

**MODIFICATION OF 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 Water Act, as amended (M.G.L. Chap. 21, §§ 26-53),

GenOn Kendall, LLC (formerly Mirant Kendall, LLC)

is authorized to discharge from the facility located at

**GenOn Kendall Cogeneration Station
265 First Street
Cambridge, MA 02142**

to receiving waters named

Charles River and Broad Canal

in accordance with effluent limitations, monitoring requirements and other conditions set forth in this modified permit. This modified permit is issued pursuant to 40 C.F.R. § 124.5, and revises and supersedes the permit that was issued on September 26, 2006, appealed on October 30, 2006, modified on December 18, 2008, and appealed on February 2, 2009.

This modified permit shall become effective on February 1, 2011, or the "Effective Date."

This permit and the authorization to discharge expire at midnight, five (5) years from the last day of the month preceding the Effective Date.

This permit consists of 31 pages in Part I including effluent limitations, monitoring requirements, and state permit conditions, Table 1, Attachments A through G (Attachments E and F are reserved), and 25 pages in Part II including General Conditions and Definitions.

Signed this 17th day of December, 2010

/S/ SIGNATURE ON FILE

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

David Ferris, Director
Massachusetts Wastewater Management Program
Department of Environmental Protection
Commonwealth of Massachusetts
Boston, MA

PART I.A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the Effective Date of the permit and lasting through expiration, the permittee is authorized to discharge through any combination of outfall serial numbers 001, 002, 003 and 004: once-through cooling water, ultrafilter and reverse osmosis (UF & RO) treatment system reject and backwash waters, other low-volume waste streams and boiler blowdown⁽¹⁾. Such discharges shall be limited and monitored by the permittee as specified below:
- a. Effluent samples shall be taken prior to mixing with other waste streams through Outfalls 001, 002, 003 and/or 004.
 - b. The results of sampling for any parameter above its required frequency must be reported.
 - c. There shall be no discharge of floating solids, oil sheen or visible foam in other than trace amounts.

<u>Effluent Characteristic</u>	<u>Discharge Limitations</u>		<u>Monitoring Requirements</u>	
	<u>Average Monthly</u>	<u>Maximum Daily</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
Flow Rate, million gallons per day	3.2 ⁽²⁾	3.2 ⁽²⁾	Daily ⁽⁹⁾	Recorder or Calculated ⁽⁴⁾
Flow Rate, million gallons per day under Planned Maintenance Operations or Unplanned Repair Operations	52.2 ^(2,3)	52.2 ^(2,3)	Daily ⁽⁹⁾	Recorder or Calculated ⁽⁴⁾
Total Residual Chlorine ⁽⁵⁾ , mg/l	Report	0.1	1/chlorination event	Grab during chlorination event
Temperature (°F), Discharge	Report	105 ⁽⁶⁾	Continuous	Recorder
Temperature (°F), In-stream	Report	Report ^(7,8)	See Part I.A.14 and Attachment D	Recorder
Facility Temperature Rise; Discharge °F minus Inlet °F	Report	20 ⁽⁹⁾	Continuous	Recorder

pH, standard units	6.5 – 9.0		Daily	Grab
Dissolved oxygen, mg/l, in-stream ^(7,15)	Report	Report	See Part I.A.14.a.2	Recorder
Heat Load, in millions of BTUs ⁽¹⁰⁾	Report	Report	Hourly and Daily	Calculated
Electricity generation, in megawatts	Report ⁽¹⁵⁾	Report ⁽¹⁵⁾	Hourly and Daily	Recorder
Whole Effluent Toxicity Testing, ⁽¹¹⁾ LC50, C-NOEC, % ^(12,13,14)	Report	Report	1/Quarter	24 hour composite

Footnotes:

1. There have been separate permit conditions established for the discharge of reject and backwash waters, other low-volume waste streams, and boiler blowdown from internal Outfall 009. See Part I.A.3.
2. For flow, report maximum and minimum daily rates and total flow for each calendar date. The limit of 3.2 MGD is a daily maximum limit. See Footnote 3 regarding exceptions for Planned Maintenance Operations and Unplanned Repair Operations. Outfalls 001, 002, 003, and 004 are designated collectively as SUM T.
3. The limit of 52.2 MGD is the daily maximum flow for each calendar date of Planned Maintenance Operations or Unplanned Repair Operations. See Part I.A.11 for definitions of, and requirements applicable to, Planned Maintenance Operations or Unplanned Repair Operations.
4. The Flow Rate may be estimated from circulating and raw water pump capacity curves and operational hours or calculated based on data logger or other digital means. This flow rate is comprised of the combined flow rates of the total cooling water flow, blowdown from the new heat recovery steam generator (HRSG) unit, boiler blowdown, and reject and backwash waters from the UF & RO water treatment units.
5. The quantity of total residual chlorine (TRC) discharged from any of these outfalls shall not exceed 0.1 mg/l as an “instantaneous maximum concentration” at a representative and accessible point of discharge to the Charles River. TRC may not be discharged from any generating unit for more than two hours in any one day. For this permit, the minimum level (ML) for TRC is defined as 20 ug/l. This value is the minimum level for chlorine using EPA-approved methods found in the most

currently approved version of Standard Methods for the Examination of Water and Wastewater, Method 4500 CL-E and G, or USEPA Manual of Methods of Analysis of Water and Wastes, Method 330.5. One of these methods must be used to determine TRC. Sample results of 20 ug/l or less shall be reported as zero on the discharge monitoring report. The ML is not the minimum level of detection, but rather the level at which the entire analytical system shall give recognizable signal and acceptable calibration points. Chlorine may be used as a biocide. Sampling shall be conducted only during periods of chlorination at the Facility, when chlorine is being discharged. No other biocide shall be used without explicit approval from the Regional Administrator and the Commissioner (See Part I.A.4). 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 (MassDEP) or their designees. The TRC limit of 0.1 mg/l does not apply to Outfall 009 in Part I.A.3.

6. The 1-minute average discharge temperature shall not exceed 105 °F at any time. The maximum 1-minute average temperature for each day may be recorded by a data scan, data logger, instruments, or computers.
7. The permittee may not discharge heated effluent, unless, for each Monitoring Point at Monitoring Station 3, one or more of the following is true:
 - a. The Station 3 Measured Temperature at such Monitoring Point does not exceed the Actually Applicable Temperature Limit; or
 - b. The Highest Cross-Transect Temperature corresponding to such Monitoring Point does not exceed the Cross-Transect Reference Temperature; or
 - c. Such Monitoring Point is 24 feet or deeper, and the Station 3 Measured Dissolved Oxygen at such Monitoring Point is below 5.0 mg/l; or
 - d. Such Monitoring Point is 24 feet or deeper, and the date is between November 1 and March 29; or
 - e. The permittee claims an available Springtime Exception, and the Station 3 Temperature at such Monitoring Point does not exceed the Springtime Exception Limit;

See **Attachment A** for definitions of terms in this footnote. The monitored temperatures may be recorded by a data logger, instruments, computers, or other digital means. See Part I.A.14.d.2.(d) for monthly instream temperature and DO reporting requirements. This data shall be attached to the monthly DMRs as shown in the sample tables of Attachment G as required.

8. Notwithstanding footnote 7, the permittee shall not discharge heated effluent on any day if, for each of the two preceding calendar days, all three of the following were true:
- The permittee discharged heated effluent; and
 - The permittee was required to conduct Compliance Temperature Monitoring and the Station 3 Measured Temperature at any Monitoring Point that exceeded the Actually Applicable Temperature Limit by more than 0.28° C (0.5° F); and
 - The Station 3 Vertical Average Shallow Temperature exceeded the Average Afternoon Intake Temperature by more than 0.56° C (1.0° F).

For purposes of this footnote, “Station 3 Vertical Average Shallow Temperature” means the average of the Station 3 Measured Temperatures for the 2 foot depth, the 6 foot depth, and the 12 foot depth; and “Average Afternoon Intake Temperature” means the average of all instantaneous temperature readings measured at the Kendall Station cooling water intake at evenly spaced intervals between 2:00 PM and 5:00 PM. See Attachment A for definitions of other terms in this footnote. The monitored temperatures may be recorded by a data logger, instruments, computers, or other digital means.

9. Facility Temperature Rise is the difference between the discharge temperature (to be flow weighted if necessary if apportioned between more than one outfall) and intake temperature. The intake and discharge temperatures may be recorded by a data logger, instruments, or computers. The Facility Temperature Rise and Flow Rate shall be calculated as hourly averages based upon readings every fifteen (15) minutes. These hourly average values will be tabulated for each month and attached to the monthly Discharge Monitoring Reports (DMR). The hourly average discharge temperature shall be the average of the temperatures measured by temperature probes in Outfalls 001 and 002 or Outfalls 003 and 004, depending on which combination are in use (flow weighted if necessary) and shall not exceed a 20 °F rise over the hourly average temperature of the intakes on the Broad Canal for the corresponding hour.
10. The Heat Load shall be calculated on an hourly basis using the following equation: $Q = Cpm(\Delta T)/24 \text{ hours}$

Where Q = Heat Load, British Thermal Units (BTU)/hour

Cp = Heat Capacity (Specific Heat) of water = 1.0 BTU/pound-°F

m = mass of water = cooling water flow rate (MGD) x density of river water =
cooling water flow rate (MGD) x 8.34 pounds/gallon

ΔT = discharge temperature - intake temperature, °F, hourly average (See footnote 9 above) The monthly heat load shall be calculated by adding together each day’s heat load for that month. Each day’s heat load shall be calculated by adding together each hour’s heat load for that day.

11. The permittee shall conduct chronic (and modified acute) Whole Effluent toxicity (WET) tests four times per year. The chronic test may be used to calculate the acute LC50 at the 48-hour exposure interval. Prior to taking the first sample for this test, the permittee shall measure the salinity in its intake water. If such salinity is measured at less than 1 part per thousand (ppt), the permittee shall follow the testing protocol specified in Attachment C1 for freshwater species. If the measured salinity is 1 ppt or greater, the permittee shall follow the testing protocol specified in Attachment C2 for marine species. Toxicity test samples shall be collected during the calendar quarters ending March 31, June 30, September 30 and December 31. The test results shall be submitted by the last day of the month following the completed quarter, April 30, July 31, October 31 and January 31, respectively. The tests must be performed in accordance with test procedures and protocols specified in **Attachments C1 and C2** of this permit, follow the conditions set forth in the table below and be conducted during normal operating conditions. On the DMR, report the results for the WET species used. For those species not used, enter the no discharge (NODI) code of “9”.

Day 1 (Acute and sample #1 for chronic)	Day 3 (sample #2 for chronic)	Day 5 (sample #3 for chronic)
Discharge of Sodium Bisulfite HRSG Blowdown UF and RO Water Treatment Reject Water	HRSG Blowdown UF and RO Water Treatment Reject Water	HRSG Blowdown UF and RO Water Treatment Reject Water

After submitting one year and a minimum of four consecutive sets of WET test results (one per quarter), the permittee may request a reduction or elimination of the WET testing requirements, based upon the test results. 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. Days 3 and 5 may or may not include the discharge of sodium bisulfite.

12. The LC50 is the concentration of effluent which causes mortality to 50% of the test organisms.

13. 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 at a specific time of observation as determined from hypothesis testing where the test results exhibit a linear dose-response relationship. However, where the test results do not exhibit a linear dose-response relationship, the permittee must report the lowest concentration where there is no observable effect.
14. If toxicity test(s) using receiving water as diluent show the receiving water to be toxic or unreliable, the permittee shall follow procedures outlined in **Attachments C1 and C2, Section IV**, of this permit in order to obtain permission to use an alternate dilution water. In lieu of individual approvals for alternate dilution water required in **Attachments C1 and C2**, the permittee may use the EPA New England guidance document entitled Self-Implementing Alternative Dilution Water Guidance (“Guidance Document”) to obtain automatic approval of an alternate dilution water, including the appropriate species for use with that water. If the Guidance Document is revoked, the permittee shall revert to obtaining approval as outlined in **Attachments C1 and C2**. The Guidance Document has been sent to all permittees with their annual set of DMRs and Revised Updated Instructions for Completing EPA’s Pre-Printed NPDES Discharge Monitoring Report (DMR) Form 3320-1 and is not intended as a direct attachment to this permit. Any modification or revocation to the Guidance Document will be transmitted to the permittees as part of the annual DMR instruction package. However, at any time, the permittee may choose to contact EPA New England directly using the approach outlined in **Attachments C1 and C2**.
15. The monitored electricity generation, in megawatts or megawatt hours, and the dissolved oxygen in mg/l, may be recorded by a data logger, instruments, computers, or other digital means.

Part I.A.2.

During the period beginning on the Effective Date and lasting through expiration, the permittee is authorized to discharge intake screen backwash water from outfall serial numbers 005, 006 and 007 at a total daily maximum Flow Rate not to exceed 0.1 MGD for each outfall.

<u>Effluent Characteristic</u>	<u>Discharge Limitations</u>		<u>Monitoring Requirements</u>	
	<u>Average Monthly</u>	<u>Maximum Daily</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
Flow Rate, million gallons per day	-----	0.1	1/Month	Estimate
pH, standard units	See part c.	See part c.	1/Month	Meter

- a. There shall be no discharge of floating solids, oil sheen or visible foam in other than trace amounts.
- b. The water used for intake screen backwashing shall be comprised of the receiving water only. The permittee may not use any cooling or process water associated with the operation of this facility for this backwashing operation.
- c. The pH shall not be less than 6.5 standard units and not more than 9.0 standard units, unless these values are exceeded due to natural causes. The pH shall be no more than 0.5 units outside the natural background range. To demonstrate that pH values of the effluent are outside the permitted pH range due to natural causes, the permittee must show that pH measurements of the source water and the effluent are the same. Documentation of such conditions must be submitted by the permittee with the discharge monitoring reports.
- d. See Parts I.A.11.d.(5) and (6) and I.A.13 regarding the operation of the traveling screens at the intake structures and impingement related conditions.

Part I.A.3. During the period beginning on the Effective Date and lasting through expiration, the permittee is authorized to discharge low-volume waste from outfall serial number 009: UF & RO water treatment system reject and backwash waters, other low-volume waste streams and boiler blowdown. This is an internal outfall.

<u>Effluent Characteristic</u>	<u>Discharge Limitations</u>		<u>Monitoring Requirements</u>	
	<u>Average Monthly</u>	<u>Maximum Daily</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
Flow Rate, million gallons per day	Report	3.2	Daily	Recorder or Calculated ⁽¹⁾
Total Suspended Solids, mg/l	30	100	1/Week	24 hour composite
Oil and Grease, mg/l	15	20	1/Week	Grab
Total Residual Chlorine, mg/l	Report	Report	1/Week, when in use	Grab during chlorination event ⁽²⁾

- a. There shall be no discharge of floating solids, oil sheen or visible foam in other than trace amounts.
- b. The results of sampling for any parameter above its required frequency must be reported.
- c. The combination of these streams will be monitored prior to joining the condenser cooling water stream.
- d. The monitoring of this outfall must coincide with the approximate time period of the maximum use of the chemicals listed in Table 1 at the end of this permit.

Footnotes:

1. The Flow Rate may be estimated from circulating and raw water pump capacity curves and operational hours or calculated based on data logger or other digital means.
2. See Footnote 5 on Pages 3 and 4.

The permittee shall collect a grab sample of this outfall and analyze it for the 126 priority pollutants found on Appendix A of 40 CFR 423 during the first month of discharge from the UF & RO system under the permit. This sampling and analysis shall also be conducted annually thereafter during the period of July through September except as provided in Part I.A.15.c.

Part I.A. (continued)

4. The chemicals listed in Table 1 are approved for water discharge. A generic equivalent of any chemical in Table 1 may be substituted if the permittee documents that such chemical causes no greater aquatic toxicity than the chemical it replaces, based on the aquatic LC50 values in such chemical's Material Safety Data Sheet (MSDS). If aquatic toxicity data is not available, the permittee must make an alternative demonstration. If the permittee substitutes a generic equivalent pursuant to this provision, the permittee shall retain all records pertaining to its determination that the generic equivalent causes no greater aquatic toxicity than the listed chemical as long as the permit is effective or for five years after it ceases discharge of the generic equivalent, whichever is later. 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 (RA) and the Commissioner before any discharges to the river resulting from such studies takes place. A report summarizing the results of any such studies shall be submitted to the RA and the Commissioner regarding discharge frequency, concentration, and the impact, if any, on the indigenous populations of the receiving water. The RA or the Commissioner may require WET testing as part of any feasibility study.
5. The discharges shall not cause a violation of any applicable water quality standards (WQS) or degrade the aquatic habitat quality.
6. Any change in the location, design or capacity of the present cooling water intake structures shall be approved by the RA and the Commissioner.
7. This permit may be modified, revoked or reissued to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b) (2), and 207(a) (2) of the Act, if the effluent standard or limitation so issued or approved:
 - a. contains different conditions or is otherwise more stringent than any effluent limitation in this permit; or
 - b. controls any pollutant not limited by this permit.

If the permit is modified or reissued, it shall be revised to reflect all currently applicable requirements of the Act.

8. There shall be no discharge of polychlorinated biphenyl (PCB) compounds. The permittee shall dispose of all known PCB equipment, articles, and wastes in accordance with 40 CFR § 761. The permittee shall certify to EPA at the address in Part I.B.3. that this disposal has been accomplished.

9. All existing manufacturing, commercial, mining, and silvicultural dischargers must notify the RA as soon as they know or have reason to believe (40 CFR §122.42):
- a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant (as defined at 40 CFR §122.2) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
 - (1) One hundred micrograms per liter (100 ug/L);
 - (2) Two hundred micrograms per liter (200 ug/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/L) for 2,4-dinitrophenol and for 2-methyl- 4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
 - (3) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR §122.21(g)(7); or
 - (4) Any other notification level established by the RA of EPA in accordance with 40 CFR §122.44(f).
 - b. 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 Director of EPA in accordance with 40 CFR §122.44(f).
 - c. That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the permit application.
10. [Reserved – Left intentionally blank]
11. Cooling Water Intake Structure (CWIS) Requirements to Minimize Adverse Environmental Impacts from Impingement and Entrainment
- a. The design, location, construction, and capacity of the permittee's CWIS shall reflect the best technology available (BTA) for minimizing the adverse environmental impacts from the entrainment and impingement of fish eggs and

larvae, as well as impingement of adult and juvenile fish, due to the CWIS. In order to satisfy this BTA standard, the permittee shall install and operate as necessary an air cooled condenser (ACC) and back pressure steam turbine (BPST) and, except as specifically provided in Part I.A.11.b or 11.c below, shall comply with Part I.A.11.a.(1)-(5) below.

- (1) The permittee shall not withdraw more than 3.2 million gallons of water through the CWIS on any day.
 - (2) The permittee shall restrict the effective through-screen velocity through each of the traveling screens to no more than 0.5 feet per second (fps) at any point on the screen.
 - (3) The permittee shall inspect the traveling screens at least monthly. The permittee shall repair damage that compromises performance as soon as practicable.
 - (4) The permittee shall clean, rotate, and otherwise maintain the traveling screens as often as needed to maintain a through-screen velocity no greater than 0.5 fps. When cleaning, rotating, or otherwise maintaining the traveling screens, the permittee shall comply with Parts I.A.11.d.5 and I.A.11.d.6 below.
 - (5) Within 90 days of the Effective Date of the permit, the permittee shall submit calculations to verify that, except as provided in Parts I.A.11.b and I.A.11.c, the through-screen velocity through each of the traveling screens is no greater than 0.5 fps. This and all other submittals in this Part shall be made to EPA and MassDEP at the addresses in Part I.B.3.
- b. The permittee may conduct Planned Maintenance Operations from time to time consistent with the limitations and obligations described in Part I.A.11.b.(1)-(6). Planned Maintenance Operations means continued operation of the Facility when the Facility's discharge or withdrawal is in excess of 3.2 MGD due to the unavailability of the BPST, the ACC, and/or any steam line from the Kendall Cogeneration Station due to scheduled maintenance. The permittee may only conduct Planned Maintenance Operations in compliance with Part I.A.11.b.(1)-(6).
- (1) Planned Maintenance Operations may only be conducted between October 15 and December 15, except as described in Part I.A.11.b.1.a-c below.
 - a. If, before conducting activities that require the permittee to avail itself of the provisions of Part I.A.11.b, the permittee is required by the mandatory requirements of ISO New England, Inc. ("ISO-NE"), or its successor, to obtain ISO-NE's approval to engage in such activities, then the permittee must timely request such approval, must request approval for a time period within the period of October 15-December 15, must advise ISO-NE of the requirements of Part I.A.11.b of this permit, and

must inform ISO-NE that the permittee is able to conduct such activities anytime between October 15-December 15.

- b. If ISO-NE does not authorize the permittee to conduct such activities within the period of October 15-December 15, then the permittee must seek approval to conduct the activities that require ISO-NE's approval during a time period as reasonably proximate to October 15-December 15 as ISO-NE will approve. However, regardless of the conditions of any ISO-NE approval, the permittee may not conduct any activities pursuant to Part I.A.11.b from January 1 through September 30. If the conditions of ISO-NE's approval, or any other factors, require the permittee to conduct activities that the permittee cannot conduct consistent with the requirements of Part I.A.11.a from January 1 through September 30, then any such activities conducted from January 1 through September 30 shall be considered Unplanned Repair Operations under Part I.A.11.c rather than Planned Maintenance Operations under Part I.A.11.b, and such days from January 1 through September 30 shall be counted against the total Unplanned Repair Operations days available to the permittee under Part I.A.11.c.2.
 - c. Within 10 days of receiving approval from ISO-NE to conduct such activities in a time period other than October 15-December 15, the permittee will notify EPA of that approval, and provide EPA with copies of correspondence between the permittee and ISO-NE leading to that result.
- (2) The permittee must notify EPA and MassDEP in writing at least 10 business days in advance of initiation of Planned Maintenance Operations.
 - (3) The permittee may not conduct Planned Maintenance Operations for more than a total of 30 days out of any rolling five-year period.
 - (4) Whenever the permittee is conducting Planned Maintenance Operations under Part I.A.11.b, the requirements of Part I.A.11.d apply.
 - (5) Within 90 days after completion of Planned Maintenance Operations, the permittee shall submit a report to EPA and MassDEP explaining whether the permittee had discovered any issues during the Planned Maintenance Operations that are likely to require additional Planned Maintenance Operations or Unplanned Repair Operations in the next twelve months, and detailing all biological and fish monitoring information collected pursuant to Parts I.A.11.d.
 - (6) In order to continue withdrawals under this section, the permittee shall conduct any required maintenance activities as expeditiously as can be achieved (using commercially reasonable methods) without compromising

safety or reliability, or violating any applicable Federal, State, local, and/or ISO-NE requirements.

- c. The permittee may conduct Unplanned Repair Operations from time to time if necessary, consistent with the limitations and obligations described in Part I.A.11.c. Unplanned Repair Operations means continued operation of the Facility when the Facility's discharge or withdrawal is in excess of 3.2 MGD due to the unplanned unavailability (for physical, technical, and/or safety reasons) of the back pressure steam turbine, the air cooled condenser, and/or the steam line. The permittee may withdraw water through the CWIS during periods of Unplanned Repair Operations only in compliance with Part I.A.11.c.(1)-(6).
- (1) The permittee shall notify EPA and MassDEP as soon as practicable after it becomes aware or determines that Unplanned Repair Operations will occur, but in any event must notify EPA and MassDEP within 24 hours after Unplanned Repair Operations have begun.
 - (2) The permittee shall not withdraw water through any of the CWISs under Part I.A.11.c for more than a total of 30 days out of any rolling five-year period.
 - (3) The permittee may conduct Unplanned Repair Operations pursuant to Part I.A.11.c consecutively with Planned Maintenance Operations pursuant to Part I.A.11.b, but the total combined period shall not exceed 30 consecutive days.
 - (4) Whenever the permittee is conducting Unplanned Repair Operations under Part I.A.11.c, the requirements of Part I.A.11.d apply.
 - (5) Within 90 days after conclusion of Unplanned Repair Operations, the permittee shall submit a report to EPA and MassDEP explaining the circumstances that led to the necessity for Unplanned Repair Operations, the actions taken in response, all biological and fish monitoring information collected pursuant to Parts I.A.11.d and/or I.A.12-14 below, the volume of water withdrawn for each day during the Unplanned Repair Operations period, and steps already taken and/or to be taken (with a proposed schedule) to avoid a similar event in the future, if applicable.
 - (6) In order to continue withdrawals under this section, the permittee shall conduct any required maintenance activities as expeditiously as can be achieved (using commercially reasonable methods) without compromising safety or reliability, or violating any applicable Federal, State, local, and/or ISO-NE requirements.
- d. When conducting Planned Maintenance Operations pursuant to Part I.A.11.b or Unplanned Repair Operations pursuant to Part I.A.11.c, the permittee shall operate the cooling water pumps and traveling screens at Units 1 and 2 in accordance with Part I.A.11.d.(1)-(6) below.

- (1) The permittee shall not withdraw more than 52.2 million gallons of water through the CWIS on any day.
- (2) The permittee shall restrict the effective through-screen velocity through each of the traveling screens to no more than 0.8 feet per second (fps) at any point on the screen.
- (3) The permittee shall inspect the traveling screens at least every eight hours. The permittee shall repair damage that compromises performance of the traveling screens as soon as practicable.
- (4) The permittee shall clean, rotate and otherwise maintain the traveling screens at least once every eight hours. Each screen rotation shall be for a time sufficient to dislodge and collect any impinged organisms. This screen rotation shall continue until such time that normal operating conditions are re-established and intake flow is reduced to no greater than 3.2 million gallons on any day.
- (5) As soon as practicable following each rotation, material collected must be inspected for live fish, either by plant personnel or another method, in a manner that maximizes the survival of impinged fish. All live adult and juvenile fish collected or trapped on the traveling screens shall be identified to species, measured in millimeters (mm), or if greater than 100 mm in length, to the nearest centimeter (cm), inspected to determine overall health and reproductive condition (if possible) and returned to the lower Basin downstream of the head wall of the Broad Canal. Fish may be carried in buckets of river water and released by hand or by any other method that sufficiently ensures survival of the organisms as described in advance in writing by a biologist on behalf of the permittee. Dead fish collected or trapped on the traveling screen shall be identified to species (if possible) and measured in millimeters, or if greater than 100 mm in length, to the nearest cm. All fish collection information shall be included in the Annual Monitoring Report.
- (6) All other material shall be removed from the traveling 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.

12. Fish Mortality Requirements

Each day through the year that the permittee is discharging heated effluent, the permittee shall visually inspect (1) the Broad Canal and (2) the Charles River in the vicinity of Outfall 001 for dead fish. A fish, defined for this purpose as any juvenile or adult fish, shall be considered dead if it is observed to have a loss of equilibrium for at least two minutes.

a. Initial Notification and Response

1. If the permittee observes three or more dead fish, the frequency of observation shall be increased to not less than once every two hours until no additional dead fish are observed. If 25 or more dead fish are observed within any 24 hour period in either of the areas specified above, the permittee shall provide telephone notification to the Massachusetts Division of Marine Fisheries (DMF), EPA's Office of Ecosystem Protection, and the MassDEP, within four hours of such observation. See contact names for the EPA and DMF in Part I.B.3. of this permit and for MassDEP in Part I.A.14.g. If 25 or more dead fish are observed during a 24 hour weekend, holiday or evening period, the permittee shall notify the DMF, EPA and MassDEP on the next business day.

2. Upon observation of fish mortalities sufficient to require notification, the permittee shall make a concerted effort to collect and report the following information, if practicable: (1) the hourly Facility discharge temperatures for the 24 hours prior to and including the time of the fish mortality, (2) the dissolved oxygen levels and river temperatures at Monitoring Stations 2 through 6, (3) the dissolved oxygen levels and river temperature, from surface to bottom, at the approximate location of the fish kill, (4) the number of dead fish observed, by species, and (5) the length of all dead fish collected, in millimeters, or if greater than 100 mm in length, to the nearest centimeter (cm). If more than 100 dead fish are collected, a representative subset of the fish may be measured for total length.

Dissolved oxygen and river temperature values shall be collected once a day, unless directed otherwise by MassDEP or EPA. Facility discharge temperature data is already recorded on a continuous basis and would be sufficient to meet Part I.A.12.a.2.(1) of the requirement above. The information collected in Part I.A.12.a.2 shall be included in the written report documenting the event, as required in Part I.A.12.c, below.

3. On observation of fish mortalities sufficient to require notification, the permittee shall suspend all unit chlorination operations, and if the discharge temperature is greater than 95°F, the permittee shall reduce the discharge temperature to no more than 95°F within two hours of such observation.

4. If, at the end of the 24 hour period from the initial observation, fish mortalities are no longer occurring and EPA or the MassDEP do not advise otherwise, the permittee shall cease monitoring under this section of the permit and return to normal station operation, including unit chlorination.

- b. In the event of fish mortalities sufficient to require notification in the Broad Canal or the Charles River in the vicinity of Outfall 001, the permittee will begin removing all dead fish within four hours after the fish mortalities have been observed. The dead fish shall be enumerated in accordance with Part I.A.12.a.2.(4) and (5), above.

- c. The permittee shall make a written report of any documented fish mortalities to DMF, EPA, and MassDEP, within ten (10) business days of the event. Included in this report shall be (1) the status of operation at the Facility before and during the event, along with all information required in Part I.A.12.a.2 of this permit, (2) any meteorological or other environmental conditions that may have contributed to the event, (3) the opinion of the permittee as to the cause of the event, and (4) what actions the Facility shall take in the future to reduce the recurrence of fish kills (if applicable). The MassDEP, DMF, and EPA addresses to be used are found in Part I.B.3. of this permit.

13. Unusual Impingement Events

The permittee shall report all "unusual impingement events" at the Facility. The beginning of an "unusual impingement event" (UIE) is defined as any occasion on which the permittee's rotation of one or more traveling screens yields 15 or more total fish (of all species) that were impinged upon the screens. UIEs will be reported to EPA, MassDEP and DMF designees by telephone no later than twelve (12) hours after the permittee is aware of or has reason to believe an UIE has occurred. If the UIE is observed during weekend, holiday or evening periods, the permittee shall notify the EPA, MassDEP and DMF on the next business day. The permittee shall prepare and submit a written report regarding such UIE within ten (10) business days to EPA, MassDEP and DMF. The MassDEP, DMF, and EPA addresses to be used are found in Part I.B.3. of this permit. Upon the initial observation of a UIE, the permittee shall rotate all traveling screen[s] once every hour until the impingement rate is less than 15 fish per hour. Impinged fish shall be enumerated in accordance with Part I.A.12.a.2.(4) and (5). Any live impinged fish shall be treated in accordance with the live fish requirements specified in Part I.A.11.d.(5). The permittee shall refer to Part I.A.11.d of this permit regarding inspection requirements. The permittee shall report any UIE that takes place during these required inspections or during any other periods.

14. Temperature and Water Quality Monitoring

a. In-stream Compliance Monitoring Program

1. Compliance Temperature Monitoring

- (a) In-stream compliance temperature monitoring shall be conducted throughout the year for the effective period of the permit in accordance with the following provisions:
 - (1) When specified in Attachment D, and/or
 - (2) On any day that the effluent flow exceeds 3.2 MGD.

- (b) Whenever in-stream compliance temperature monitoring is required pursuant to Part I.A.14.a.1.(a), the permittee shall conduct in-stream compliance temperature monitoring at discrete Monitoring Points in the water column at Monitoring Station 1 (Background) and Monitoring Station 3, shown in Attachment B, to determine permit compliance as specified in Part I.A.1. footnote 7.
 - (c) When in-stream compliance temperature monitoring data collection is required at Monitoring Station 1, the permittee shall obtain temperature data at Monitoring Points at depths of 2 feet, 6 feet and 12 feet.
 - (d) When in-stream compliance temperature monitoring data collection is required at Monitoring Station 3, the permittee shall obtain temperature data at Monitoring Points at depths of 2 feet, 6 feet, 12 feet, 24 feet (when station depth allows), and approximately 3 feet above the bottom (when the river depth at Monitoring Station 3 is equal to or greater than 30 feet).
 - (e) At a minimum, the permittee shall record one temperature value at each discrete Monitoring Point depth specified in Part I.A.14.a.1.(c) and 1.(d). The permittee shall also record the time and date of each in-stream compliance temperature monitoring collection.
 - (f) The permittee shall collect in-stream compliance temperature monitoring data at all Monitoring Point depths of Station 3 and Station 1 between the hours of 2:00 pm and 2:45 pm. An average temperature for each Monitoring Point may be substituted for a single temperature measurement, providing the collection and calculation of the average temperature meets the “Average Temperature” definition specified in Attachment A.
 - (g) [Reserved – Left intentionally blank]
 - (h) When unsafe conditions beyond the control of the permittee prevent data collection as specified in Part I.A.14.a.1.(f), data shall be collected as close as possible to the time frame specified in Part I.A. 14.a.1.(f), once in-stream data collection can be conducted safely.
2. Dissolved Oxygen Monitoring
- (a) The permittee shall collect dissolved oxygen (DO) concentrations at each Monitoring Point depth specified in Part I.A.14.a. when an in-stream temperature is collected in the Charles River to determine compliance as specified in Attachment A. DO shall be reported as part of the Monthly Monitoring Report as described in Part I.A.14.d.

b. In-Stream Compliance Support Monitoring Program

1. Compliance Support Temperature Monitoring

- (a) The permittee shall conduct compliance support in-stream temperature monitoring at the locations identified in Part I.A.14.b.1.(b), throughout the year for the effective period of the permit in accordance with the following provisions:
 - (1) Whenever the Station 3 Measured Temperature (as defined in Attachment A) is above the corresponding Actually Applicable Temperature Limit as specified in Attachment A, and/or
 - (2) On any day that the effluent flow exceeds 3.2 MGD.
- (b) The permittee shall conduct compliance support temperature monitoring at the following discrete Monitoring Points in the water column at Monitoring Stations 2, 4, 5, 6, 7 and 8, shown in Attachment B.
 - (1) Monitoring Station 7, as represented in Attachment B, is located at the midpoint of the Old Locks at the Museum of Science. The midpoint of the Old Locks will be sampled when conditions make such sampling feasible. When conditions such as boat traffic make sampling the midpoint infeasible, a sample will be collected at the nearest feasible location downstream of the Old Locks.
- (c) When compliance support temperature monitoring is required at the Monitoring Stations identified in Part I.A.14.b.1(b), the permittee shall obtain temperature data at depths of 2 feet, 6 feet, 12 feet, 24 feet (when station depth allows), and approximately 3 feet above the bottom (when the river depth at the Monitoring Station is equal to or greater than 30 feet deep).
- (d) At a minimum, the permittee shall record one temperature value at each discrete Monitoring Point depth specified in Part I.A.14.b.1.(c) at Monitoring Stations 2, 4, 5, and 6 throughout the year, when required. The time and date of each temperature collection must also be recorded.
- (e) At a minimum, the permittee shall record one temperature value at each discrete Monitoring Point depth specified in Part I.A.14.b.1.(c) at Monitoring Stations 7 and 8 from April 1 through October 31, when required. The time and date of each temperature collection must also be recorded.
- (f) When required, compliance support in-stream temperature monitoring shall be performed between the hours of 2:00 pm and 5:00 pm. An average temperature for each Monitoring Point may be substituted for a single temperature

measurement, providing the collection and calculation of the average temperature meets the “Average Temperature” definition specified in Attachment A. Temperature data shall be reported as part of the Monthly Monitoring Report as described in Part I.A.14.d.

- (g) When unsafe conditions beyond the control of the permittee prevent data collection as specified in Part I.A.14.b.1.(f) the permittee shall collect data as close as possible to the time frame specified in Part I.A.14.b.1.(f), once in-stream data collection can be conducted safely.

2. Dissolved Oxygen Monitoring

- (a) DO concentrations shall be collected at each Monitoring Point depth in the water column when a temperature reading is collected in the Charles River, as specified in Part I.A.14.b.1. DO shall be reported as part of the Monthly Monitoring Report as described in Part I.A.14.d.

c. Supplemental Monitoring Program

1. Supplemental In-stream Temperature Monitoring

- (a) The permittee shall conduct supplemental in-stream temperature monitoring at the locations identified in Part I.A.14.c.1.(b) for twenty-four (24) consecutive months beginning on the Effective Date of the permit, in accordance with the following provisions:
 - (1) The permittee shall conduct supplemental in-stream temperature monitoring on any day when in-stream compliance temperature monitoring is required by Attachment D but the Station 3 Measured Temperature (as defined in Attachment A) for each depth at Monitoring Station 3 is at or below the Actually Applicable Temperature Limit specified in Attachment A, provided that the permittee is not required to conduct supplemental in-stream temperature monitoring pursuant to this provision (Part I.A.14.c.1.(a)(1)) for more than one day within a week (Sunday through Saturday).
 - (2) If no in-stream compliance monitoring has been required by Attachment D during the first three weeks of a calendar month, then the permittee shall conduct supplemental in-stream temperature monitoring once during the last week of the month at all Monitoring Points at the Monitoring Stations specified in Part I.A.14.c.1.(b), as well as at all Monitoring Points at compliance Monitoring Stations 1 and 3.

- (b) The permittee shall conduct supplemental in-stream temperature monitoring at the discrete Monitoring Points in the water column at the Monitoring Stations identified in section Part I.A.14.b.1.(b) and shown in Attachment B.
 - (c) The permittee may voluntarily conduct supplemental in-stream temperature monitoring according to Part I.A.14.c.1. at any time. All data collected must be submitted as part of the Monthly Monitoring Report as described in Part I.A.14.d.
 - (d) When supplemental in-stream temperature monitoring is conducted at the Monitoring Stations identified in Part I.A.14.1.c., the permittee shall obtain temperature data at depths of 2 feet, 6 feet, 12 feet, 24 feet (when station depth allows), and approximately 3 feet above the bottom, when a Monitoring Station depth is equal to or greater than 30 feet deep.
 - (e) At a minimum, the permittee shall record one temperature value at each discrete Monitoring Point depth specified in Part I.A.14.c.1.(d). at Monitoring Stations 2, 4, 5, and 6 throughout the year, when required. The time and date of each temperature collection must also be recorded.
 - (f) From April 1 through October 31, the permittee shall, at a minimum, record one temperature value at each discrete Monitoring Point depth specified in Part I.A.14.c.1.(d) at Monitoring Stations 7 and 8, when required. The time and date of each temperature collection must also be recorded.
 - (g) When required, supplemental in-stream temperature monitoring shall be performed between the hours of 2:00 pm and 5:00 pm. An average temperature for each Monitoring Point may be substituted for a single temperature measurement, providing the collection and calculation of the average temperature meets the "Average Temperature" definition specified in Attachment A. Temperature data shall be reported as part of the Monthly Monitoring Report as described in Part I.A.14.d.
 - (h) When unsafe conditions beyond the control of the permittee prevent data collection as specified in Part I.A.14.c.1.(g) the permittee shall collect data as close as possible to the time frame specified in Part I.A.14.a.1.(g), once in-stream data collection can be conducted safely.
2. Dissolved Oxygen Monitoring
- (a) DO concentrations shall be collected at each Monitoring Point depth in the water column when a temperature reading is collected in the Charles River, as specified in Part I.A.14.c.1. DO shall be reported as part of the Monthly Monitoring Report as described in Part I.A.14.d.

d. General and Reporting

1. Additional Data Collection

For each day when in-stream temperature monitoring is required pursuant to Part I.A.14.a., b, and/or c, the permittee shall obtain and report the following data:

- (a) Meteorological and Charles River data: local air temperature at the time of monitoring, river flow at the time of monitoring, as measured at the USGS Waltham Gage and local precipitation on the day of monitoring (24 hour total).
- (b) Facility operation data: the hourly intake temperature, the hourly discharge temperature, the hourly Facility temperature rise (intake versus discharge), the hourly discharge flow rate and the hourly Facility megawatt generation (related to heat load to the river) from 0000 hrs (midnight) to 2359 hrs on the day the monitoring took place. This information shall be obtained for each day that in-stream monitoring takes place.

2. Reporting Requirements

- (a) The permittee shall conduct the monitoring and reporting described in Parts I.A. 14.a., b. and c., and present the information in a “Monthly Monitoring Report” (MMR) and an “Annual Monitoring Report” (AMR). After one year’s collection of data under the Monitoring Program (MP), and before the permit’s expiration date, the permittee may request a modification to the Monitoring Program pursuant to Part I.A.15.a of this permit.
- (b) Unless otherwise specified, the results of all monitoring, including monitoring that is performed in addition to what is required in Part I.A.14.a., b. and c., shall be reported in the MMR and the AMR. The MMR shall contain all monitoring conducted during the month and be submitted as an attachment to the Facility Discharge Monitoring Report (DMR). The AMRs shall be submitted ninety (90) days after the end of the calendar year and include a compilation of all monthly data collections. All of these reports shall be sent to the same address as the DMR reports, under separate cover letter and as provided at the end of this permit. During any period after the expiration date of this permit and before reissuance, the Monitoring Program will continue and the Annual Monitoring Report submittals will be made each year.
- (c) Each AMR shall present the previous year's information. The AMR shall identify any anomalies or unexpected patterns or trends that appear in the annual data collection. The report must offer possible reasons for the anomalies, along with

supporting information, if available. The permittee will make recommendations for any additional or revised monitoring to better understand such anomalies should they reoccur.

- (d) Temperature and DO data recorded to determine compliance at all depths at Monitoring Stations 1 and 3 (including, whenever calculated, the Station 1 Measured Temperature and the Substituted Ambient Temperature Limit, as defined in Attachment A) shall be reported in the Compliance Section of the MMR and the AMR as well as stored electronically. If there were any occasions where the Station 3 Measured Temperature exceeded the Actually Applicable Temperature Limit (regardless of whether such exceedances constituted permit violations), the permittee shall include a separate table to be attached to the monthly DMR which will list the specifics of such exceedances (e.g. time of day, depth). The permittee may use the table shown in Attachment G or similar table to list these exceedances.
- (e) Compliance support temperature and DO data recorded at all depths at Monitoring Stations 2, 4, 5, 6, and when applicable, Monitoring Stations 7 and 8 (including the calculated Highest Cross-Transect Temperature, and Cross-Transect Reference Temperature, as defined in Attachment A), shall be reported in the Compliance Support Data Section of the MMR and AMR as well as stored electronically.
- (f) Supplemental temperature and DO data recorded at all depths at Monitoring Stations 2, 4, 5, 6, and when applicable, Monitoring Stations 7 and 8 (including the calculated Highest Cross-Transect Temperature, and Cross-Transect Reference Temperature, as defined in Attachment A), shall be reported in the Supplemental Data Section of the MMR and AMR as well as stored electronically.
- (g) For all water quality data described in Parts I.A.14.a., b. and c., the time and date of each collection, the associated meteorological and river flow data described in Part I.A.14.d.1(a), and the facility operation information described in Part I.A.14.d.1(b) for the day of monitoring will be assembled and, together with an electronic copy of the raw data, be included in the MMR and the AMR. Any electronic information must be compatible with a generally available spreadsheet program.
- (h) When in-river data cannot be collected due to unsafe conditions, as stated in Part I.A.14.a.1.(h), Part I.A.14.b.1(g) and Part I.A.14.c.1.(h) the permittee must document the specific reason(s) that prevented the data collection, including supporting information when appropriate. The permittee shall include this information in the MMR and the AMR.

3. Quality Assurance Project Plan (QAPP)

- (a) The permittee shall develop and submit to EPA at the address in Part I.B.3. a Quality Assurance Project Plan (QAPP) within sixty (60) days after the Effective Date of the permit in conformance with the applicable requirements of the EPA QA/R-5 document, published in March of 2001. This document is available at www.epa.gov/quality1/qa_docs.html. The QAPP shall encompass all measurements of all instream monitoring data and must describe how data will be reported and reviewed for accuracy and usability prior to its submittal to EPA and MassDEP. The permittee shall also provide its methods for calibrating the equipment that measures its influent and effluent temperature.
- (b) All Quality Assurance/Quality Control data will be reported and summarized in the AMR, including a detailed Materials and Methods and Instrument Calibration Section, supporting the results of the monitoring.
- (c) Instrument calibration and maintenance will be done in accordance with the manufacturers' recommendations and accepted water quality data collection practices and with the QAPP described in this Part. Instrument calibration and maintenance logs will be maintained for a minimum of five years and be made available for agency review upon request. Calibration or maintenance problems that have the potential to impact the accuracy of the data will be reported in the monthly DMR and also noted in the Annual Monitoring Report.

4. Adjustment To Monitoring Station Locations

- (a) As of the Effective Date of the permit, the Monitoring Stations identified in Part I.A.14 shall be located as shown in Attachment B. The following Monitoring Stations are expected to monitor areas of the Charles River with these water quality characteristics:
 - (1) Monitoring Station 1 – monitor an area of the lower Basin that is not influenced by the thermal plume from the facility discharge.
 - (2) Monitoring Stations 3, 4, 5, and 6 - evenly spaced Stations on a bank-to-bank transect perpendicular to the river flow that monitors the cross-section of the river where the thermal plume is expected to have the greatest impact. The distance between any two adjacent Monitoring Stations in this transect is the same as the distance from the Boston shoreline to Monitoring Station 3 and the distance from the Cambridge shoreline to Monitoring Station 6.

- (b) The permittee shall collect the following information under the conditions identified to determine whether the water quality characteristics listed in Part I.A.14.d.4.(a)(1) and (2) are generally represented by the locations of Monitoring Stations 1, 3, 4, 5, and 6, as shown in Attachment B:
- (1) The permittee shall collect temperature data on at least one occasion (i.e., the permittee must collect temperature data on one occasion, but may collect temperature data on additional occasions) that meet(s) all of the following conditions:
 - (i) during the first continuous July through August time period after the permit's Effective Date,
 - (ii) when the Charles River flow as measured at the Waltham USGS Gage is less than 150 cfs, and
 - (iii) when the facility is discharging at or near the maximum heatload and at or near a flow of 3.2 MGD.
 - (2) Temperature data shall be collected at Monitoring Stations 1, 3, 4, 5, and 6 as specified in Part I.A.14.a.1.(c) - (e) and Part I.A.14.b.1.(c) and (d).
 - (3) Temperature data shall also be collected, at a minimum, at locations approximately 400 feet upstream and downstream of Monitoring Stations 1, 3, 4, 5, and 6 as specified in Part I.A.14.a.1.(c) - (e) and Part I.A.14.b.1.(c) - (d).
- (c) Within 60 days of the last data collection event (but in no case later than October 31 of the year in which the data collection occurred), the permittee shall submit to EPA and MassDEP the complete temperature data required in Part I.A.14.d.4.(b) as part of a Monitoring Station Report. The report shall recommend whether the location of Monitoring Stations 1, 3, 4, 5, and/or 6 should be adjusted to better monitor the water quality characteristics listed in Part I.A.14.d.4.(a)(1) and (2).
- (d) Upon receipt of the Monitoring Station Report, EPA and MassDEP may accept or reject the permittee's recommendation. If EPA and MassDEP determine that the locations of one or more of Monitoring Stations 1, 3, 4, 5, and/or 6 should be adjusted to better monitor the water quality characteristics listed in Part I.A.14.d.4.(a)(1) and (2), EPA and MassDEP shall revise Attachment B to reflect any adjustment to the Monitoring Station locations, and shall send a revised Attachment B to the permittee by certified mail. This revised Attachment B will

take effect 30 days after it is mailed, and will be available to any person upon request to EPA or MassDEP.

e. In-stream Total Residual Chlorine (TRC) Monitoring

The permittee shall monitor for in-stream TRC once per month, only for those months during which the permittee chlorinates its cooling water. Sampling shall be conducted at the surface at Stations 2, 4 and 7 within one (1) to eight (8) hours of chlorination and be consistent with other conditions in footnote 5 of Part I.A.1. of this permit. This sampling shall be conducted concurrently with the effluent TRC monitoring, during or immediately after periods of chlorination at the Facility. The EPA reserves the right to waive this requirement after at least one year of sampling.

f. Outfall Pipe Monitoring

Once per month during April, May and June and for as long as the permit remains effective, the permittee shall conduct surveillance of Outfalls 001 and 002 and the Charles River in the vicinity of these outfalls. This monitoring is not required for any particular month that there is no discharge from these outfalls. For each such surveillance event, the permittee shall make reasonable efforts to document the presence, abundance and behavior of fish. Each surveillance event shall include visual inspection, photography or other means to effectively estimate fish numbers, characteristics and behavior (e.g.; spawning and congregating). These surveillance results shall be reported annually in the AMR.

g. In the event that the temperature monitoring or data logging equipment referenced herein is damaged, lost, or moved away from its standard location and the Facility becomes aware of the situation during a business day between 9 AM to 5 PM, the permittee shall notify EPA (G. Papadopoulos, ph: 617-918-1579) and MassDEP (G. Szal, ph: 508-767-2789) by telephone on that business day. If the temperature monitoring or data logging equipment is damaged, lost or moved away from its standard location and the Facility becomes aware of the situation at any other time, the permittee must notify EPA and MassDEP as early as practicable on the following business day. The permittee will have five (5) days from the discovery of the damage, loss or movement of such temperature monitoring equipment to re-establish the data collection and data logging capability.

h. The following parameters of Facility operation data, collected in accordance with Part I.A.1 of this permit, shall be collected continuously, with at least one recorded value (by data logger or other electronic means) per hour, for the same time intervals: intake temperature, discharge temperature, Facility temperature rise (intake versus discharge), discharge flow rate, Facility megawatt generation, and heat load to the river).

i. Regular Monitoring Program Evaluation

If DMRs or other required monitoring for any calendar year identify any anomalies or unexpected patterns or trends, the cover letter to the January DMR for the following calendar year must offer possible reasons for the anomalies, along with supporting information, if available. The permittee will make recommendations for any changes in the monitoring program considered necessary to understand the anomalies, if any.

15. Contingency for Reopener

a. If any of the monitoring conducted pursuant to this permit and/or any related studies indicate that there are water quality violations, that the Balanced Indigenous Population (“BIP”) is not being adequately protected due to the discharges from the Facility, or that a modification to the Monitoring Program of Part I.A.14 is warranted, or if a TMDL is approved for the Charles River basin, then this permit may be modified to include numerical limitations and/or other new or revised permit conditions. Any permit modification will be conducted according to 40 CFR §122.62, 122.63, 122.64 and 124.5.

b. Notwithstanding Part I.A.15.a, EPA and MassDEP may revise Attachment D by letter in accordance with Part I.A.15.b.1-3 below:

- (1) EPA and MassDEP may revise Attachment D by letter upon their own initiative, or upon the request of the permittee or any other person, if EPA and MassDEP have received, for each flow range depicted in Attachment D, as to which a revision is proposed, complete and QAPP-validated supplemental monitoring results for at least ten days on which Attachment D had predicted a temperature that was warmer than 1° F below the applicable temperature limit, and cooler than 5° F above the applicable temperature limit. These data will be available to any person upon request to EPA or MassDEP.
- (2) EPA and MassDEP may also revise Attachment D by letter if they determine in writing that application of the same or similar statistical techniques that generated Attachment D, or application of other generally accepted statistical techniques, shows that proposed revisions to Attachment D would predict the observed data described in Part I.A.15.b.1 more accurately, without increasing the percentage of false predictions of compliance, as compared to the version of Attachment D then in effect.
- (3) If EPA and MassDEP decide to so revise Attachment D, each agency shall send the permittee a letter by certified mail including the final revision to Attachment D. This letter will be available to any person upon request to EPA or MassDEP.

- c. Notwithstanding Part I.A.15.a, EPA and MassDEP may revise Part I.A.3 by letter as follows. After two consecutive years of non-detect results for one or more of the priority pollutants analyzed, the permittee may submit to EPA and MassDEP a request to remove the requirement to sample such pollutant(s). EPA and MassDEP may then remove or, alternatively, reduce the sampling frequency of the requirement to sample such pollutant(s). If EPA and MassDEP decide to so revise Part I.A.3, EPA shall send the permittee a letter by certified mail stating the revisions. This letter will be available to any person upon request to EPA or MassDEP.

B. MONITORING AND REPORTING

For a period of one year from the effective date of the permit, the permittee may either submit monitoring data and other reports to EPA in hard copy form or report electronically using NetDMR, a web-based tool that allows permittees to electronically submit discharge monitoring reports (DMRs) and other required reports via a secure internet connection. Specific requirements regarding submittal of data and reports in hard copy form and for submittal using NetDMR are described below:

1. Submittal of Reports Using NetDMR

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

DMRs shall be submitted electronically to EPA no later than the 21st day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA and will no longer be required to submit hard copies of DMRs to MassDEP. However, permittees shall continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP.

2. Submittal of NetDMR Opt-Out Requests

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

Attn: NetDMR Coordinator

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

and

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

3. Submittal of Reports in Hard Copy Form

Monitoring results obtained during the previous month shall be summarized for each month and reported on separate discharge monitoring report (DMR) forms and other forms as described in **Attachment G** and postmarked no later than the 21st day of the month following the Effective Date of the permit and monthly thereafter. The **Annual Monitoring Report** is also due no later than ninety (90) days after the **close of the calendar year** of the Effective Date of the permit and annually thereafter, as described in Part I.A.14.d. In addition, a record of monitoring data in an electronic format must be provided to EPA and/or MassDEP upon request, within a reasonable time period. The electronic format must be readable and presented in a generally available spreadsheet software program.

Mirant Kendall, 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 Kendall. Effluent information shall not be regarded as confidential.

Signed and dated originals of the DMRs, and AMRs required herein, shall be submitted to the Director and the State at the following addresses:

U.S. Environmental Protection Agency
Water Technical Unit (SMR-04)
5 Post Office Square - Suite 100
Boston, MA 02109-3912

The State Agency is:

Massachusetts Department of Environmental Protection
Bureau of Resource Protection
Northeast Regional Office
205B Lowell Street
Wilmington, MA 01887

In addition, copies of all DMRs only and all other notifications 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

Copies of all notifications, data submittals, and QAPPs, with the exception of DMRs and AMRs shall be sent to the following address:

U.S. Environmental Protection Agency
5 Post Office Square - Suite 100
Mailcode OEP 06-1
Boston, MA 02109-3912
Attention: George Papadopoulos

The AMRs will also be submitted to the following addresses:

Massachusetts Coastal Zone Management
251 Causeway Street, Suite 800
Boston, MA 02114
Attention: Todd Callaghan

and

Massachusetts Division of Marine Fisheries
Annisquam River Marine Fisheries Station
30 Emerson Avenue
Gloucester, MA 01930
Attention: Jack Schwartz, Ph.D.

C. STATE PERMIT CONDITIONS

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.

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.

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.

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

STATEMENT OF BASIS

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
PERMIT MODIFICATION TO DISCHARGE TO WATERS OF THE UNITED
STATES PURSUANT TO THE CLEAN WATER ACT (CWA)

NPDES PERMIT NUMBER: **MA0004898**

PUBLIC NOTICE START AND END DATES: October 25, 2010 – November 23, 2010

NAME AND MAILING ADDRESS OF APPLICANT:

**Mirant Kendall, L.L.C.
1099 Hingham Street
Rockland, MA 02370**

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

**Mirant Kendall Cogeneration Station
265 First Street
Cambridge, MA 02142**

RECEIVING WATER(S): **Charles River and Broad Canal**

RECEIVING WATER CLASSIFICATION(S): **Class B - Warm water fishery,
Restrictions: CSO**

SIC CODE: **4961**

CURRENT PERMIT - ISSUED: September 26, 2006; **APPEALED:** October 30, 2006

MODIFIED: December 18, 2008; **APPEALED:** February 2, 2009

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I. Summary of Proposed Action

EPA is proposing a modification to the Final Permit issued by EPA Region 1 to Mirant Kendall Station on September 26, 2006 (the Final Permit or the 2006 Final Permit). The Final Permit has yet to take effect because in October 2006, both the permittee (Mirant Kendall) and the Conservation Law Foundation (CLF), with Charles River Watershed Association (CRWA) as co-petitioner, petitioned EPA's Environmental Appeals Board (EAB) in Washington, D.C., for review of the Final Permit.

This modification concerns the major changes that the permittee is proposing for its facility which will substantially reduce the intake of cooling water from the Broad Canal and result in a commensurate reduction in the volume and heat load associated with the effluent discharged to the Charles River.

A. Background

1. 2006 Permit, 2008 Modification, and Ongoing Appeal

The Final Permit included both thermal discharge limits imposed under Clean Water Act (CWA) § 316(a) and cooling water intake structure (CWIS) requirements imposed under CWA §§ 316(b), 301(b)(1)(C), and 401(a)(1) and (d). In October 2006, both the permittee (Mirant Kendall) and CLF, with CRWA as co-petitioner, petitioned EPA's Environmental Appeals Board (EAB) in Washington, D.C., for review of the Final Permit. Following a decision of the United States Court of Appeals for the Second Circuit and EPA's subsequent suspension of a regulation upon which the Final Permit had been partly based, the Region requested (and the EAB granted) a stay of proceedings so that it would withdraw the provisions of the 2006 Final Permit that were informed by the suspended portions of the regulation and prepare a permit modification to address the withdrawn permit provisions.

A permit modification was issued on December 18, 2008 containing specific requirements related to Kendall Station's cooling water intake structures (CWISs) which established requirements designed to minimize both entrainment and impingement mortality of fish. The biological data indicates that, under current operation, Kendall Station's CWISs entrain significant numbers of fish eggs and larvae on a seasonal basis (from approximately April through July). At that time, the technological data indicated that screening systems exist that should be able to reduce entrainment while also allowing the organisms blocked from being entrained to escape the screening system without suffering impingement mortality. The permit modification required, among other things, the use of an aquatic organism exclusion technology meeting certain technical design standards (*e.g.*, a maximum screen opening or pore size) that should minimize entrainment (the "primary BTA technology"). The permit modification further sought to minimize impingement mortality by requiring that whenever the primary BTA technology is not in place and functioning properly, the permittee must implement a coarse-mesh barrier net system meeting certain design criteria geared to minimize impingement mortality (the "secondary BTA technology"). The permit modification

further required that whenever neither the primary BTA technology nor the secondary BTA technology are in place and functioning properly, the permittee must operate the existing traveling screens in a manner intended to minimize impingement mortality (the “tertiary BTA technology”).

On February 3, 2009, Mirant Kendall appealed the 2008 permit modification to the EAB.

2. Discussions Regarding Further Permit Modification

As EPA was completing the 2008 permit modification, the parties (Mirant Kendall, EPA, MassDEP, CLF, and CRWA) began discussing a potential facility upgrade and accompanying NPDES permit modification that could resolve the appeal. The parties requested (and the EAB granted) a stay of proceedings to explore settlement, and, over the course of 2009 and 2010, the EAB extended this stay at the parties’ request on several occasions. This proposed permit modification is the outcome of these settlement discussions.

3. Current Proposed Permit Modification

On October 15, 2010, Mirant Kendall submitted to EPA a formal request for a permit modification. The request included an explanation of Mirant Kendall’s proposed upgrade and post-upgrade operations, and of why Mirant Kendall believes a modification is appropriate. The request also included, as an attachment, a proposed permit modification, which forms the basis of this draft permit modification.

Although this new draft permit modification is formally a modification of the 2006 Final Permit, rather than a new draft permit, it replaces many of the provisions of both the 2006 Final Permit and the 2008 modification, and therefore effectively supersedes them. The permittee’s proposed reductions in pollutant discharges and intake water volume have been determined to meet Best Available Technology, CWA § 316(a) variance, and Best Technology Available requirements. Therefore, many of the thermal control provisions of the 2006 Final Permit, and the screening technologies and related measures required by the 2008 modification, are not needed anymore and have been removed from the permit and replaced with new provisions.

II. Permit Modification and Basis

A. Current Facility Operation

Water needed to cool and condense steam exiting the Facility’s turbines is withdrawn from the Broad Canal, which is a channel connected to the Charles River, through three permitted intake structures. This cooling water is circulated through the Facility’s three condensers, where the heat from the condensers is transferred to the water. This heated water is eventually discharged to the Charles River.

The Facility's CWISs include a multi-tiered system of screens designed to minimize the amount of debris entering the Facility. The existing intake water (approach) velocities range from approximately 0.8 to 0.9 feet per second (fps) at the intake screens (Alden Research Laboratory, November 21, 2007). There are two intake water screen houses, with one housing 2 CWISs and the other housing the third CWIS. Six pumps (each capable on average of producing a flow of approximately 13 million gallons per day (MGD)) are used to control flow of the cooling water through the screen houses and to the condensers, two per CWIS and condenser. The Facility does not have variable control speed pumps but rather can regulate flow by turning on or off any sequence of pumps. Each intake structure includes a trash rack and traveling screen. The trash racks are located across the three six-by-ten-foot inlets along the Broad Canal; their steel bars are spaced three inches apart and collect large debris such as plastic and wood fragments that may be in the intake water.

Located downstream of the trash racks are the traveling screens that intersect each intake's cross-sectional area. The traveling screens are divided into six-foot-by-one-foot panels and are located perpendicular to the flow of the water. The screen mesh size is three-eighths (3/8) of an inch. This mesh size is too large to prevent the entrainment of any fish eggs or larvae, or other tiny organisms, present in the water withdrawn for cooling. The traveling screens are rotated three times per day and cleaned with river water that is returned to the Broad Canal. Any fish or debris caught on the screens is placed in a holding bin and eventually disposed of so that impingement mortality is 100%.

B. Proposed Facility Operation

Mirant has proposed to make significant changes to its facility which will allow it to produce considerably more steam for sale than it is currently producing. This will eventually result in a significant reduction in the withdrawal of water from the Lower Charles Basin as well as a commensurate reduction in the heat load discharged from the facility. This is also expected to result in indirect air quality improvements as Kendall Station's steam sales into Boston may replace steam that is currently supplied by other sources (e.g., older, less-efficient boilers) that have higher air emissions than Kendall Station. Mirant's plan relies on the construction of a new steam pipeline to be constructed along the Longfellow Bridge, which will be owned and operated by Trigen-Boston Energy Corporation, or "Trigen."¹ Mirant has determined that the construction and operation of a back pressure steam turbine (BPST) and an air cooled condenser (ACC), in conjunction with the proposed steam pipeline, will allow it to sell up to twice as much steam as it is currently able to.

Since the construction and operation of the steam line along with the BPST and ACC are multi-year projects, the parties have discussed, and EPA plans to issue, an administrative compliance order which will set timelines for construction and operation of the BPST and

¹ The Trigen steam line will be built in coordination with the Massachusetts Department of Transportation's Longfellow Bridge Rehabilitation Project. For more information on that project, see: <http://www.massdot.state.ma.us/Highway/abp/longfellow.aspx>.

ACC, and establish interim permit limits and conditions. The final compliance order would not be issued until after this permit modification has been finalized, and is not part of the comment process for this draft permit modification.

Once the facility upgrades have been completed and Mirant is selling steam as planned, it expects that the non-contact cooling water flow will be reduced from a daily maximum of 80 MGD to 3.2 MGD, which represents a reduction of over 95%. The through-screen velocity at the intake screens would also be reduced to 0.5 feet per second or less. Mirant also expects the heat load to be reduced from the currently permitted 13,344 million (mm) BTUs/day to a maximum of 534 mm BTUs/day, a decrease of more than 96%. Moreover, according to Mirant, these upgrades will allow Kendall Station to operate more economically, by allowing Kendall Station to sell up to twice as much steam into Boston as is currently possible. Mirant has proposed, and EPA agrees, that these reductions represent the Best Technology Available (BTA) for minimizing adverse environmental impacts from the impingement and entrainment of fish as required under Section 316(b) of the CWA, and the Best Available Technology (BAT) for controlling the discharge of heat, as required under Section 301(b) of the CWA.

However, even after installation of this technology, the Station's discharge would cause certain portions of the Lower Charles River Basin to exceed the in-stream temperature criteria of the Massachusetts water quality standards (83 °F for Class B waters). Therefore, the permittee has requested a variance from this water quality standard under Section 316(a) of the Clean Water Act.

The permittee has also requested that the permit provide alternate technology-based limitations under Section 316(b) during certain operational conditions. According to the permittee, while the BPST and ACC are reliable technologies, industry experience regarding this type of equipment indicates the need for occasional planned shutdowns of the BPST and ACC to conduct preventive maintenance or repairs, as well as occasional shutdowns for unplanned repairs. These conditions would be characterized as either Planned Maintenance Operations (PMO) or Unplanned Repair Operations (URO). PMO occurs when the permittee would conduct scheduled maintenance for the BPST, the ACC, and/or any steam line from the site which would necessitate open-cycle operations with intake and discharge flow of 52.2 MGD (and concomitant increase in total heat load to the river). URO occurs if there is an unexpected failure of a component of the BPST, ACC, and/or the steam line from the site, which would require a similar shutdown of a major system component as with the PMO, but without the advanced knowledge of such an event. In order to account for these conditions, the permit will allow for operations under either of these scenarios which would allow for the intake and discharge of up to 52.2 MGD under specified limited circumstances.

The permittee may operate under a PMO only for the time period and duration specified in the draft permit and may not conduct PMO for more than a total of 30 days out of any rolling five-year period. See Part I.A.11.b. of the draft permit modification for other requirements related to PMO operations. Under URO, the permittee would be authorized to continue operating the Facility, resulting in the discharge or withdrawal in excess of

3.2 MGD, due to the unplanned unavailability (for physical, technical, and/or safety reasons) of the BPST, the ACC, and/or the steam line. The permittee shall not withdraw water through any of the CWISs under Part I.A.11.c for more than a total of 30 days out of any rolling five-year period. See Part I.A.11.c of the draft permit modification for other requirements related to URO operations. In addition, any time the facility operates under PMO or URO, the draft permit modification includes specific technology-based permit provisions related to the operation of the CWISs in compliance with CWA § 316(b).

As previously indicated, the BPST/ACC technologies include, as an inherent limitation in the technologies themselves, the occasional necessity for planned maintenance and/or unplanned repairs. Because of this, EPA has determined that, at a maximum daily intake of 52.2 MGD, and in combination with the limitation on total number of days of PMO/URO operation, the requirements associated with intake velocity and screen rotation, inspection, and handling of live fish during PMO/URO operation, as specified in Part I.A.11.d of the draft permit, are consistent with BTA to reduce impingement mortality at the CWIS.

C. Section 316(a) Variance and Thermal Limits

Under CWA § 316(a), if a permittee can demonstrate to the satisfaction of EPA that a technology-based or water quality-based effluent limit for heat is “more stringent than necessary to assure the projection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made,” then EPA may impose an alternate heat effluent limitation “that will assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on that body of water.” 33 U.S.C. § 1326(a).

The 2006 permit contained end-of-pipe thermal limits and enforceable in-stream thermal limits that were based on a § 316(a) variance designed to maintain a zone of passage and habitat protective of a balanced, indigenous population (BIP). See “Clean Water Act NPDES Permitting Determinations for Thermal Discharge and Cooling Water Intake from Mirant Kendall Station in Cambridge, MA” (“Determination Document”), available at http://epa.gov/ne/npdes/mirantkendall/assets/pdfs/draftpermit/Kendall_Determin-Doc_06_08_04.pdf. At that time, EPA concluded that the need to discharge more heat than would be allowed by setting end-of-pipe limits protective of in-stream temperatures required a more complex and innovative thermal monitoring regime than is typical of NPDES permits in order to support a BIP, as required under § 316(a). In this modification, EPA has not changed the end-of-pipe thermal limits or in-stream thermal endpoints from the 2006 permit because they were based on an extensive analysis of the thermal requirements of the BIP. However, because the proposed changes to the operations at Mirant Kendall will reduce the discharge volume and heat load to the river, the thermal impacts of the discharge are not expected to be as detrimental as the impacts under current (pre-upgrade) operating conditions. The end-of-pipe thermal limits in the 2006 Final Permit (105° F, with a 20° F facility temperature rise) at the reduced volume are expected to maintain protective in-stream temperatures under most circumstances, but

there will be circumstances under which Kendall Station's discharge, even at lower levels, has the reasonable potential to cause or contribute to an exceedance of these protective in-stream temperatures. Mirant proposes, and EPA agrees, that further temperature restrictions should be based on an in-stream temperature measurement and compliance mechanism, similar to (but less complex than) the mechanism in the 2006 Final Permit.

The draft permit modification proposes a less complex and intensive monitoring regime based on the use of a temperature grid that predicts afternoon river temperatures based on morning intake temperatures. This approach employs a predictive approach regarding whether the in-stream temperature limits are expected to be met and determines if the permittee is required to monitor river temperature on a given day. To be clear, this permit modification does *not* alter the biologically-based in-stream temperature endpoints set forth in EPA's 2006 permit, but rather provides a simpler, less expensive compliance mechanism to ascertain whether the facility's (now greatly reduced) discharges are achieving those endpoints.

1. Summary of Compliance Mechanism

The 2006 Permit defined seasonal protective maximum temperatures (known as the Maximum Temperature Limits, or MTLs), at an extensive array of points (eight locations and approximately four depths at each location) in the Charles River, and then required real-time in-stream compliance monitoring at each of those points.² The currently proposed operation (including use of an ACC and BPST) will drastically reduce the heat load to the Charles River. As such, EPA believes that the in-stream thermal limits will likely be met much of the time, and intensive real-time monitoring is no longer necessary.

Instead, EPA has developed a new framework to direct in-stream monitoring (see Attachment D of the permit modification). While the resulting mechanism still has many complex elements, it is in most respects simpler than (but just as protective as) operating a network of in-stream real-time monitoring stations.

The draft permit modification retains the MTLs as the in-stream temperature endpoints that constitute protection of the BIP. EPA has developed a simple but conservative model (in the form of a grid) to predict, given morning temperatures and river flows, whether in-stream temperatures may approach the MTLs during the hottest part of the day (the afternoon). Each day, Mirant must consult the grid based on the morning's river temperature and river flow. If the grid predicts that afternoon temperatures may approach the MTLs, then Mirant must conduct in-stream temperature monitoring that afternoon to determine if there is actually an exceedance. Such an exceedance constitutes a permit violation unless Mirant can demonstrate that one of several precisely defined exceptions applies. In addition, the permit also contains a "failsafe" condition under which Mirant will curtail operations if there are several consecutive days of high temperatures. Details of this approach are discussed below.

² See Determination Document at 122-170.

2. Selection of compliance monitoring location (Monitoring Station 3)

As noted above, the extensive modifications associated with the proposed operation of the ACC and BPST are expected to result in a 95% reduction in intake water and 96% reduction in heat load to the Charles River. Given that these reductions will likely lead to improvements in water quality and habitat, EPA examined surface temperatures recorded at several monitoring locations during 2008 to determine if attainment of the protective in-stream temperatures in the 2006 Permit could be ensured by measuring at a single location.

Of the four monitoring locations downstream of the Harvard Bridge (Boston, Longfellow, Museum, and Dam), the Boston thermistor consistently recorded the highest maximum daily 4-hour average, and would have consistently captured a maximum daily 4-hour average temperature in exceedance of the proposed in-stream thermal limits when any other monitoring location also recorded an exceedance if these limits were effective in 2008. EPA concludes that a location near the Boston thermistor would be a suitable monitoring location to use as a proxy for the rest of the monitoring locations in order to determine if the facility is meeting in-stream thermal limits. The modification applies the numeric, in-stream thermal limits from the 2006 permit at one location (Monitoring Station 3) near the Boston Thermistor, but also requires additional supportive and supplemental monitoring at several additional locations to ensure that Station 3 accurately reflects temperatures in the Lower Basin.

3. Calculation of Predictive Temperature Grid (Attachment D)

As noted above, the draft permit modification's compliance mechanism requires Mirant to consult a grid that is designed to predict whether the in-stream temperatures are likely to approach or exceed the MTL. To develop this grid, EPA used existing in-stream temperature and facility heat load data to model afternoon river temperature based on the morning intake temperature at the CWIS. EPA calculated a predicted afternoon temperature in two stages: (1) a standard increase to model the increase in intake temperature from 9:00 AM to 2:00 PM, and (2) the difference (delta T) between the observed temperature at the Boston thermistor and the temperature at Mirant Kendall's intake based on temperature and heat load data between 2003 and 2008. The underlying assumption was that, if reliably defined, the relationship between the morning intake temperature and the afternoon river temperature could be used to predict whether the facility would exceed in-stream compliance temperatures on a given day. In turn, this prediction determines whether afternoon in-stream monitoring is required on a given day. As a conservative measure, in-stream monitoring is triggered when the afternoon temperature is expected to be within 2°F of the MTL. Conversely, if the afternoon temperature on the Boston side is predicted to be cooler than the MTL by more than 2°F, in-stream monitoring is not required.

4. In-stream Temperature Compliance Requirements

The in-stream temperature compliance requirements are contained in Part I.A.1 footnote 7 and Attachment A. Broadly speaking, Attachment A defines certain key terms, and Part I.A.1 footnote 7 provides the operational conditions. Briefly, the in-stream temperature compliance requirements are designed to prohibit Kendall Station from discharging heated effluent that causes, or contributes to, an exceedance of protective in-stream temperature endpoints. The central element of the compliance requirement is a prohibition on discharge of heated effluent unless MTLs are attained at all depths at Monitoring Station 3. However, the permit modification contains a set of carefully circumscribed exceptions through which the permittee can demonstrate that, despite a measured exceedance of an MTL at Monitoring Station 3, Kendall Station did not cause or contribute to that exceedance,³ or (for other exceptions) the exceedance is still consistent with protection of the BIP. Very briefly (and as explained in more detail below), those exceptions are:

- i. *The “upstream/downstream exception.”* Natural variability can result in the river already exceeding MTLs even without Kendall Station’s discharge. In some cases this can occur throughout the river; in other cases, upstream conditions (as measured at the B.U. Bridge) may fall below the MTL but temperatures near Monitoring Station 3 can be warmer due to natural variability. This could potentially result in an exceedance of the MTL at Station 3 that may not be attributable to the facility’s discharge. Therefore, the draft permit modification allows the measured temperature at Station 3 to exceed the MTL if Mirant can demonstrate that the Station 3 temperature does not exceed the upstream temperature plus an “upstream/downstream buffer” (which varies depending on circumstances, but is typically 1.0° F) to account for natural upstream/downstream variation.
- ii. *The “cross-transect exception.”* Natural variability can also result in the temperature at Monitoring Station 3 (on the Boston side of the river) being warmer than the temperatures closer to the Cambridge side of the river (where Kendall Station discharges). In other words, it is possible that Kendall Station’s thermal plume might dissipate mid-river, yet due to entirely unrelated circumstances, the Boston side of the river could be warmer than the MTL. This could potentially result in an exceedance of the MTL at Station 3 that may not be attributable to the facility’s discharge. Therefore, the draft permit modification allows the measured temperature at Station 3 to exceed the MTL if Mirant can

³ To be clear, the draft permit modification does not rely on case-specific demonstrations as to whether Kendall Station’s discharge did or did not “cause or contribute to” a particular in-stream temperature exceedance. Rather, in developing the draft permit modification, EPA has defined precise exceptions to the general prohibition on discharge of heat, whereby certain categories of in-stream temperature exceedances are excepted because of insufficient certainty that exceedances in that category would be caused or contributed to by Kendall Station’s discharge. By contrast, in-stream temperature exceedances that do *not* qualify for one of the defined exceptions are, *per se*, permit violations.

demonstrate that mid-river temperatures do not exceed the MTL (or, if higher, the background temperature).

- iii. *Deep measurement exceptions.* The draft permit modification allows the deepest monitoring point (24-foot depth) to exceed the MTL when it is unlikely to be used as habitat due to low dissolved oxygen, or during the winter when a type of unique “reverse” thermal stratification may occur.
- iv. *Springtime exceptions.* As in the 2006 permit, the draft permit modification recognizes that temperatures can vary widely during the spring, and allows the permittee to exceed applicable temperatures up to six times during the period of April 15 to June 7.

These exceptions are discussed below in more detail.

i. Upstream/Downstream Exception

In a November 24, 2009 email, Mirant stated that, based on historical data, “differences of 1° F or more between background temperatures and Station 3 were not uncommon even with zero thermal discharge.” Consequently, Mirant requested that a buffer be built into the permit that would provide that certain small exceedances of the MTL at Station 3 would not constitute permit violations. This buffer would account for natural sources of variability in the river that could cause the temperature at Station 3 to exceed the MTL without the contribution of the thermal discharge from Outfall 001 of the facility.

EPA recognizes that natural variability between the upstream Station 1 (near the B.U. Bridge) and Station 3 could potentially result in an exceedance of the MTL at Station 3 that may not be attributable to the facility’s discharge. To this end, EPA proposes that when the temperature at Station 3 is above the MTL, the applicable temperature limit shall be the background temperature (i.e., the corresponding-depth temperature at Station 1), plus an “upstream/downstream buffer” that, under most circumstances, is 1.0° F. EPA believes a 1.0° F buffer is appropriate because, based on analysis of the differences between Mirant’s Harvard Bridge Station and a location upstream of EPA’s Station 3 (Mirant’s Boston location) at times when the facility was not operating, a 1° F buffer sufficiently encompasses the natural variability between the two monitoring locations. Thus, if the Station 3 temperature is within 1° F of the Station 1 temperature, the facility is not in violation of the permit. If the Station 3 temperature is 0.4° F above the MTL, but the Station 1 temperature is 0.6° F below the MTL, then the Station 3 temperature is meeting its applicable temperature limit because it is within 1.0° F of the Station 1 temperature. In other words, the applicable temperature limit at Station 3 is the MTL *or* the Station 1 temperature plus 1.0° F, whichever is greater.

The upstream/downstream buffer is 1.0° F under most anticipated circumstances. A 1° F buffer adequately captures the natural variability between the monitoring stations in the permit. To be specific, based on present information, EPA is *not* stating that any Station 3 MTL exceedances that are within 1° F of the Station 1 temperature are necessarily protective, *nor* that such exceedances are not attributable to Kendall Station’s discharge. Rather, for any given Station 3 MTL exceedance that is within 1° F of the Station 1

temperature, there is insufficient certainty (based on present information) that such an exceedance would be wholly or partly attributable to Kendall Station's discharge. For this reason, with a few exceptions, Station 3 temperatures that are within 1° F of the corresponding-depth Station 1 temperature qualify for this exception. On the other hand, present information suggests that differences above 1°F are sufficiently likely to be wholly or partly attributable to effects of the plant's heated effluent that, in the context of the entire permit scheme and absent another exception provided by the permit itself, it is appropriate for the permit to provide that any Station 3 exceedances that are more than 1° F above the Station 1 temperature are (absent another applicable exception) *per se* permit violations on days when Mirant Kendall is discharging heat.

As noted above, the upstream/downstream buffer is normally 1.0° F. However, there are two potential instances that may occur within the Chill Period (November 1 through March 29) where the exception has been increased to 2.0° F. Both these instances allow for an increased buffer to account for natural variability during a mild late fall/early winter that could result in higher temperatures at Monitoring Station 3 independent of Kendall Station's thermal discharge. In this case, EPA believes a 2.0° F buffer is appropriate because, based on an analysis of Kendall Station intake water temperatures from 1994 through 2002 (Kendall Station Determination Document; Figures 5.9.2-15 to 5.9.2-23) ambient water temperatures in the Charles River were sometimes seen to remain above a temperature of 50° F during the onset of the Chill Period or be slightly below 50° F and then increase above 50° F during a mild weather pattern. An addition of 1.0° F to the exception of 1.0° F is still protective of the BIP when water temperatures are cool and uniform in the lower Basin. The additional 1.0° F buffer provides the Facility with some operational flexibility when the ambient river temperature has exceeded the maximum temperature in effect for the chill period, without diminishing protection of the BIP.

Finally, certain ambient river conditions can create a scenario where protection of the BIP requires no upstream/downstream buffer. This occurs when dissolved oxygen (DO) values at Station 1 measured at 2 feet and 6 feet, as well as the Station 3 DO values at 2 feet and 6 feet are *all* below 5.0 mg/l. DO values below 5.0 mg/l do not meet Massachusetts Water Quality Standards and are below levels considered suitable for fish habitat. EPA believes that addition of 1.0° F above the Station 1 temperature is no longer appropriate under these extreme conditions, when a large part of the lower Basin is exhibiting depressed DO conditions that are stressful to the balanced indigenous fish population.

On a final note, as stated above, the 1° F buffer and other temperature exceptions included in the draft permit, are based on a review of presently available data comparing Mirant's Harvard Bridge Station to Mirant's Boston thermistor as well as historical intake water temperature data from the Facility. Analysis of data collected under the permit's Supplemental In-stream Temperature Monitoring program (including any data voluntarily collected by Mirant pursuant to the same protocols provided by that program) may justify an adjustment to this buffer in the future.

ii. Cross-Transect Exception

If an exceedance at Station 3 does not qualify under the “upstream/downstream” exception, Mirant may attempt to demonstrate that the cross-transect exception should apply by measuring the temperature at mid-river locations. Mirant must measure the corresponding depths at each of Monitoring Stations 4 and 5 (and, for Monitoring Points 12 feet and deeper, Monitoring Station 6), and select the highest. For example, if the temperature at the 12 foot depth at Monitoring Station 3 exceeds the MTL and also exceeds the upstream temperature by more than the “upstream/downstream buffer,” then the temperatures at the 12-foot depth at each of Monitoring Stations 4, 5, and 6 would be compared. The highest of these three temperatures would constitute the “Highest Cross-Transect Temperature” for that depth. The Highest Cross-Transect Temperature would then be compared to the MTL and the upstream temperature for that depth. If the Highest Cross-Transect Temperature does not exceed the MTL, then the middle portion of the river is at a protective temperature, and the exception applies, because the BIP is protected notwithstanding the Station 3 exceedance. Alternatively, if the Highest Cross-Transect Temperature exceeds the MTL but does not exceed the upstream temperature for that depth, then the middle portion of the river near Kendall Station’s discharge is no warmer than the upstream temperature, and any exceedance on the Boston side is not attributed to Kendall Station’s discharge.

iii. Deep Measurement Exceptions

Two exceptions may apply for the 24-foot depth: one dependent on dissolved oxygen, and one seasonal. First, the draft permit modification allows the deepest monitoring point (24-foot depth) to exceed the MTL when it is unlikely to be used as habitat due to low dissolved oxygen. This provision follows reasoning included in the 2006 permit. It is based on the premise that a zone of depth in the lower Basin, no matter what the temperature, is not considered to be suitable habitat when the accompanying DO is less than 5.0 mg/l (the Massachusetts Water Quality Standard for DO). Areas of low DO may cause fish to abandon that habitat or become stressed if they remain. This degraded habitat does not support a balanced indigenous population, so it is specified as a deep water exception when the accompanying temperature exceeds the MTL.

The second type of exception is only allowed under certain circumstances during the late fall/early winter season, when a type of unique thermal stratification may occur. This “reverse thermal stratification” is characterized by relatively warm (above 50° F), dense, saline water from Boston Harbor, which seeps into the lower Basin through the New Charles River Dam and Locks and sinks to the deepest portions of the river bed. When a large enough volume of this dense water enters the Basin, depths up to 24 feet may be affected. Cold (below 50° F), but less dense fresh water flows downstream from the Charles River Watershed and “floats” at shallower depths on top of the dense saline lens. In this case, the warm deeper water is a result of the site-specific hydrologic conditions of the lower Basin. Kendall Station’s thermal discharge does not contribute to the elevated temperatures of this deep water, so an exception is allowed when this warm, dense water reaches 24 feet and exceeds the MTL.

iv. Springtime Exceptions

These are carried forward from the 2006 permit. While their implementation has been translated into the compliance mechanism of this draft permit modification, the definitions of the springtime exceptions, their applicability, and their justification have not changed from those set forth in the 2004 Draft Permit Determinations Document (pp. 169) and need not be repeated here.

5. Failsafe condition

The draft permit modification also contains a “failsafe” condition proposed by Mirant to ensure that consecutive warm days do not result in an unacceptable condition. The failsafe condition is triggered when three criteria apply for each of two consecutive days:

1. The facility discharged heated effluent.
2. The permittee was required to conduct compliance temperature monitoring (either because the predictive grid predicted warm temperatures, or because the facility was operating under open-cycle conditions) and the temperature at Station 3 at any depth exceeded the applicable temperature limit by more than 0.5° F.
3. The temperature at Station 3 exceeded Kendall Station’s intake temperature by more than 1.0° F (with both the intake and the Station 3 temperatures for this purpose being measured as vertical averages of afternoon temperatures).

If all three criteria are true for both days, then the facility will not discharge any heated effluent at all on the third day. This failsafe condition supplements the core in-stream temperature compliance mechanism and helps ensure protectiveness.

6. In-stream Temperature Monitoring

i. In-stream Temperature Monitoring Under BPST and ACC Operation

Several key operational aspects of Kendall Station justified the continuous, real time in-stream temperature monitoring required in the 2006 permit. The rationale supporting the extensive in-stream temperature monitoring is fully discussed in the 2004 Kendall Station Determination Document at pp. 149-160. One supporting example is given here. The proposed maximum daily water withdrawal at Kendall Station under the 2006 permit was limited to 80 MGD, which is approximately 123 cfs, resulting in a heat load discharge of 556 MMBTU/hour. The average flow of the Charles River near the station is 113 cfs in August, and the low flow, 7Q10 value for the lower Charles River Basin is approximately 22 cfs. Kendall Station’s discharge, under these flow profiles and expected heat load, was likely to be a major thermal influence in the lower Basin that could quickly modify the thermal profile of the lower Basin. The volume of the thermal plume was documented to reach as far upstream as the Harvard Bridge. A real-time temperature monitoring system in the river was deemed the best way for Kendall Station to maintain a degree of

operational flexibility while also providing a mechanism to ensure that fish passage and suitable fish habitat were maintained.

In addition, at the time the permit was written, a validated thermal model of the lower Basin was not available. Only a limited amount of river temperature data from a few in-stream locations and depths was available. The data were insufficient to predict river temperatures in one part of the Basin based on temperatures at another location. EPA determined that a minimum of nine fixed in-stream monitoring stations were required to monitor the thermal plume continuously to ensure that protective in-stream temperatures were maintained.

Under the provisions in this draft permit modification, Kendall Station's BPST and ACC operational profile will be very different. A 3.2 MGD intake flow limit represents a reduction of over 95% from the 2006 permit. The heat load is expected to decrease more than 96%. Coupled with these dramatic operational changes, the permittee submitted additional continuous temperature data from areas in the lower Basin. The analysis of these data sets has allowed EPA to better understand the thermal interactions of the lower Basin when the Facility operated at lower levels.

The large reduction in heat load has greatly reduced the potential for the Facility's discharge to raise temperatures throughout the Basin, especially within a short time period. This has allowed EPA to remove the requirement for real-time, continuous, fixed temperature monitoring stations.

EPA has analyzed supplemental temperature data from the Basin and identified two key representative temperature monitoring locations needed to monitor the thermal profile of the Basin when Kendall Station is withdrawing river water at a rate of 3.2 MGD. EPA has reduced the number of monitoring locations from nine to two when the Facility is operating at this level. Station 1, the upstream station below the B.U. Bridge will serve as the ambient river temperature, or background station. This station location is similar to the Station 1 described in the 2006 permit (Permit Attachment B). Station 3 is also retained as part of the draft permit. This station, nearest to the Boston shore and downstream of the facility's discharge, is placed in a similar location to Station 3 as described in the 2006 permit (Permit Attachment B).

ii. Compliance Support and Supplemental Temperature Monitoring

EPA has identified Station 1 and Station 3 as the two representative locations needed to determine permit compliance in the lower Basin under expected conditions. With temperature information from only these two stations, EPA must assume that the discharge from Kendall Station has the characteristic of a "text book" thermal plume. The plume is expected to move downstream and spread out from the Cambridge side of the river to the Boston side of the river. Water temperatures are expected to diminish as the plume moves downstream and across the river.

However, EPA recognizes that:

- (1) The Charles River lower Basin is a dynamic water body. The river temperature data sets analyzed do not reflect river temperature conditions under all meteorological and hydrologic events. Basin conditions will not always allow the thermal plume to follow a “text book” pattern.
- (2) Other heat sources (solar, runoff water, other discharges) may warm the Boston side of the river independent from the impact of Kendall Station’s thermal plume.
- (3) There is no long term historical record of Kendall Station operation at 3.2 MGD to assist in refining the temperature projections.
- (4) Planned Maintenance Operations (PMO) and Unplanned Repair Operations (URO), although relatively brief in duration, will increase the cooling water intake flow to 52.2 MGD and increase the heat load from approximately 22 MMBTU/hr to approximately 363 MMBTU/hr. There is insufficient in-stream historical temperature data to predict the nature of the thermal plume under these operating conditions.

In order to reduce the degree of uncertainty presented by the factors above, EPA has required that when compliance temperature monitoring is required by provisions in the draft permit, compliance support monitoring or supplemental temperature monitoring shall also be conducted as specified in the permit. This additional monitoring at Stations 2, 4, 5, 6, 7 and 8, will verify the temperature relationships predicted using historical data, more precisely demarcate the thermal plume, provide data needed to evaluate whether Kendall Station’s thermal plume caused or contributed to the temperature exceedance at Station 3 and document whether sufficient fish passage and suitable fish habitat are present in the lower Basin.

7. Other changes

Attachments A, B, D, and G are being modified. Attachments E and F are no longer necessary and have been reserved. Attachments H and I are no longer necessary and have been eliminated. Attachment C is not being modified.

Minor changes to permit modification:

The fish mortality requirements of Part I.A.12 have been revised. Instead of the observance of one dead fish triggering the periodic inspection of the Broad Canal and discharge area, this has been changed to three fish.

The permit limits at Part I.A.2 have been changed to require screen wash water to be monitored once per month at each traveling screen instead of when in use. The flow limit has been changed from a monthly average to a daily maximum of 0.1 MGD to be consistent with the description in the heading of this Part.

A requirement has been added to Part I.A.13 of the permit regarding unusual impingement events (UIE) which requires the permittee, upon the occurrence of a UIE, to rotate all traveling screens once every hour until the impingement rate falls below 15 fish per hour.

The Quality Assurance Project Plan (QAPP) requirement in Part I.A.14.d.3 has added clarification that it applies only to all instream monitoring data. This was believed to be the original intention of this requirement. The permittee shall also provide its methods for calibrating the equipment that measure its influent and effluent temperature.

Language has been added to Part I.A.14. e. regarding the instream total residual chlorine (TRC) monitoring which specifies that this monitoring needs to be conducted only for those months that chlorination occurs and that such sampling be conducted within one (1) to eight (8) hours of chlorination.

The monitoring frequency for certain parameters in Part I.A.3 has been changed from daily to weekly.

Part I.B. has been revised to include language which requires the permittee to begin using a web-based reporting system called “NetDMR” to electronically submit monitoring results within a specified time frame. This language also provides opt-out language if the permittee is unable to use NetDMR.

III. Essential Fish Habitat Determination (EFH)

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

Essential fish habitat is only designated for species for which federal fisheries management plans exist (16 U.S.C. § 1855(b) (1) (A)). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999. The following is a list of the EFH species and applicable lifestage(s) for the area that includes Massachusetts Bay, to which the Charles River discharges:

Species	Eggs	Larvae	Juveniles	Adults
Atlantic cod (<i>Gadus morhua</i>)	X	X	X	X
Haddock (<i>Melanogrammus aeglefinus</i>)	X	X		
Pollock (<i>Pollachius virens</i>)	X	X	X	X

Whiting (<i>Merluccius bilinearis</i>)	X	X	X	X
Red hake (<i>Urophycis chuss</i>)	X	X	X	X
White hake (<i>Urophycis tenuis</i>)	X	X	X	X
winter flounder (<i>Pseudopleuronectes americanus</i>)	X	X	X	X
yellowtail flounder (<i>Pleuronectes ferruginea</i>)	X	X	X	X
windowpane flounder (<i>Scopthalmus aquosus</i>)	X	X	X	X
American plaice (<i>Hippoglossoides platessoides</i>)	X	X	X	X
Ocean pout (<i>Macrozoarces americanus</i>)	X	X	X	X
Atlantic halibut (<i>Hippoglossus hippoglossus</i>)	X	X	X	X
Atlantic sea scallop (<i>Placopecten magellanicus</i>)	X	X	X	X
Atlantic sea herring (<i>Clupea harengus</i>)		X	X	X
Long finned squid (<i>Loligo pealei</i>)	n/a	n/a	X	X
short finned squid (<i>Illex illecebrosus</i>)	n/a	n/a	X	X
Atlantic butterfish (<i>Peprilus triacanthus</i>)	X	X	X	X
Atlantic mackerel (<i>Scomber scombrus</i>)	X	X	X	X
Summer flounder (<i>Paralichthys dentatus</i>)				X
Scup (<i>Stenotomus chrysops</i>)	n/a	n/a	X	X
black sea bass (<i>Centropristus striata</i>)	n/a		X	X
surf clam (<i>Spisula solidissima</i>)	n/a	n/a	X	X
Bluefin tuna (<i>Thunnus thynnus</i>)			X	X

A review of the 23 species revealed that the life stages of concern are present in the seawater salinity zone (salinity > 25.0 parts per thousand) or the mixing water/brackish salinity zone (0.5 < salinity < 25.0 parts per thousand) only. No life stage is identified as inhabiting the tidal freshwater salinity zone. The freshwater of the Charles River does not experience appreciable mixing with the saline Boston Harbor water, due to the location of New Charles River Dam and Locks at the mouth of the river. This dam highly regulates the river level and flow of the Charles River, resulting in the river possessing the characteristics of the freshwater salinity zone. Although there is seasonal salt water intrusion, this typically results in a temporary salt wedge which is usually confined to the bottom few meters of the lower basin of the Charles River.

In addition, during four years of adult and juvenile fish sampling as well as extensive ichthyoplankton collection in the Charles River (1999, 2000, 2002 and 2003; Mirant Kendall Reports), none of the 23 species listed above has been collected.

Based on the freshwater characteristics of the river and the absence of any of the species listed above, EPA has determined that the conditions of this Permit Modification will not have a direct adverse effect on the EFH species of concern.

However, EPA recognizes that Station operation has the potential to indirectly cause adverse effects to EFH species in Boston Harbor or Massachusetts Bay. The Station is located on the Cambridge side of the Charles River, approximately one mile upstream of the New Charles River Dam and Locks. Anadromous species that enter the Charles River and move past the Station to spawn upstream may be affected by the thermal plume or the cooling water intake operation at the Station, or both. These species (blueback herring and alewife), while not identified as EFH species, may be selected as prey by EFH species. If these prey species are affected by Station operation, this has the potential to indirectly affect EFH species through loss of prey. EPA's Final Permit proposes thermal discharge limits under CWA § 316(a) designed to assure the protection and propagation of the balanced indigenous population of fish, shellfish and wildlife in the lower Charles River basin, including the anadromous fish species discussed above.

Moreover, it has been determined that the operations with the new equipment represents the Best Technology Available for minimizing adverse environmental impact, since the intake of water is substantially reduced. This BTA is expected to reduce losses of blueback herring and other anadromous fish species in the lower Basin, and thereby also reduce losses of these forage sources for certain EFH species that are present in Boston Harbor.

EPA believes that the conditions and limitations contained within the draft permit adequately protects all aquatic life, including those forage sources for EFH species in the receiving water, and that further mitigation is not warranted. Should adverse impacts to EFH be detected as a result of this permit action, or if new information is received that changes the basis for EPA's conclusions, NMFS will be contacted and an EFH consultation will be re-initiated.

As the federal agency charged with authorizing the discharge from this facility, EPA has submitted the draft Permit Modification and Statement of Basis, along with a cover letter to NMFS Habitat Division for their review.

IV. Endangered Species Act (ESA)

Section 7(a) of the Endangered Species Act of 1973, as amended (ESA), grants authority to, and imposes requirements, upon Federal agencies regarding endangered or threatened species of fish, wildlife, or plants ("listed species") and habitat of such species that has been designated as critical (a "critical habitat"). The ESA requires every Federal agency,

in consultation with, and with the assistance of, the Secretary of Interior, to ensure 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 administer Section 7 consultations for bird, terrestrial, and freshwater aquatic species. NOAA Fisheries typically administers Section 7 consultations for marine species and anadromous fish.

EPA has reviewed the federal endangered or threatened species of fish, wildlife, and plants to see if any such listed species might potentially be impacted by this Permit Modification and has not found any such listed species. Upon review of the current listing of endangered and threatened species in Massachusetts, there appear to be no species of concern present in the vicinity of the discharge. Therefore, EPA has determined that this permit action will have no effect on any listed species and that it does not need to consult with NMFS or USFWS under the ESA regarding the effects of this draft Permit Modification. EPA has, however, provided a copy of this draft Permit Modification to both NMFS and USFWS for comment as part of the public comment period.

V. State Certification Requirements

Under Section 401 of the CWA, EPA is required to obtain from the state in which the discharge is located a certification that all water quality standards or other applicable requirements of state law, in accordance with Section 301(b)(1)(C) of the CWA, are satisfied. EPA permits are to include any conditions required in the state's certification as being necessary to ensure compliance with state water quality standards or other applicable requirements of state law. *See* CWA Sections 401(a) and (d), and 40 CFR § 124.53(e). Regulations governing state certification are set out at 40 CFR §§ 124.53 and 124.55. EPA regulations pertaining to permit limits based upon water quality standards and state requirements are contained in 40 CFR § 122.44(d).

The staff of MassDEP has reviewed the draft permit modification and advised EPA that the limitations are adequate to satisfy the Massachusetts water quality standards. *See* generally 314 CMR 4.05(3)(b). EPA has requested permit certification by the State pursuant to 40 CFR 124.53 and expects that the draft permit modification will be certified.

VI. Public Comment Period, Public Hearing, and Procedures for Final Decision

All persons, including applicants, who believe any condition of the Draft Permit modification is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to George Papadopoulos, U.S. EPA, Industrial Permits Branch, Mailcode OEP 06-1, 5 Post Office Square, Suite 100, Boston, Massachusetts 02109-3912. Any person, prior to such date, may submit a request in writing for a public hearing to consider the Draft Permit modification to EPA and the State Agency. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public meeting may be held if

the criteria stated in 40 C.F.R. § 124.12 are satisfied. In reaching a final decision on the Draft Permit modification, the EPA 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 any public hearings, if such hearings are held, the EPA 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. Within 30 days following the notice of the Final Permit decision, any interested person may submit a petition for review of the permit to EPA's Environmental Appeals Board consistent with 40 C.F.R. § 124.19.

VII. EPA and MassDEP Contacts

Additional information concerning the draft Permit Modification may be obtained between the hours of 9:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays, from the EPA and MassDEP contacts below:

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Boston, MA 02109-3912
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October 18, 2010
Date

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

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