

**DRAFT 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),

Mirant Canal, LLC

is authorized to discharge from the facility located at:

**Mirant Canal Station
9 Freezer Road
Sandwich, Massachusetts 02563**

to receiving waters named the **Cape Cod Canal to Atlantic Ocean**

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

This permit shall become effective 60 days from the date of issuance.

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

This permit supersedes the permit issued on June 23, 1989.

This permit consists of: 19 pages of Part I including Sections A-C with Effluent Limitations, Monitoring Requirements, and State Permit Conditions and Part II Requirements containing General Conditions and Definitions.

Signed this day of , 2006

Linda M. Murphy, Director
Office of Ecosystem Protection
Environmental Protection Agency (EPA)
Environmental
Boston, MA

Glenn Haas, Director
Division of Watershed Management
Massachusetts Department of
Protection (MA DEP)
Boston, MA

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. The term "Regional Administrator" means the Regional Administrator of Region I of the U.S. Environmental Protection Agency (EPA) and the term "Commissioner" means the Commissioner of the Massachusetts Department of Environmental Protection (MA DEP) or their designees.

2. During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge from **outfall serial number: 001**: once through non-contact condenser cooling water, treated station effluent (internal outfalls 010, 011 and 012), and stormwater. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations			Monitoring Requirements	
	Average Monthly	Maximum Daily	Instantaneous Maximum	Measurement Frequency	Sample Type
Flow Rate (million gallons per day)	Report	518	---	Continuous	Recorder: Pump capacity curve and operational hours
Total Residual Oxidants (mg/l)	---	0.1	0.2 ¹	1 Sample every 30 minutes during chlorination	Grab
Whole Effluent Toxicity	Report	Report		Quarterly	24-Hour Composite
pH (standard units)	≥6.5 and ≤8.5 ²			Continuous	Recorder; report monthly range
Temperature (°F)	---	107	---	Continuous	Recorder
Temperature Rise (ΔT) ³	---	33	---	Continuous	Recorder

¹ A TRO limit of 0.2 mg/L shall not to be exceeded at any time (instantaneous maximum).

² pH shall not be more than 0.2 units outside the naturally occurring range.

³ ΔT equals the discharge temperature(°F) minus the inlet temperature (°F).

- a. Effluent samples shall be taken within the last 10 feet of the 750-foot open discharge flume prior to discharging through the diffuser to the Cape Cod Canal.
- b. Chlorination may be conducted for no more than two hours per day for each condenser unit and simultaneous multi-unit chlorination is permitted.
- c. The water temperature in the upper 15 ft of the water column above the discharge diffuser shall not exceed 86°F at any time. The permittee shall measure and record the temperature of the water 15 feet below the water surface, directly above the discharge diffuser, during slack tide, once per week and during the generation of electricity, for the duration of the permit. This information shall be submitted to the EPA and MA DEP annually by January 31st. The information shall be reported in the annual Heat Load Report.
- d. The permittee shall use the procedures and protocols contained in Attachment A to this permit when conducting the WET testing. If there is any discharge of metal cleaning wastes during each sampling quarter, the WET samples shall be collected at times when metal cleaning waste is being discharged. The permittee is required to report the results of chronic (and modified acute) WET tests on a quarterly basis. Reports shall include documentation of waste streams discharged during sample collection. If after eight consecutive sampling periods (two years), no test shows a $LC_{50} < 100\%$ and a $C\text{-NOEC} < 20\%$, the permittee may request a reduction in toxicity testing. A variance from the above WET testing schedule may be allowed upon written approval by EPA with concurrence from MA DEP.

3. During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge from **outfall serial number: 002**: intake screen washwater and condenser cooling water. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Average Monthly	Maximum Daily	Measurement Frequency	Sample Type
Flow Rate (million gallons per day)	2.5	4.4	Continuous	Recorder: Pump capacity curve and operational hours
pH (standard units)	≥ 6.5 and $\leq 8.5^1$		Continuous	Recorder; report monthly range
Temperature (°F)	---	90	Continuous	Recorder
Temperature Rise (ΔT) ²	---	33	Continuous	Recorder

¹ pH shall not be more than 0.2 units outside the naturally occurring range.

² ΔT equals the discharge temperature(°F) minus the inlet temperature (°F).

- a. Temperature and pH shall be monitored at the Cape Cod Canal end of the outfall 002 discharge flume within 2 feet from the water surface.
- b. There shall be no condenser water discharge at this location during times the screen wash is in operation until upgrades are made to the fish return system as required by Part 1.A.13.e of this permit.
- c. There shall be no condenser water discharge at this location during the chlorination of any Unit condensers.

4. During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge from internal **outfall serial number: 010**: Unit 1 floor drains (*consisting of vacuum and pump seal water, fuel heater room discharges, and boiler leaks*) during emergencies only. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Average Monthly	Maximum Daily	Measurement Frequency	Sample Type
Flow Rate (million gallons per day)	0.072	0.144	Continuous when in use	Recorder: Pump capacity curve and operational hours
Total Suspended Solids (mg/l)	30	100	1X/Day	Composite
Oil and Grease (mg/l)	10.0	15.0	1X/Day	Grab

- a. The permittee shall notify EPA and MA DEP within 24 hours by telephone after initiating discharge from this location. A written confirmation report shall be provided within five business days.
- b. Effluent samples shall be taken from the discharge side of the oil/water separator prior to mixing with other streams and prior to discharging into the final effluent flume.

5. During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge from internal **outfall serial number: 011**: metal cleaning waste streams (*consisting of air preheater wash, boiler fireside wash, precipitator wash, boiler chemical cleaning, stack and breach wash, equipment cleaning and feedwater heater chemical cleaning, metal cleaning sludge dewatering filtrate*). Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Average Monthly	Maximum Daily	Measurement Frequency	Sample Type
Flow Rate (million gallons per day)	0.12	0.18	Continuous	Recorder: Pump capacity curve and operational hours
Total Copper (mg/l)	1.0	1.0	1X/Day	Composite
Total Iron (mg/l)	1.0	1.0	1X/Day	Composite
Total Suspended Solids (mg/l)	30	100	1X/Day	Composite
Oil and Grease (mg/l)	10.0	15.0	1X/Day	Grab

- a. Effluent samples shall be taken from the spigot on the discharge line of one of the two waste neutralization tanks prior to discharging into the final effluent flume for each day metal cleaning wastes are discharged.
- b. Low volume or fly ash wastewater shall not be combined with metal cleaning wastewater prior to discharge to the final effluent flume.
- c. The permittee shall submit an annual certification that all caustic used has no detectable levels of mercury.
- d. For each boiler chemical cleaning event, the composite sample shall also be analyzed for petroleum hydrocarbons and priority pollutant metals. Results of these analyses shall be submitted to the EPA with the appropriate monthly Discharge Monitoring Report (DMR). The mercury analysis shall be performed using EPA Method 1631.

6. During the period beginning on the effective date of the permit and lasting through expiration, the permittee is authorized to discharge from internal **outfall serial number 012**: ash sluice wastewater and low volume waste streams (*consisting of floor drains, water treatment wastes (demineralizer and condensate polisher), boiler blowdown, laboratory wastewater, and boiler seal water*). Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Average Monthly	Maximum Daily	Measurement Frequency	Sample Type
Flow Rate (million gallons per day)	0.3	0.5	Continuous	Recorder: Pump capacity curve and operational hours
Total Suspended Solids (mg/l)	30	100	1X/Week	Composite
Oil and Grease (mg/l)	15.0	15.0	1X/Week	Grab

- a. Effluent samples shall be taken from either the spigot on the discharge line of one of the two waste neutralization tanks or directly from one of the waste ponds, prior to discharging into the final effluent flume.

7. During the period beginning on the effective date and for at least three years, the permittee shall submit an annual **Heat Load Report** providing the following information for Units 1 and 2:

- a. Hourly average intake and discharge temperatures over the past year (January to December).
- b. Net heat load (in BTUs) each hour over the past year (January to December). Net heat load means the total actual waste heat to the Cape Cod Canal and shall be calculated as follows: $Q = C_p m (\Delta T)$

Where Q = Heat Load, BTU/Hour

C_p = Heat Capacity (Specific Heat) of pure water
= 1.0 BTU/pound $^{\circ}$ F

m = mass of water (discharged)

= flow rate x specific gravity of pure water

= flow rate, gallons per hour (gph) x 8.344 pounds/gallon

ΔT = discharge - intake temperature, $^{\circ}$ F

- c. Amount of water discharged each hour over the past year (January to December).
- d. This data shall be presented in electronic form, able to be read by a spreadsheet program such as Excel or Lotus 123, in tabular form for each Unit as demonstrated below:

Unit Number:

Date (MM/DD/YY HH:MM) ¹	Intake Temperature (°F)	Discharge Temperature ² (°F)	Hourly Heat Load (BTU)	Unit Discharge Flow (gph)
10/22/01 0:00				
10/22/01 1:00				
10/22/01 2:00				
↓				
10/22/01 23:00				

¹ Use of military format is recommended for documenting hours (0:00-23:00).

² Temperature shall be measured directly after each Unit condenser prior to mixing with any other stream.

- e. The annual Heat Load report shall be submitted by January 31st and shall contain all data outlined above from January through December of the previous year.
8. Reports Required Pursuant to 316(b) Phase II Regulations for Reducing Adverse Environmental Impacts From Impingement and Entrainment
- a. The permittee shall submit the **Proposal for Information Collection (PIC)** required by 40 C.F.R. §125.95(b)(1) as expeditiously as practicable and prior to the start of biological monitoring and/or information collection activities not otherwise required by this permit, but not later than October 7, 2006. The PIC shall include a description of the information that will be used to support the Comprehensive Demonstration Study (CDS). The permittee must submit its PIC to the Regional Administrator prior to starting information collection activities, but the permittee may initiate such activities prior to receiving comments on the PIC from EPA.
 - b. The permittee shall submit a **Comprehensive Demonstration Study (CDS)** pursuant to 40 C.F.R. § 125.95 as expeditiously as practicable, but not later than January 7, 2008. The purpose of the CDS is to characterize impingement mortality and entrainment by Mirant Canal's cooling water intake structures, to

describe the operation of the facility's cooling water intake structures, and to confirm that the technologies, operational measures, and/or restoration measures already installed, or that the permittee proposes to install, at the facility meet the applicable compliance requirements of 40 C.F.R. § 125.94.

- c. Consistent with 40 C.F.R. § 125.95(a)(2), the permittee shall also submit to the Regional Administrator by January 7, 2008, **the information required by 40 C.F.R. §§ 122.21(r)(2), (3) and (5)**, which includes:

- i. Source Water Physical Data
- ii. Cooling Water Intake Structure Data
- iii. Cooling Water System Data

9. Biological Monitoring - Sampling and Reporting Requirements

- a. During operation of Canal Station, the permittee shall conduct biological studies using methods described below. The permittee shall begin monitoring 30 days after the effective date of this permit.
- b. Ichthyoplankton (fish eggs and larvae): Occurrence and Abundance of Species
Entrained
 - i. Entrainment monitoring shall be conducted weekly during the months of March through August, and twice per month during September through February.
 - ii. Three entrainment samples shall be collected each sampling week (once on Monday morning at 8:00 am, once on Wednesday afternoon at 2:00 pm, and once on Friday night at 8:00 pm) for each separate cooling water intake structure. Both of the cooling water circulating pumps for each operating unit must be operated continuously during the sample period.
 - iii. Entrainment samples shall be collected from a representative location within the intake structure.
 - iv. Sampling shall be conducted using a 0.333-mm mesh, 60-cm diameter plankton net. Each sample shall represent approximately 100 m³ of water. Exact filtration volume shall be determined using a digital flow meter mounted in the mouth of the net and recorded for each event. After each sample, the nets shall be washed down and the sample transferred from the cod end to a jar containing sufficient formalin to produce a 5 to 10% solution.

- v. In the laboratory, all fish eggs and larvae shall be identified to the lowest practical taxa. Subsampling with a plankton splitter shall be used if the count of eggs and larvae in a sample is greater than 400 organisms so that a minimum of 200 eggs and larvae will be present in any subsample.
 - vi. Ichthyoplankton counts shall be converted to densities per 100 m³ based on the flow through the sampling net and the data shall be presented in the annual Biological Monitoring Report. Estimates of total numbers based on Station flow rates shall also be provided. Entrainment losses shall be converted from weekly estimates of density per unit volume, to monthly and yearly loss estimates based on design plant flow. In addition, loss estimates should be converted to adult equivalents for species in which regionally specific larval survival rates are available.
- c. Finfish: Occurrence and Abundance of Species Impinged
- i. Impingement monitoring shall be conducted weekly during the months of March through August, and twice per month during September through February. Sampling shall be completed on the same day as entrainment monitoring, if possible.
 - ii. Three impingement samples shall be collected each sampling week (once on Monday morning at 8:00 am, once on Wednesday afternoon at 2:00 pm, and once on Friday night at 8:00 pm) for each screen within the two separate cooling water intake structures. Sampling shall only be conducted for each intake structure when both pumps are operating continuously during the sampling period.
 - iii. Sampling shall be conducted using 3/8-inch (9.5 mm) stainless steel baskets placed in the screenwash return sluiceways. Each collection shall cover a period of at least two hours following an initial cleansing screenwash and the exact time period shall be recorded. The trash racks shall also be cleaned during each sampling period and its contents examined for any fish, mammals, reptiles or invertebrates.
 - iv. All fish will be immediately examined for initial condition (live, dead, injured). Any fish that is alive or injured at the time of collection shall be placed in a 20-gallon holding tank supplied with continuously running ambient seawater. Latent survival shall be determined after 48 hours.
 - v. All fish shall be identified, counted, and measured (to the nearest mm total length) and the data shall be presented in the annual Biological Monitoring Report. In large collections, 25 individuals per species will be

measured and the remainder counted. Twenty-four hour and monthly totals shall be extrapolated and reported.

- vi. Impingement estimation shall be conducted using the number of fish impinged in a 24 hour period. The number of fish by species shall be counted and based upon the sampling interval, a 24 hour estimate shall be calculated. Monthly totals shall be calculated from 24 hour estimates and annual impingement rates shall be extrapolated from monthly estimates.
- d. Within six weeks of effective date of this permit, the permittee shall inspect and remove sediment build-up on the face of the Unit 2 intake sill to return the sill to its original design capability. After this has been completed and for the duration of the permit, the permittee shall evaluate and report the number of impinged organisms for each individual intake structure separately.
- e. This biological monitoring shall be conducted for the duration of this permit unless authorization to discontinue or modify portions of the sampling program is granted by the Regional Administrator and the Commissioner.
- f. A **Biological Monitoring Report** shall be submitted annually by February 28th. Each annual report shall provide and summarize the previous year's information in narrative. The report shall also include graphical representations, where appropriate and all quality control procedures.
 - i. The annual report conclusions will indicate the trends of the various parameters analyzed and identify any anomalies that appear in the annual historical data comparison. These differences will be explained, if possible. The permittee will make recommendations for any remediation considered necessary or for any programs to better understand the anomaly.
 - ii. The annual report will provide the status of the present monitoring programs, the expected effort in the ensuing six months, and an alert to EPA and the State of any anomalies or patterns that may be evident in the data collection.
- g. The Station is required to submit a written explanation if any aspect of the biological monitoring program is not conducted. The report shall be submitted as part of the Discharge Monitoring Report for the month the sampling was not done. The explanation for not monitoring must include all specific sampling activities that did not take place, along with the justification for suspending the identified sampling. This information also must be included in the annual Biological Monitoring Report.

10. Within 30 days of the effective date of this permit, the permittee shall submit to EPA and MA DEP a copy of its **Marine Mammals Monitoring Program and Response Protocol**. The program shall include reporting requirements for any sightings of marine turtles and whales, seals or other marine mammals, in the vicinity of Mirant Canal Station and its cooling water intake structures.
 - a. The permittee shall implement the Marine Mammals Monitoring Program and Response Protocol for the duration of this permit.
 - b. All sightings of marine mammals in the vicinity of Mirant Canal Station and its cooling water intake structures shall be reported in the annual Biological Monitoring Report.

11. Discharge Related Mortality
 - a. The permittee shall visually inspect the shoreline areas adjacent to the discharge canal (Outfall 001) for any sign of environmental stress and/or fish mortality at least once per operating shift, for the duration of the permit. A fish shall be considered dead if it exhibits a loss of equilibrium.
 - b. In the event of fish mortalities in the discharge or thermal plume, the permittee will begin removing all dead fish from the receiving waters, or from the shoreline within four hours after the fish mortalities have been observed, while also complying with all the monitoring and reporting requirements in this permit.
 - c. If the permittee observes 25 or more dead fish within any 24 hour period, the permittee shall:
 - i. Report to the Regional Administrator and the Commissioner within 24 hours by telephone as required by Part II of this permit. A written confirmation report shall be provided within five business days. These oral and written reports shall include the following information:
 - (1) Characterization of fish killed: All dead fish shall be enumerated and recorded by species. Report the species, size ranges, and approximate number of organisms involved in the incident. In addition, from a representative sample of 25% of each fish species killed, up to a maximum of 25 total fish specimens from each species, shall be sampled as follows:
 - (a) Length: The dead fish shall be measured to the nearest centimeter total length.

(b) Scale samples: These shall be collected for the Massachusetts Division of Marine Fisheries (DMF). The scale samples shall be collected from the acceptable body locations for each individual species (as directed by the DMF). Sampled fish shall be appropriately preserved for future pathological examination as may be directed by the DMF.

- (2) The time and date of the occurrence.
 - (3) The operational mode of the specific facility system that was in operation that may have caused the occurrence.
 - (4) The opinion of the permittee as to the reason the incident occurred.
 - (5) The remedial action that the permittee recommends to reduce or eliminate this type of incident.
- ii. Immediately collect a water sample of the discharge to be analyzed for Total Residual Oxidants (TRO). Suspend all unit chlorination operations immediately after collection of water samples for TRO.
 - iii. Immediately initiate a separate hourly record showing: (1) the discharge temperature; (2) the dissolved oxygen levels at the intake structures and at the discharge; (3) the number of dead fish observed by species; and (4) the Total Residual Oxidants (TRO) level of the discharge. The record shall also contain as much of this data that is available from up to 24 hours prior to the event, in order to provide information as to the possible causes of the fish mortality event.
 - iv. If at the end of the 24 hour period from the initial observation, fish mortalities do not exceed 25 or more dead fish within any 24 hour period from the areas near the shoreline discharge locations, the permittee will cease special monitoring and return to normal station operation (including unit chlorination).

12. Unusual Impingement Event

- a. The permittee shall rotate and visually inspect the intake screens of the cooling water intake structures for Units 1 and 2 at least every eight hours that the unit circulation pumps are operated, for the duration of the permit.
- b. If the permittee observes on the cooling water intake screens, or estimates, based

on temporally-limited observations, 40 or more dead fish within any 8 hour period, the permittee shall:

- i. Initiate continuous screen washes until the impingement rate decreases to less than five fish per hour.
 - ii. Report to the Regional Administrator and the Commissioner within 24 hours by telephone as required by Part II of this permit. A written confirmation report shall be provided within five business days. These oral and written reports shall include the following information:
 - (1) All dead fish shall be enumerated and recorded by species. Report the species, size ranges, and approximate number of organisms involved in the incident. In addition, from a representative sample of 25% of each fish species killed, up to a maximum of 25 total fish specimens from each species, shall be measured to the nearest centimeter total length.
 - (2) The time and date of the occurrence.
 - (3) The operational mode of the specific system that may have caused the occurrence.
 - (4) The opinion of the permittee as to the reason the incident occurred.
 - (5) The remedial action that the permittee recommends to reduce or eliminate this type of incident.
13. Cooling Water Intake Structure Requirements to Minimize Adverse Impacts from Impingement and Entrainment
- a. The permittee shall maintain the Unit 2 intake sill as designed to minimize impingement by periodically removing sediment build-up. The date of each cleaning shall be included in the annual Biological Monitoring Report.
 - b. The permittee shall equip each of the existing screens with fish holding buckets to hold collected organisms in approximately 2 inches of water while they are lifted to the fish return system. This work shall be completed within 12 months of the effective date of this permit.
 - c. The permittee shall ensure that a low pressure (<30 psi) screen spray wash is in operation as part of each screenwash system in a manner such that organisms are not exposed to high pressure screen spray. The low pressure spray shall be

engineered to deliver aquatic organisms from the fish holding buckets to the return trough, with minimal stress. The installation shall be completed within 12 months of the effective date of this permit.

- d. The permittee shall relocate all cooling water chlorination injection points in a manner such that organisms are not exposed to chlorine prior to and during impingement on the intake screens. This work shall be completed within 12 months of the effective date of this permit.
- e. The permittee shall reconfigure the fish return system such that, once returned to the Cape Cod Canal, the fish are transported away from both intake structures based on the tidal flow in the Cape Cod Canal. The fish return trough shall be engineered to provide the return of aquatic organisms to the Cape Cod Canal always at sufficient depth for fish locomotion, with minimal stress, including during all periods of low tide level. There shall be no vertical drop of fish from the end of the fish return trough to the surface of the Cape Cod Canal. This work shall be completed within 18 months of the effective date of this permit.
- f. After completion of the reconfigured fish return system and for the duration of the permit, the permittee shall operate all screens continuously when the corresponding circulating water pumps are in operation.
- g. For the reduction of adverse impacts from entrainment, the permittee shall follow the procedures for developing, selecting, and implementing one of the five compliance alternatives, mandated by the Phase II Regulations at 40 C.F.R. § 125 Subpart J.
- h. Any change in the location, design or capacity of the present structures (excluding those required in Part I.A.13.b-e of this permit) shall be approved by the Regional Administrator and the Commissioner. The construction of these modifications shall be done in accordance with appropriate federal, state, and local regulation governing construction of waterways and banks.

14. Other Cooling Water Intake Structure Requirements

- a. No discharge shall occur from the heated backwash process that Canal Station performs for the removal of debris from the condenser tubes. A log shall be maintained that documents the times and duration of the heated backwash operation. Logs shall be kept on the property of the Station for at least five years and shall be made available upon request.
- b. All live fish, shellfish, and other aquatic organisms collected or trapped on the intake screens shall be returned to their natural habitat with minimal stress. All

other material, except natural debris (e.g. seaweed), shall be removed from the intake screens and disposed of in accordance with all existing federal, state, and/or local laws and regulations that apply to waste disposal. Such material shall not be returned to the receiving waters.

- c. A log shall be maintained that documents the times and duration of operation of the traveling screens for each unit. Logs shall be kept on the property of the Station for at least five years and shall be made available upon request.

15. Water Quality Requirements

- a. Discharges and water withdrawals shall not impair any Class SB use of the Cape Cod Canal and shall not violate any applicable narrative criteria from the state water quality standards, although discharges may exceed numeric temperature criteria included in state water quality standards to the extent that such discharges comply with temperature and flow limits specified herein pursuant to section 316(a) and 316(b) of the Clean Water Act.
- b. The thermal plumes from the station shall: (a) not block zones of fish passage, (b) not interfere with spawning of indigenous populations, (c) not change the balanced indigenous population of the receiving water, and (d) have minimal contact with surrounding shorelines.
- c. Pollutants which are not limited by the permit, but have been specifically disclosed in the last permit application, may be discharged at the frequency and level disclosed in the application, provided that such discharge does not violate sections 307 and 311 of the Act or applicable water quality standards.
- d. Discharges to the Cape Cod Canal shall be adequately treated to insure that the surface water remains free from pollutants in concentrations or combinations that settle to form harmful deposits, float as foam, debris, scum or other visible pollutants. They shall be adequately treated to insure that the surface waters remain free from pollutants which produce odor, color, taste, or turbidity in the receiving water which is not naturally occurring and would render it unsuitable for its designated uses.
- e. The effluent shall not contain metals and/or materials in concentrations or in combinations which are hazardous or toxic to aquatic life or which would impair the uses designated by the classification of the receiving waters.

16. Except as specified in Parts I.A.2 through I.A.6 herein the permittee shall not discharge to the Cape Cod Canal a final effluent to which it has added any pollutants.
- a. There shall be no discharge of polychlorinated biphenyl (PCB) compounds such as those commonly used for transformer fluid. The permittee shall dispose of all known PCB equipment, articles, and wastes in accordance with 40 CFR 761. The permittee shall submit to EPA and MA DEP a certification that this disposal has been accomplished within 30 days of such disposal.
 - b. Chlorine may be used as a biocide for Units 1 and 2. No other biocide shall be used without explicit approval from EPA and the Commissioner. Bromine may be used as a chlorine adjunct only upon approval of EPA and MA DEP.
 - c. The permittee may propose to conduct feasibility studies involving new chemicals not currently approved for water discharge. The permittee shall gain approval from the Regional Administrator and the Commissioner before any such studies take place. A report summarizing the results of any such studies shall be submitted to the Regional Administrator and the Commissioner regarding discharge frequency, concentration, and the impact, if any, on the indigenous populations of the receiving water. The Regional Administrator or the Commissioner may require, among other parameters, Whole Effluent Toxicity testing as part of feasibility studies.
 - d. The permittee shall comply with all existing federal, state, and local laws and regulations that apply to the reuse or disposal of solids, such as those periodically removed from the solids settling tanks. At no time shall these solids be discharged to the Cape Cod Canal.
 - e. All existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Regional Administrator as soon as they know or have reason to believe (40 CFR §122.42):
 - i. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
 - (1) One hundred micrograms per liter (100 ug/l);
 - (2) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR §122.21(g)(7); or

- (3) Any other notification level established by the Regional Administrator in accordance with 40 CFR §122.44(f) and Massachusetts regulations.
 - ii. That any activity has occurred or will occur which would result in the discharge, on a non-routine or infrequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
 - (1) Five hundred micrograms per liter (500 ug/l);
 - (2) One milligram per liter (1 mg/l) for antimony;
 - (3) Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR §122.21(g)(7); or
 - (4) Any other notification level established by the Regional Administrator in accordance with 40 CFR §122.44(f) and Massachusetts regulations.
17. This permit shall be modified, or alternatively, revoked and reissued to comply with any applicable standard or limitation promulgated or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
 - (1) contains different conditions or is otherwise more stringent than any effluent limitation in this permit; or
 - (2) controls any pollutant not limited by this permit.

B. MONITORING AND REPORTING

Monitoring results obtained during the previous month shall be summarized for each month and reported on separate discharge monitoring report (DMR) forms postmarked no later than the 15th day of the month following the effective date of the permit. The permittee shall provide written explanations of all violations in DMR cover letters.

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

Signed and dated originals of the DMRs, and all other reports required herein, shall be submitted to each Permit Issuing Authority at the following addresses:

U.S. Environmental Protection Agency	Massachusetts Department of Environmental Protection
Water Technical Unit (SEW)	Bureau of Waste Prevention
P.O. Box 8127	Southeast Regional Office
Boston, Massachusetts 02114	20 Riverside Drive
	Lakeville, MA 02347

In addition, copies of all Discharge Monitoring Reports and all other notifications and reports required by this permit shall be submitted to the following address:

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

In addition, annual Heat Load Reports, the Proposal for Information Collection (PIC), the Comprehensive Demonstration Study (CDS), annual Biological Monitoring Reports, Marine Mammals Monitoring Program and Response Protocol and all Discharge Related Mortality and Unusual Impingement Event notifications and Reports required by this permit shall also be submitted to:

Sharon Zaya (Telephone: 617-918-1995)
U.S. Environmental Protection Agency
One Congress Street, Suite 1100 (CIP)

Boston, MA 02114-2023

C. STATE PERMIT CONDITIONS

1. This discharge permit is issued jointly by the U. S. Environmental Protection Agency and the Massachusetts Department of Environmental Protection under Federal and State law, respectively. As such, all the terms and conditions of this permit are hereby incorporated into and constitute a discharge permit issued by the Commissioner of the Massachusetts Department of Environmental Protection pursuant to M.G.L. Chap. 21, §43.
2. 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.

MARINE CHRONIC TOXICITY TEST PROCEDURE AND PROTOCOL

I. GENERAL REQUIREMENTS

The permittee shall conduct acceptable silverside chronic (and modified acute) 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 and acute toxicity data shall be reported as outlined in Section VIII. The chronic Menidia test can be used to calculate an LC50 at the end of 48 hours of exposure when both an acute (LC50) and a chronic (C-NOEC) test is specified in the permit.

II. METHODS

Methods to follow are those recommended by EPA in:

Klemm, D.J. et al. Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters To Marine and Estuarine Organisms, Second Edition. Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, July 1994, EPA/600/4-91/003.

Any exceptions are stated herein.

III. SAMPLE COLLECTION

For each sampling event involving the Menidia beryllina, three discharge samples shall be collected. Fresh samples are necessary for Days 1, 3, and 5 (see Section V. for holding times). A single sample is necessary for the Arbacia punctulata test. The sample shall be analyzed chemically (see Section VI). The initial sample (Day 1) is used to start the tests, and for test solution renewal on Day 2. The second sample is collected for use at the start of Day 3, and for renewal on Day 4. The third sample is used on Days 5, 6, and 7. The initial (Day 1) sample will be analyzed chemically (see Section VI). Day 3 and 5 renewal samples will be held until test completion. If either the Day 3 or 5 renewal sample is of sufficient potency to cause lethality to 50 percent or more test organisms in any of the dilutions for either species, then a chemical analysis shall be performed on the appropriate sample(s) as well.

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

Standard Methods for the Examination of Water and Wastewater describes dechlorination of samples (APHA, 1992). Dechlorination can be achieved using a ratio of 6.7 mg/L anhydrous sodium thiosulfate to reduce 1 mg/L chlorine. A thiosulfate control (maximum amount of thiosulfate in lab control or receiving water) should also be run.

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

IV. DILUTION WATER

Grab samples of receiving water used for chronic toxicity testing shall be collected from one or several distances away from the discharge. It may be necessary to test receiving water at several distances in a separate chronic test to determine the extent of the zone of toxicity. Avoid collecting near areas of obvious road or agricultural runoff, storm sewers or other point source discharges. An additional control (0% effluent) of a standard laboratory water of known quality shall also be tested.

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

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

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

V. TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA

EPA New England requires that tests be performed using four replicates of each control and

effluent concentration because the on-parametric statistical tests cannot be used with data from fewer replicates. Also, 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 TEST¹

1. Test type	Static, non-renewal
2. Salinity	30 o/oo \pm 2 o/oo by adding dry ocean salts
3. Temperature	20 \pm 1°C
4. Light quality	Ambient laboratory light during test preparation
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 per chamber	About 2000 eggs and 5,000,000 sperm cells per vial
10. Number of replicate chambers per treatment	4
11. Dilution water	Uncontaminated source of natural seawater or deionized water mixed with artificial sea salts
12. Dilution factor	Approximately 0.5
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. An additional dilution at the permitted effluent concentration (% effluent) is required.
16. Acceptability of test	Minimum of 70% fertilization in controls. 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/600/4-91/003, July 1994.
2. When receiving water is used for dilution, an additional control made up of standard laboratory dilution water (0% effluent) is required.

EPA NEW ENGLAND RECOMMENDED TEST CONDITIONS FOR THE INLAND SILVERSIDE, MENIDIA BERYLLINA, GROWTH AND SURVIVAL TEST¹

1.	Test type	Static, renewal
2.	Salinity	5 o/oo to 32 o/oo \pm 2 o/oo by adding artificial sea salts
3.	Temperature	25 \pm 1°C
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 <u>Artemia</u> nauplii less than 24 hr old
14.	Feeding regime	Feed once a day 0.10 g wet wt <u>Artemia</u> nauplii per replicate on days 0-2; feed 0.15 g wet wt <u>Artemia</u> 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 ³	5 and a control. An additional dilution at the permitted effluent concentration (% effluent) is required.
19.	Dilution factor	≥ 0.5
20.	Test duration	7 days
21.	Effects measured	Survival and growth (weight)
22.	Acceptability of test	The average survival of 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/600/4-91/003, July 1994.

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.

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

VI. CHEMICAL ANALYSIS

As part of each daily renewal of the Menidia test, pH, dissolved oxygen, salinity, and temperature must be measured at the beginning and end of each 24 hour period in each dilution and in the controls. It must also be done at the start of the Arbacia test. The following chemical analyses shall be performed for each sampling event.

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

Superscripts:

*¹ Total Residual Oxidants

Either of the following methods from the 18th Edition of the APHA (1992) Standard Methods for the Examination of Water and Wastewater must be used for these analyses:

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

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

VII. TOXICITY TEST DATA ANALYSIS

LC50 Median Lethal Concentration (Determined at 48 Hours)

Methods of Estimation:

- Probit Method
- Spearman-Kärber
- Trimmed Spearman-Kärber
- Graphical

See flow chart on page 56 of EPA/600/4-91/003 for appropriate point estimation method to use on a given data set.

Chronic No Observed Effect Concentration (C-NOEC)

Methods of Estimation:

- Dunnnett's Procedure
- Bonferroni's T-Test
- Steel's Many-One Rank Test
- Wilcoxin Rank Sum Test

Reference flow charts on pages 191, 192, and 321 of EPA/600/4-91/003 for the appropriate method to use on a given data set.

In the case of two tested concentrations causing adverse effects but an intermediate concentration not causing a statistically significant effect, report the C-NOEC as the lowest concentration where there is no observable effect. The definition of NOEC in the EPA Technical Support Document only applies to linear dose-response data.

VIII. TOXICITY TEST REPORTING

A report of results will include the following:

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