered here based on the intermittent discharge, as described above.

3. Nitrogen

Nitrogen was monitored during the review period in the forms of Total Kjeldahl Nitrogen (TKN), nitrate plus nitrite and ammonia (See Attachment B). Since total nitrogen can be calculated as the sum of TKN and nitrate plus nitrite, the average monthly total nitrogen discharge can be calculated for each month during the review period. The average of the total nitrogen monthly averages is 5.5 mg/l. Since Narragansett Bay is downstream of the discharge and suffers from nutrient impairments, a monitoring requirement for total nitrogen will remain in the permit. This monitoring is in terms of loading (lb/d) instead of concentration (mg/l) because the impact to Narragansett Bay further downstream is the result of cumulative loadings from many nitrogen sources in the watershed. EPA notes that the Swansea desalination facility is not a source of additional nitrogen to the watershed and only discharges nitrogen which it has withdrawn from the receiving water.

Additionally, the monthly average ammonia discharge during the review period was 0.13 mg/l

with a daily maximum of 0.41 mg/l in April 2014. Assuming relative worst case ambient conditions of 25°C water temperature, 8.0 pH, and 10 g/kg salinity, the saltwater ammonia criteria would be 0.69 mg/l (chronic) and 4.6 mg/l (acute). Based upon this comparison, EPA has determined that the levels of ammonia in the discharge do not have the reasonable potential to cause or contribute to a violation of water quality standards. However, due to concerns regarding coastal water quality impairments from excess nitrogen, the monitoring requirements for ammonia, TKN, and nitrate + nitrite will remain. After three years from the date of issuance, the permittee may request a review of the data for consideration to reduce or suspend this monitoring requirement.

4. Total Dissolved Solids (TDS)

Monitoring for total dissolved solids (TDS) was required in the 2008 permit for both the intake and the effluent. During the review period, average monthly TDS in the intake ranged from 700 mg/l to 13,950 mg/l. Average monthly TDS in the effluent ranged from 3,670 mg/l to 36,200 mg/l. As noted above, the primary ecological concern as a result of the concentrated discharge of brine is the salinity change in the receiving water and its effect on the native habitat. In the draft permit, the impact of this brine is restricted through the limitation of salinity as described above. Hence, EPA has determined that monitoring requirements for TDS are unnecessary to determine the impact on the receiving water. The monitoring requirement for TDS in the intake and the effluent have been removed in the draft permit.

5. Bis (2-ethylhexyl) phthalate

The priority pollutant scan conducted as part of the 2015 permit reapplication process detected bis (2-ethylhexyl) phthalate (DEHP) in the discharge with an average concentration of 25.1 ug/l and a maximum of 56.0 ug/l (out of 3 samples). DEHP is the most common member of the class of phthalates which are used as plasticizers. Due to its suitable properties and low cost, DEHP is widely used as a plasticizer in manufacturing articles made of PVC. DEHP is a "probable human carcinogen"[4] and is listed in EPA's 2015 National Recommended Human Health Criteria with ambient water quality criteria of 0.32 ug/l (consumption of water + organism) and 0.37 ug/l (consumption of organism only).

Based on these limited data, it is unclear whether DEHP is being leached from the facility's PVC piping (or some other source within the facility) or if DEHP is present in the intake and passes through the facility to the effluent, or both. In order to gather sufficient data on the presence of DEHP in the intake and the discharge, the draft permit requires quarterly monitoring for DEHP at both the intake and effluent sampling locations. If the results of the first year of sampling (4 samples) indicate that DEHP is not detected, the permittee may send a written request to EPA that this monitoring requirement be terminated. In such a case, the permittee must continue to conduct quarterly monitoring until receiving written authorization from EPA to suspend DEHP monitoring. Should it be determined that the permittee is contributing to elevated levels of DEHP in the discharge, EPA may establish an effluent limitation for DEHP in a future permitting action.

---

[4] See page 12 of EPA's June 2015 *Update of Human Health Ambient Water Quality Criteria: Bis(2-ethylhexyl) Phthalate 117-81-7* found at http://water.epa.gov/scitech/swguidance/standards/criteria/current/upload/Update-of-Human-Health-Ambient-Water-Quality-Criteria-Bis-2-ethylhexyl-Phthalate.pdf

J. Whole Effluent Toxicity

Under Section 301(b)(1) of the CWA, discharges are subject to effluent limitations based on water quality standards. The Massachusetts Surface Water Quality Standards [314 CMR 4.05(5)(e)], include the following narrative statements and require that EPA criteria established pursuant to Section 304(a)(l) of the CWA be used as guidance for interpretation of the following narrative criteria:

> "*All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife. Where the State determines that a specific pollutant not otherwise listed in 314 CMR 4.00 could reasonably be expected to adversely affect existing or designated uses, the State shall use the recommended limit published by EPA pursuant to 33 U.S.C. 1251 §304(a) as the allowable receiving water concentrations for the affected waters unless a site-specific limit is established. Site specific limits, human health risk levels and permit limits will be established in accordance with 314 CMR 4.05(5)(e)(1)(2)(3)(4).*"

Based on the potential for toxicity resulting from the wastewater, and in accordance with EPA regulations and policy, the draft permit includes chronic and acute toxicity limitations and monitoring requirements. (See, e.g. Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants", 50FR30784 (July 25, 1985); see also EPA Technical Support Document for Water Quality-Based Toxics Control," (EPA/505/2-90-001, September 1991).

The principal advantages of biological techniques are: (1) the effects of complex discharges of many known and unknown constituents can be measured only by biological analysis; and (2) bioavailability of pollutants after discharge is measured by toxicity testing including any synergistic effect of pollutants. The 2008 permit required that the permittee conduct chronic and acute WET testing on Outfall 001 effluent four times per year. Each test included the sea urchin *Arbacia punctulata*, the inland silverside *Menidia beryllina*, and the mysid shrimp, *Mysidopsis bahia* in accordance with EPA Region I protocol. On August 14, 2014, the permittee requested that the required testing be reduced to one species based on consistent compliance with the WET limitations. On August 21, 2014, EPA granted this request and reduced the required test species to only the inland silverside *Menidia beryllina*. The limits established for each of these toxicity tests was a minimum LC50 of 100% for the acute test and 77% C-NOEC for the chronic test. During the review period, the permittee has consistently complied with these WET test limits (no permit violations), as shown in Attachement B.

As described in Section F above, the dilution factor used in the 2008 permit was determined to be inaccurate and a revised dilution factor of 9.36 is used in this permit reissuance. Therefore, the chronic toxicity C-NOEC limit was recalculated to be 11% (1 / 9.36), which is applied in the draft permit. This less stringent limit is in accordance with anti-backsliding exception found at CWA 402(o)(2)(B)(ii). The technical mistake made in the 2008 permit was using an erroneous dilution factor.

The permittee must perform both acute and chronic toxicity tests once per quarter on the inland silverside *Menidia beryllina* in accordance with EPA Region I acute and chronic protocols found in Attachments A and B of the draft permit, respectively.

V. Anti-degradation

Federal regulations found at 40 CFR Section 131.12 require states to develop and adopt a statewide antidegradation policy which maintains and protects existing instream water uses and the level of water quality necessary to protect the existing uses, and maintains the quality of waters which exceed levels necessary to support propagation of fish, shellfish, and wildlife and to support recreation in and on the water. The Massachusetts Antidegradation Regulations are found at 314 CMR 4.04

This draft permit is being reissued with an allowable waste-load identical to, or more stringent than, the current permit and there has been no change in outfall location. Since there are no new or increased discharges being proposed with this permit reissuance the MassDEP is not required to conduct an antidegredation review regarding this permit reissuance.

VI. Anti-backsliding

A permit may not be renewed, reissued or modified with less stringent limitations or conditions than those contained in the previous permit unless in compliance with the anti-backsliding requirements of the CWA [see Sections 402(o) and 303(d)(4) of the CWA and 40 CFR §122.44(l)(1 and 2)]. EPA's anti-backsliding provisions prohibit the relaxation of permit limits, standards, and conditions except under certain circumstances. Effluent limits based on BPJ, water quality, and state certification requirements must also meet the anti-backsliding provisions found at Section 402(o) and 303(d)(4) of the CWA. TRC and DO limits are less stringent than in the 2008 permit, based on anti-backsliding exceptions discussed in the respective sections above. Since all other proposed permit limitations are at least as stringent as those of the 2008 permit, the anti-backsliding provisions for this permit reissuance are being met.

VII. Essential Fish Habitat

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C.§ 1801 et seq. (1998)), EPA is required to consult with National Marine Fisheries Service (NMFS) if EPA's action or proposed actions that it funds, permits, or undertakes, "may adversely impact any essential fish habitat." 16 U.S.C.§ 1855(b). The Amendments broadly define "essential fish habitat" (EFH) as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. U.S.C.§ 1802(10). Adverse impact means any impact, which reduces the quality and/or quantity of EFH. 50 CFR§ 600.910(a). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

Essential fish habitat is only designated for species for which federal fisheries management plans exist. 16 U.S.C.§ 1855(b)(1)(A). The U.S. Department of Commerce approved EFH

designations[5] for New England on March 3, 1999.

Description of Proposed Action

The facility is designed to withdraw approximately 4.92 million gallons per day (MGD) of raw water from the Palmer River to supply an average of 2.18 MGD of potable water to local communities. The remaining water is discharged as treated effluent to Outfall 001 as described in Section I and shown in Figure 1 above.

Analysis of Effects

This permit regulates the discharge of pollutants associated with the plant's operation. Several pollutants may be present in the effluent that could adversely affect aquatic organisms if discharged at elevated concentrations. The salt waste that results from the reverse osmosis (RO) filtration process could form a high salinity plume relative to ambient conditions if discharged at high concentrations. This could possibly impede the movement of fish species and other aquatic organisms that typically pass through the vicinity of the discharge, or otherwise create intolerable habitat conditions. In addition to salt, other pollutants contained in the raw river water may remain in the brine concentrate, and represent potential sources of toxicity to aquatic organisms. Finally, chlorination of the potable water system is routinely performed and could result in the discharge of residual chlorine and chlorination byproducts which can be toxic to aquatic organisms.

Salinity

Water will be withdrawn during tidal stages when the salinity is comparatively low. Conversely, the brine concentrate will be discharged during tidal stages of higher salinity. This permit requires that the salinity of the effluent be no greater than 32 ppt. This is not expected to adversely affect aquatic organisms, including EFH species.

Non-conventional Pollutants

The draft permit contains limits for total recoverable copper and requires that the effluent be monitored for certain pollutants that could cause toxicity to aquatic organisms. These monitoring requirements include ammonia and bis (2-ethylhexyl) phthalate. If effluent monitoring detects these pollutants at concentrations which have a reasonable potential to cause or contribute to a violation of state water quality standards, then EPA can modify this permit to include numeric limits for those pollutants.

Chlorination

There is a potential for this facility to discharge chlorine at levels that exceed state water quality criteria. Therefore, effluent chlorine limits based on water quality criteria for marine water have been included in this permit.

WET

In addition to the required monitoring of these specific pollutant parameters of concern, testing for chronic and acute whole effluent toxicity (WET) is required quarterly to ensure the aggregate of known and unknown pollutants in the effluent are not toxic to aquatic organisms. EPA-Region 1 routinely requires WET testing for facilities that discharge to surface waters.

---

[5] http://www.greateratlantic.fisheries.noaa.gov/habitat/efh/efhoverview.html

Conclusion

The EPA believes that the effluent limitations, conditions, and monitoring requirements contained in the proposed permit are protective of state water quality standards and minimize impacts to aquatic organisms, including EFH species, as well as their habitat. In addition to this NPDES permit's requirements, design and operational requirements for the facility's raw water intake structure have been established in a state-issued Water Management Act (WMA) permit. These requirements are intended to minimize entrainment and impingement impacts on early life stages of aquatic organisms associated with water withdrawal.

Mitigation

This NPDES permit should sufficiently minimize impacts to EFH from the discharge of pollutants such that additional mitigation is not warranted. If adverse impacts to EFH species or their habitats do occur either as a result of non-compliance, or from unanticipated effects from this activity, the permit may be modified. Additionally, if such an incident occurs, or if new information becomes available that changes the basis for our determination, then consultation with NMFS will be initiated.

VIII. Endangered Species

Section 7(a) of the Endangered Species Act of 1973, as amended, 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 or Commerce, 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 fresh water species, and the National Marine Fisheries Services (NMFS) administers Section 7 consultations for marine species and anadromous fish.

Based on EPA's review of available data, there are no federally-listed species known to inhabit this area of the Palmer River. During the public comment period, EPA has provided a copy of the draft permit and fact sheet to both NMFS and USFWS.

IX. 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 requires the permittee to continue to electronically report monitoring results obtained during each calendar month as Discharge Monitoring Report (DMRs) to EPA and the state using NetDMR no later than the 15th day of the month following the completed reporting period.

NetDMR is a national web-based tool for regulated CWA permittees to submit 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 can be found on the EPA Region 1 NetDMR website located at http://www.epa.gov/region1/npdes/netdmr/index.html.

In most cases, reports required under the permit shall be submitted to EPA as an electronic attachment through NetDMR. Certain exceptions are provided in the permit such as for providing written notifications required under the Part II Standard Permit Conditions. With the use of NetDMR to report DMRs and reports, the permittee is no longer be required to submit hard copies of DMRs or other reports to EPA and is 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. State reporting requirements are further explained in the draft permit.

X. State Certification Requirements

EPA may not issue a permit unless MassDEP with jurisdiction over the receiving waters certifies that the effluent limitations contained in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate MA SWQS or it is deemed that this certification is waived. The staff of MassDEP have reviewed the draft permit. EPA has requested permit certification by the state pursuant to 40 CFR § 124.53 and expects that the draft permit will be certified.

EPA anticipates that MassDEP's certification statement will include a requirement for the permittee to conduct an annual Biological and Hydrological Monitoring Plan as approved by MassDEP. Section I.E.4 of the draft permit reflects this anticipated requirement.

XI. Public Comment Period, Public Hearing, 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 a supporting material for their arguments in full by the close of the public comment period, to Michael Cobb, 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 to EPA and MassDEP for a public hearing to consider the draft permit. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the 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 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.

XII. EPA and MassDEP Contacts

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:

Michael Cobb
Municipal Permits Branch
U.S. Environmental Protection Agency
5 Post Office Square, Suite 100 (OEP 06-1)
Boston, MA 02109-3912
Telephone: (617) 918-1369
E-Mail: cobb.michael@epa.gov

Cathy Vakalopoulos
MA Department of Environmental Protection
Bureau of Water Resources
1 Winter Street
Boston, MA 02108
Telephone: (617) 348-4026
E-Mail catherine.vakalopoulos@state.ma.us

8/8/2016

Date

Ken Moraff, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency
Boston, MA

Attachment A – Map of Facility, Receiving Water and Outfall

(Aerial view obtained from maps.google.com)

Attachment B – Discharge Monitoring Report Summary

No Data Indicator Code "C" indicates the facility had no discharge during that monitoring period.
Bold, red text indicates a permit violation.

Effluent from Outfall 001

Monitoring Period End Date	Arsenic		Chloride		TRC		Copper	
	Mon, MG/L	Mon, MG/L	Mon, MG/L	Mon, MG/L	7.5, UG/L	13, UG/L	Mon, MG/L	Mon, MG/L
	MO AVG	DAILY MX	MO AVG	DAILY MX	MO AVG	DAILY MX	MO AVG	DAILY MX
7/31/13	0.005	0.005	2730	4400	**25**	**50**	0.09	0.09
8/31/13	0.049	0.049	14050	16200	**17.5**	**20**	0.09	0.09
9/30/13	0.069	0.069	15800	15800	5	10	0.075	0.075
10/31/13	C	C	C	C	C	C	C	C
11/30/13	C	C	C	C	C	C	C	C
12/31/13	0.0	0.0	9235	10600	3.3	10	0.0	0.0
1/31/14	C	C	C	C	C	C	C	C
2/28/14	C	C	C	C	C	C	C	C
3/31/14	0.018	0.018	4340	4340	5	10	0.02	0.02
4/30/14	0.005	0.005	1945	2930	5.7	10	0.014	0.014
5/31/14	0.022	0.022	4965	6860	7.3	10	0.005	0.005
6/30/14	0.056	0.056	9303	15900	**13.8**	**50**	0.015	0.015
7/31/14	0.034	0.034	15092	19600	**21.5**	**70**	0.084	0.084
8/31/14	0.049	0.049	16066	16200	**33.8**	**60**	0.092	0.092
9/30/14	0.044	0.044	17800	18000	**42.2**	**60**	0.005	0.005
10/31/14	0.005	0.005	16363.33	21600	**15.8**	**40**	0.08	0.08
11/30/14	C	C	C	C	C	C	C	C
12/31/14	0.005	0.005	13900	13900	6	10	0.008	0.008
1/31/15	C	C	C	C	C	C	C	C
2/28/15	C	C	C	C	C	C	C	C
3/31/15	C	C	C	C	C	C	C	C
4/30/15	C	C	C	C	C	C	C	C
5/31/15	C	C	C	C	C	C	C	C
6/30/15	0.005	0.005	19420	37600	**8.3**	**20**	0.013	0.013

Monitoring Period End Date	Arsenic		Chloride		TRC		Copper	
	Mon, MG/L	Mon, MG/L	Mon, MG/L	Mon, MG/L	7.5, UG/L	13, UG/L	Mon, MG/L	Mon, MG/L
	MO AVG	DAILY MX	MO AVG	DAILY MX	MO AVG	DAILY MX	MO AVG	DAILY MX
7/31/15	0.065	0.065	12474	16700	3.4	20	0.005	0.005
8/31/15	0.084	0.084	16875	21100	2.8	10	0.05	0.05
9/30/15	0.093	0.093	21000	21000	0	0	0.03	0.03
10/31/15	C	C	C	C	C	C	C	C
11/30/15	C	C	C	C	C	C	C	C
12/31/15	C	C	C	C	C	C	C	C
1/31/16	0.046	0.046	10497	12500	2.7	10	0.003	0.003
2/29/16	0.058	0.058	5407.5	9620	3.3	10	0.003	0.003
3/31/16	C	C	C	C	C	C	C	C
4/30/16	C	C	C	C	C	C	C	C
Maximum	0.093	0.093	21000	37600	42.2	70.0	0.092	0.092
Minimum	--	--	--	--	--	--	--	--
Average	0.0375	0.0375	11961	14992	11.7	25.3	0.036	0.036

Monitoring Period End Date	Flow		Lead		Nitrite plus nitrate		TKN	
	2.71, MGD	Mon, MGD	Mon, MG/L	Mon, MG/L	Mon, MG/L	Mon, MG/L	Mon, MG/L	Mon, MG/L
	MO AVG	DAILY MX	MO AVG	DAILY MX	MO AVG	DAILY MX	MO AVG	DAILY MX
7/31/13	0.441	0.9642	0.001	0.001	3.96	3.96	0.53	0.53
8/31/13	0.13952	0.288	0.001	0.001	0.26	0.26	0.5	0.5
9/30/13	0.112475	0.39	0.002	0.002	0.59	0.59	0	0
10/31/13	C	C	C	C	C	C	C	C
11/30/13	C	C	C	C	C	C	C	C
12/31/13	0.358311	0.6722	0.001	0.001	0.0	0.0	0.0	0.0
1/31/14	C	C	C	C	C	C	C	C
2/28/14	C	C	C	C	C	C	C	C
3/31/14	0.22888	0.3542	0.001	0.001	0.53	0.53	1.19	1.19
4/30/14	0.279	0.6468	0.001	0.001	0.75	0.75	1.11	1.11
5/31/14	0.199059	0.8147	0.002	0.002	0.63	0.63	0.5	0.5

Monitoring Period End Date	Flow		Lead		Nitrite plus nitrate		TKN	
	2.71, MGD	Mon, MGD	Mon, MG/L	Mon, MG/L	Mon, MG/L	Mon, MG/L	Mon, MG/L	Mon, MG/L
	MO AVG	DAILY MX	MO AVG	DAILY MX	MO AVG	DAILY MX	MO AVG	DAILY MX
6/30/14	0.430396	0.8676	0.001	0.001	0.25	0.25	0.5	0.5
7/31/14	0.6285	1.3356	0.001	0.001	6.52	6.52	0.5	0.5
8/31/14	0.587556	2.0546	0.001	0.001	1	1	0.5	0.5
9/30/14	0.18732	0.4514	0.005	0.005	5	5	0.5	0.5
10/31/14	0.142273	0.5314	0.001	0.001	5	5	0.5	0.5
11/30/14	C	C	C	C	C	C	C	C
12/31/14	0.32292	0.9248	0.016	0.016	5	5	0.5	0.5
1/31/15	C	C	C	C	C	C	C	C
2/28/15	C	C	C	C	C	C	C	C
3/31/15	C	C	C	C	C	C	C	C
4/30/15	C	C	C	C	C	C	C	C
5/31/15	C	C	C	C	C	C	C	C
6/30/15	0.408167	0.7699	0.001	0.001	5	5	0.5	0.5
7/31/15	0.34391	0.7785	0.004	0.004	1.25	1.25	0.61	0.61
8/31/15	0.449607	0.9394	0.005	0.005	3.75	3.75	0.5	0.5
9/30/15	0.4939	0.5766	0.002	0.002	1	1	0.5	0.5
10/31/15	C	C	C	C	C	C	C	C
11/30/15	C	C	C	C	C	C	C	C
12/31/15	C	C	C	C	C	C	C	C
1/31/16	0.4931	0.9074	0.004	0.004	5	5	0.5	0.5
2/29/16	0.3994	1.2452	0.001	0.001	50	50	0.5	0.5
3/31/16	C	C	C	C	C	C	C	C
4/30/16	C	C	C	C	C	C	C	C
Maximum	0.6	2.1	0.016	0.016	50.0	50.0	1.2	1.2
Minimum	--	--	--	--	--	--	--	--
Average	0.350	0.816	0.0027	0.0027	5.0	5.0	0.5	0.5

Monitoring Period End Date	Ammonia		DO	Salinity	TDS		TSS			pH	
	Mon, MG/L	Mon, MG/L	6, MG/L	32000, MG/L	Mon, MG/L	Mon, MG/L	20, MG/L	30, MG/L	Mon, MG/L	6.5, SU	8.5, SU
	MO AVG	DAILY MX	MIN	MO AVG	MO AVG	DAILY MX	MO AVG	WKLY AVG	DAILY MX	MIN	MAX
7/31/13	0.135	0.15	7.89	19310	20500	20800	4	4	4	6.74	7.78
8/31/13	0.15	0.18	8.27	25890	26550	30600	4	4	4	7.37	7.76
9/30/13	0	0	9.18	22482	31000	31000	4	4	4	7.58	8.11
10/31/13	C	C	C	C	C	C	C	C	C	C	C
11/30/13	C	C	C	C	C	C	C	C	C	C	C
12/31/13	0.07	0.14	10.48	14771	18700	21200	4	4	7	6.98	7.75
1/31/14	C	C	C	C	C	C	C	C	C	C	C
2/28/14	C	C	C	C	C	C	C	C	C	C	C
3/31/14	0.12	0.12	10.32	7425	8130	8130	4	4	4	6.58	7.21
4/30/14	0.34	0.41	9.74	4032	3670	5600	4	4	4	6.68	7.38
5/31/14	0.29	0.34	9.15	8880	10045	14500	5	10	8.5	6.85	7.62
6/30/14	0.105	0.11	8.3	25996	27175	33000	4.18	4.25	4.5	7.26	7.96
7/31/14	0.1	0.1	7.96	29705	32340	41000	8.05	14.5	23	7.32	7.93
8/31/14	0.1	0.1	7.5	29197	31866	33400	4.6	7	7	6.85	7.78
9/30/14	0.14	0.14	8.26	**33758**	34450	35400	4.33	4.25	4.5	7.53	7.69
10/31/14	0.1	0.1	8.35	29738	32233.33	42500	4.6	5	6	7.56	7.83
11/30/14	C	C	C	C	C	C	C	C	C	C	C
12/31/14	0.1	0.1	9.64	18110	28200	28200	4	4	4	7.88	8.13
1/31/15	C	C	C	C	C	C	C	C	C	C	C
2/28/15	C	C	C	C	C	C	C	C	C	C	C
3/31/15	C	C	C	C	C	C	C	C	C	C	C
4/30/15	C	C	C	C	C	C	C	C	C	C	C
5/31/15	C	C	C	C	C	C	C	C	C	C	C
6/30/15	0.112	0.16	7.86	24257	26600	29500	4.45	8.9	7	7.16	8.06
7/31/15	0.108	0.14	7.33	21842	24042	32400	5.65	11.3	14.5	7.14	8.34
8/31/15	0.1	0.1	8.12	31903	32650	40000	4.375	8.75	5.5	7.31	8
9/30/15	0.1	0.1	8.32	**33713**	36200	36200	5	5	6	7.37	7.46
10/31/15	C	C	C	C	C	C	C	C	C	C	C

Monitoring Period End Date	Ammonia		DO	Salinity	TDS		TSS			pH	
	Mon, MG/L	Mon, MG/L	6, MG/L	32000, MG/L	Mon, MG/L	Mon, MG/L	20, MG/L	30, MG/L	Mon, MG/L	6.5, SU	8.5, SU
	MO AVG	DAILY MX	MIN	MO AVG	MO AVG	DAILY MX	MO AVG	WKLY AVG	DAILY MX	MIN	MAX
11/30/15	C	C	C	C	C	C	C	C	C	C	C
12/31/15	C	C	C	C	C	C	C	C	C	C	C
1/31/16	0.12	0.16	9.39	16930	21767	25000	7.75	15.5	26	6.85	8.16
2/29/16	0.1025	0.11	9.82	13389	11210	20600	4.625	9.25	6.5	6.63	7.79
3/31/16	C	C	C	C	C	C	C	C	C	C	C
4/30/16	C	C	C	C	C	C	C	C	C	C	C
Maximum	0.34	0.41	--	33758.0	36200.0	42500.0	8.1	15.5	26.0	--	8.3
Minimum	--	--	7.3	4032.0	3670.0	--	--	--	--	6.6	--
Average	0.13	0.15	8.7	21648.8	24069.9	27843.7	4.8	6.9	7.9	7.1	7.8

Intake

Monitoring Period End Date	DO	Salinity	TSS	TDS	
	Mon, MG/L	Mon, MG/L	Mon, MG/L	Mon, MG/L	Mon, MG/L
	MINIMUM	MO AVG	MO AVG	MO AVG	DAILY MX
7/31/13	2.95	13440	7	1545	1910
8/31/13	3.99	18506	4	13695	24200
9/30/13	6.21	14966	48	700	700
10/31/13	C	C	C	C	C
11/30/13	C	C	C	C	C
12/31/13	9.21	8814	4	13950	14500
1/31/14	C	C	C	C	C
2/28/14	C	C	C	C	C
3/31/14	8.14	3214	14	3090	3090
4/30/14	7.68	4456	2.5	1320	1750
5/31/14	5.58	6590	10.2	1227	1840

Monitoring Period End Date	DO	Salinity	TSS	TDS	
	Mon, MG/L	Mon, MG/L	Mon, MG/L	Mon, MG/L	Mon, MG/L
	MINIMUM	MO AVG	MO AVG	MO AVG	DAILY MX
6/30/14	4.02	12717	9.4	2063	2500
7/31/14	4.25	17441	7.83	2158	2790
8/31/14	4.78	20791	6.2	1850	2250
9/30/14	6.3	26760	17.2	1285	1320
10/31/14	6.17	24247	11.1	2950	3790
11/30/14	C	C	C	C	C
12/31/14	8.55	12098	4	1680	1680
1/31/15	C	C	C	C	C
2/28/15	C	C	C	C	C
3/31/15	C	C	C	C	C
4/30/15	C	C	C	C	C
5/31/15	C	C	C	C	C
6/30/15	4.3	12421	7	1692	2430
7/31/15	4.07	10020	11.2	2242	3730
8/31/15	3.45	16750	11.75	1912.5	2480
9/30/15	5.2	28899	11.5	1960	1960
10/31/15	C	C	C	C	C
11/30/15	C	C	C	C	C
12/31/15	C	C	C	C	C
1/31/16	10.5	10144	11.2	2983	3240
2/29/16	8.6	9526	10.1	2637.5	3800
3/31/16	C	C	C	C	C
4/30/16	C	C	C	C	C
Maximum	--	28899	48.0	13950	24200
Minimum	2.95	--	--	700	--
Average	6.00	14305	11.0	3207	4208

WET Test Results

Monitoring Period End Date	LC50 Acute Menidia	NOEL 7Day Chronic Menidia	LC50 Acute Mysid. Bahia	NOEL 7Day Chronic Arbacia	Cadmium	Copper	Lead	Nickel	Zinc
	100, %	77, %	100, %	77, %	ug/l	ug/l	ug/l	ug/l	ug/l
	MIN	MIN	MIN	MIN	MAX	MAX	MAX	MAX	MAX
9/30/13	100	100	100	100	0	9	0	2	20
12/31/13	100	100	100	100	0	32	22	0	90
3/31/14	100	100	100	100	0	3	0	0	43
6/30/14	100	100	100	100	0	3	0	0	12
9/30/14	100	100	--	--	0	5	0	0	7
12/31/14	100	100	--	--	0	6	0	3	17
3/31/15	C	C	--	--	C	C	C	C	C
6/30/15	100	100	--	--	0	3	0.9	0	12
9/30/15	100	100	--	--	0	0	0	0	6
12/31/15	C	C	--	--	C	C	C	C	C
3/31/16	C	C	--	--	C	C	C	C	C
Minimum	100.00	100.00	100.00	100.00	0.0	32.0	22.0	3.0	90.0
Average	100.00	100.00	100.00	100.00	0.0	7.6	2.9	0.6	25.9

Influent to Sludge Drying Beds

Monitoring Period End Date	TSS				BOD5			
	Mon, LB/D	Mon, LB/D	Mon, MG/L	Mon, MG/L	Mon, LB/D	Mon, LB/D	Mon, MG/L	Mon, MG/L
	MO AVG	DAILY MX	MO AVG	DAILY MX	MO AVG	DAILY MX	MO AVG	DAILY MX
7/31/13	1333.0	1333.0	236	236	63.8	63.8	11.3	11.3
8/31/13	118.4	118.4	60	60	4.0	4.0	4.0	4.0
9/30/13	152.0	152.0	70	70	8.7	8.7	4.0	4.0
10/31/13	C	C	C	C	C	C	C	C
11/30/13	C	C	C	C	C	C	C	C
12/31/13	272.8	424.7	49	49	22.3	34.7	4.0	4.0
1/31/14	C	C	C	C	C	C	C	C
2/28/14	C	C	C	C	C	C	C	C
3/31/14	1023.8	1590.3	177	177	353.4	549.0	61.1	61.1
4/30/14	1917.6	1917.6	360	360	69.8	69.8	13.1	13.1
5/31/14	3327.6	8333.8	720	720	68.4	171.3	14.8	14.8
6/30/14	3729.4	6164.7	528	528	102.4	169.3	14.5	14.5
7/31/14	2766.3	6219.1	312	312	129.4	291.0	14.6	14.6
8/31/14	606.0	1620.4	80	80	30.3	81.0	4.0	4.0
9/30/14	3745.5	8360.2	1530	1530	75.2	167.8	30.7	30.7
10/31/14	519.3	1267.4	216	216	9.6	23.5	4.0	4.0
11/30/14	C	C	C	C	C	C	C	C
12/31/14	8046.2	20658.8	1440	1440	69.3	177.9	12.4	12.4
1/31/15	C	C	C	C	C	C	C	C
2/28/15	C	C	C	C	C	C	C	C
3/31/15	C	C	C	C	C	C	C	C
4/30/15	C	C	C	C	C	C	C	C
5/31/15	C	C	C	C	C	C	C	C
6/30/15	287.2	524.3	47.3	47.3	51.0	93.1	8.4	8.4
7/31/15	11047.3	18605.6	2020	2020	115.9	195.3	21.2	21.2
8/31/15	27.2	41.4	4	4	27.2	41.0	4	4
9/30/15	514.1	964.0	133	133	773.1	1449.7	200	200
10/31/15	C	C	C	C	C	C	C	C

Monitoring Period End Date	TSS				BOD5			
	Mon, LB/D	Mon, LB/D	Mon, MG/L	Mon, MG/L	Mon, LB/D	Mon, LB/D	Mon, MG/L	Mon, MG/L
	MO AVG	DAILY MX	MO AVG	DAILY MX	MO AVG	DAILY MX	MO AVG	DAILY MX
11/30/15	C	C	C	C	C	C	C	C
12/31/15	C	C	C	C	C	C	C	C
1/31/16	6449.0	7819.9	880	880	138.5	168.0	18.9	18.9
2/29/16	17134.1	23950.7	2640	2640	169.4	236.8	26.1	26.1
3/31/16	C	C	C	C	C	C	C	C
4/30/16	C	C	C	C	C	C	C	C
Maximum	17134.1	23950.7	2640.0	2640.0	773.1	1449.7	200.0	200.0
Minimum	--	--	--	--	--	--	--	--
Average	3316.7	5793.0	605.4	605.4	120.1	210.3	24.8	24.8

Effluent from Sludge Drying Beds (released at high tide)

Monitoring Period End Date	TSS				BOD5	
	Mon, LB/D	Mon, LB/D	Mon, MG/L	Mon, MG/L	Mon, MG/L	Mon, MG/L
	DAILY MX	MO AVG	MO AVG	DAILY MX	MO AVG	DAILY MX
7/31/13	22.1	22.1	6	6	<4.0	<4.0
8/31/13	4.0	4.0	4	4	<4.0	<4.0
9/30/13	6.1	6.1	6.5	6.5	<4.0	<4.0
10/31/13	C	C	C	C	C	C
11/30/13	C	C	C	C	C	C
12/31/13	36.4	19.4	6.5	6.5	<4.0	<4.0
1/31/14	C	C	C	C	C	C
2/28/14	C	C	C	C	C	C
3/31/14	34.0	21.9	11.5	11.5	8.2	8.2
4/30/14	11.6	11.6	5	5	<4.0	<4.0
5/31/14	98.5	24.1	14.5	14.5	<4.0	<4.0
6/30/14	97.7	48.4	13.5	13.5	<4.0	<4.0
7/31/14	66.8	31.4	6	6	<4.0	<4.0

Monitoring Period End Date	TSS				BOD5	
	Mon, LB/D	Mon, LB/D	Mon, MG/L	Mon, MG/L	Mon, MG/L	Mon, MG/L
	DAILY MX	MO AVG	MO AVG	DAILY MX	MO AVG	DAILY MX
8/31/14	68.5	19.6	4	4	<4.0	<4.0
9/30/14	15.1	6.2	4	4	<4.0	<4.0
10/31/14	17.7	4.7	4	4	<4.0	<4.0
11/30/14	C	C	C	C	C	C
12/31/14	30.8	10.8	4	4	<4.0	<4.0
1/31/15	C	C	C	C	C	C
2/28/15	C	C	C	C	C	C
3/31/15	C	C	C	C	C	C
4/30/15	C	C	C	C	C	C
5/31/15	C	C	C	C	C	C
6/30/15	61.0	32.3	9.5	9.5	<4.0	<4.0
7/31/15	38.9	17.2	6	6	<4.0	<4.0
8/31/15	35.3	16.9	4.5	4.5	<4.0	<4.0
9/30/15	62.5	53.5	13	13	4.4	4.4
10/31/15	C	C	C	C	C	C
11/30/15	C	C	C	C	C	C
12/31/15	C	C	C	C	C	C
1/31/16	30.3	16.4	4	4	<4.0	<4.0
2/29/16	425.8	136.6	41	41	26.4	26.4
3/31/16	C	C	C	C	C	C
4/30/16	C	C	C	C	C	C
Maximum	425.8	136.6	41.0	41.0	26.4	26.4
Minimum	--	--	--	--	--	--
Average	61.2	26.5	8.8	8.8	13.0	13.0

Attachment C – Statistical Approach for Metals Effluent Data (N ≥ 10)

EPA bases its determination of "reasonable potential" on a characterization of the upper bound of expected effluent concentrations based on a statistical analysis of the available monitoring data. As noted in the *Technical Support Document for Water Quality Based Toxics Control* (EPA 1991) ("TSD"), "[a]ll monitoring data, including results for concentrations of individual chemicals, have some degree of uncertainty associated with them. The more limited the amount of test data available, the larger the uncertainty." Thus with a limited data set, the maximum concentration that has been found in the samples may not reflect the full range of effluent concentration.

To account for this, EPA has developed a statistical approach to characterizing effluent variability when the monitoring dataset includes 10 or more samples.[6] As "experience has shown that daily pollutant discharges are generally lognormally distributed," *TSD* at App. E, EPA uses a lognormal distribution to model the shape of the observed data, unless analysis indicates a different distributional model provides a better fit to the data. The model parameters (mean and variance) are derived from the monitoring data. The model parameter μ is the mean of the natural logs of the monitoring data values, while σ is the standard deviation of the natural logs of the monitoring data values.

The lognormal distribution generally provides a good fit to environmental data because it is bounded on the lower end (i.e. you cannot have pollutant concentrations less than zero) and is positively skewed. It also has the practical benefit that if an original lognormal data set X is logarithmically transformed (i.e. Y = ln[X]) the resulting variable Y will be normally distributed. Then the upper percentile expected values of X can be calculated using the z-score of the standardized normal distribution (i.e. the normal distribution with mean = 0 and variance = 1), a common and relatively simple statistical calculation. The p^{th} percentile of X is estimated by

$$X_p = \exp(\mu_y + z_p \times \sigma_y),$$

where μ_y = mean of Y
σ_y = standard deviation of Y
Y = ln[X]
z_p = the z-score for percentile "p"

For the 95^{th} percentile, $z_{95} = 1.645$, so that

$$X_{95} = \exp(\mu_y + 1.645 \times \sigma_y)$$

The 95^{th} percentile value is used to determine whether a discharge has a reasonable potential to cause or contribute to an exceedance of a water quality standard. The combination of the upper bound effluent concentration with dilution in the receiving water is calculated to determine whether the water quality criteria will be exceeded.

Datasets including non-detect values

The *TSD* also includes a procedure for determine such percentiles when the dataset includes non-detect results, based on a delta-lognormal distribution. In the delta-lognormal procedures, nondetect values are weighted in proportion to their occurrence in the data. The values above the detection limit are assumed to be lognormally distributed values.

---

[6] A different statistical approach is applied where the monitoring data set includes less than 10 samples.

The statistical derivation of the delta-lognormal upper bounds is quite complex and is set forth in the TSD at Appendix E. Calculation of the 95th percentile of the distribution, however, involves a relatively straightforward adjustment of the equations given above for the lognormal distribution, as follows.

For the deltalognormal, the pth percentile of X, referred to here as X_p^*, is given by

$$X_p^* = \exp(\mu_y^* + z_p^* \times \sigma_y^*),$$

where μ_y^*= mean of Y values for data points above the detection limit;
σ_y^*= standard deviation of Y for data points above the detection limit;
$Y = \ln[X^*]$;
X^*= monitoring data above detection limit; and
z_p^* = an adjusted z score that is given by the equation:

$$z_p^* = \text{z-score}[(p - \delta)/(1 - \delta)]$$

where δ is the proportion of nondetects in the monitoring dataset.

k = total number of dataset
r = number of nondetect values in the dataset
$\delta = r/k$

For the 95th percentile, this takes the form of $z_p^* = \text{z-score}[(.95 - \delta)/(1 - \delta)]$. The resulting values of z_p^* for various values of δ is set forth in the table below; the calculation is easily performed in excel or other spreadsheet programs.

Example calculations of z_p^* for 95th percentile

δ	$(0.95 - \delta)/(1 - \delta)$	z_p^*
0	0.95	1.645
0.1	0.94	1.593
0.3	0.93	1.465
0.5	0.90	1.282
0.7	0.83	0.967

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
COMMONWEALTH OF MASSACHUSETTS
1 WINTER STREET
BOSTON, MASSACHUSETTS 02108

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY – REGION 1
OFFICE OF ECOSYSTEM PROTECTION
5 POST OFFICE SQUARE
BOSTON, MASSACHUSETTS 02109

JOINT PUBLIC NOTICE OF A DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE INTO WATERS OF THE UNITED STATES UNDER SECTIONS 301 AND 402 OF THE CLEAN WATER ACT, AS AMENDED, AND SECTIONS 27 AND 43 OF THE MASSACHUSETTS CLEAN WATERS ACT, AS AMENDED, AND REQUEST FOR STATE CERTIFICATION UNDER SECTION 401 OF THE CLEAN WATER ACT.

PUBLIC NOTICE PERIOD: August 17, 2016 – September 15, 2016

PERMIT NUMBER: **MA0103390**

PUBLIC NOTICE NUMBER: MA-016-16

NAME AND MAILING ADDRESS OF APPLICANT:

Robert A. Marquis, Superintendent
Swansea Water District Desalination Facility
700 Wilbur Avenue
Swansea, MA 02777

NAME AND ADDRESS OF THE FACILITY WHERE DISCHARGE OCCURS:

Swansea Water District Desalination Facility
240 Vinnicum Road
Swansea, MA 02777

RECEIVING WATER: Palmer River (Class SB)

The U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) have cooperated in the development of a draft permit for the Swansea Water District Desalination Facility, which discharges treated reverse osmosis brine concentrate and reject (backwash) from the three microfiltration systems, as well as treated strainer flushings and cleaning solutions. This facility does not produce or dispose of sewage sludge. The effluent limits and permit conditions imposed have been drafted to assure compliance with the Clean Water Act, 33 U.S.C. sections 1251 et seq., the Massachusetts Clean Waters Act, G.L. c. 21, §§ 26-53, 314 CMR 3.00, and State Surface Water Quality Standards at 314 CMR 4.00. EPA has requested that the State certify this draft permit pursuant to Section 401 of the Clean Water Act and expects that the draft permit will be certified.

INFORMATION ABOUT THE DRAFT PERMIT:

The draft permit and explanatory fact sheet may be obtained at no cost at http://www.epa.gov/region1/npdes/draft_permits_listing_ma.html or by contacting:

Michael Cobb
U.S. Environmental Protection Agency – Region 1
5 Post Office Square, Suite 100 (OEP06-1)
Boston, MA 02109-3912
Telephone: (617) 918-1369
Cobb.Michael@epa.gov

The administrative record containing all documents relating to this draft permit including all data submitted by the applicant may be inspected at the EPA Boston office mentioned above between 9:00 a.m. and 5:00 p.m., Monday through Friday, except holidays.

PUBLIC COMMENT AND REQUEST FOR PUBLIC HEARING:

All persons, including applicants, who believe any condition of this draft permit is inappropriate, must raise all issues and submit all available arguments and all supporting material for their arguments in full by **September 15, 2016**, to the address or email address listed above. Any person, prior to such date, may submit a request in writing to EPA and MassDEP for a public hearing to consider this draft permit. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on this draft permit, the Regional Administrator will respond to all significant comments and make the responses available to the public at EPA's Boston office.

FINAL PERMIT DECISION:

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

DAVID FERRIS, DIRECTOR
MASSACHUSETTS WASTEWATER
MANAGEMENT PROGRAM
MASSACHUSETTS DEPARTMENT OF
ENVIRONMENTAL PROTECTION

KEN MORAFF, DIRECTOR
OFFICE OF ECOSYSTEM PROTECTION
EPA-REGION 1