I. Response to Comments Concerning Monitoring and Reporting Requirements

Comment I1: Mirant asserts that the monitoring requirements in the draft permit are excessive and unnecessary, providing specific examples in later comments.

Comment related to I1 from Riverways: MA Riverways is not supportive of this large variance in maximum temperature and delta T but agrees with EPA's suggestions to develop an extensive monitoring program.

Response to I1 and related comment: EPA has received a number of comments regarding the scope and nature of the monitoring program, with some commenting that the requirements are excessive and others that it is appropriate or lacking in some aspects. Because Mirant Kendall elected to discontinue modeling efforts in favor of an approach based on real-time compliance, in-stream temperature limits and real time monitoring are essential to providing a means to detect and react to temperature increases above protective limits in a timely manner. Biological monitoring of fish species impacted by the Mirant Kendall facility location and operations are appropriate in order to document that established limits are sufficient to protect the BIP in this water body. EPA has considered each comment, and in consideration of a number of the comments, EPA has altered the monitoring requirements in the permit (see response to comments I8, I10, I14, I16, I19 and comment related to C7 from CLF).

As explain in the response to C3 and elsewhere, the documented thermal heatload discharged from Kendall Station has degraded the habitat for alewife, resulting in appreciable harm. EPA has worked closely with the permittee, incorporating many of its suggestions (see Mirant Correspondence, May 11, 2001, AR #286 and Mirant In Stream Water Quality And Biological Monitoring During Project Operation, Draft Discussion Document, August 30, 2001, AR #288) to tailor the biological monitoring plan requirements to gather the necessary data to ensure that the fish species, discharge effects and cooling water intake structure (CWIS) impacts in the receiving water are adequately monitored and that aquatic life is protected from the long term and short term consequences of changing environmental conditions.

In developing this monitoring plan, EPA has also consulted the U.S. EPA NPDES Permit Writers' Manual (December, 1996; AR #579) on this topic, which indicates that "the frequency of monitoring pollutants should be determined on a case-by-case basis." (page 119) Among the factors to consider in determining monitoring conditions include effluent data for the facility and the variability of the discharge, with a variable discharge requiring more intensive monitoring. In this regard, EPA has also fully considered all data (from both field and laboratory studies) submitted by the permittee, as well as the characteristics of the water body. EPA has also considered costs and other consequences of monitoring.

Characterizing the impacts of the thermal discharges from this particular facility is not straightforward for the following reasons. First, Mirant Kendall has not submitted a verified hydrodynamic model to predict in-stream temperatures in the lower Basin with changes in

thermal loading from the Station. Without an acceptable model to predict with reasonable confidence the Station's impact on the receiving water under a variety of conditions, there is greater uncertainty regarding the facility's impacts to the Charles River. Second, the amount of thermal discharge is large for the size of the receiving water body. Third, the facility discharges to a confined area so that the intake water temperature can be influenced by the facility's own thermal discharge, causing a continuing increase in the discharge temperature. Fourth, EPA expects that the facility will potentially increase capacity utilization to approach full load for longer periods of time, so past performance and impacts are not reliable indicators of future impacts. The permittee's permit renewal application (Mirant, February 2001, AR #453) stated the intent of the facility to increase electricity generation. Heatload data subsequently submitted by the permittee for the summers of 2004 and 2005 confirmed this increase in production. Since this facility is highly dependent on market demand for power, EPA cannot be confident of future estimates of reduced levels of generation. (See responses in Section B.) And finally, this water body provides habitat to ecologically and recreationally important species. Protective technologies such as cooling-water towers and/or a well developed, verifiable hydrodynamic model might reduce the need for some of the required biological monitoring. However, with the continued and variable thermal discharge, and in consideration of the previously listed factors, the level of biological monitoring required in this permit is appropriate.

Mirant Kendall mistakenly claims that the permit requires biological monitoring that "far exceeds any monitoring or sampling requirements in any other NPDES Permit." A few examples of NPDES permits in the region that in the past required or currently require approximately the same level of biological monitoring as well are: Pilgrim Nuclear Power Station (MA0003557), Brayton Point Station (MA0003654) and Seabrook Nuclear Power Station (NH0020338). Finally, legal authority for all monitoring requirements in this permit derives from sections 308 (monitoring, reporting and entry) and 402 (National Pollutant Discharge Elimination System) of the Clean Water Act.

EPA acknowledges the Riverways comment indicating agreement with scope of the monitoring program developed by EPA in the Draft Permit. EPA's responses to other Section I comments provide the rationale for the noted reductions in monitoring in the Final Permit.

Comment I2: Mirant asserts that it is unnecessary to install an expensive and elaborate monitoring network as a long-term permit requirement, particularly if Mirant receives authorization to use the proposed new outfall and diffuser. If use of the new outfall and diffuser is allowed by the final permit or in the future, Mirant Kendall acknowledges that intensive monitoring of the type that has been in use since 2001 is appropriate for a period of initial operations, but there is no need or reason to require the program as an indefinite permit requirement.

Response to I2: Mirant Kendall misstates the reason for the network of real-time, in-stream monitoring buoys and related requirements. The real-time continuous temperature monitoring program was not established in order to address uncertainties about the horizontal and vertical dimensions of Kendall Station's thermal plume. As supported by the record, explained in the

Final Permit, the DD, and in this response, this monitoring program was originally proposed and is required because the permittee failed to submit a hydrodynamic model which predicted with confidence the relationship between the end-of-pipe discharge temperatures from Kendall Station and the resultant temperatures at key locations in the receiving water. Resultant receiving water temperatures at key locations (i.e., the ZPH) must remain at or below protective temperature limits in order to assure that the BIP is protected. Other aspects of the monitoring program are essential to properly document that the established permit limits do not allow appreciable harm. As explained in the permit and DD, monitoring information from the temperature stations will assess compliance with the in-stream temperature limits, the delta Ts and the maintenance of the ZPH. The real-time component of the program is essential because it is the only way to allow Kendall Station to modify operation in a biologically meaningful time period when permit limits are exceeded. This real-time monitoring program is a common feature at power plants which have effluent temperature monitoring requirements, such as Brayton Point Station in Somerset, MA (MA0003654) and Sithe Mystic Station in Everett, MA(MA0004740). The MKS permit has additional instream monitoring because a reliable model for temperatures was not available, as there was for the Brayton Point Station permit.

If the permittee can supply predicted temperatures for key areas of the lower Basin (ZPH), based on Station discharge temperature and river flow, as would be generated from a verifiable hydrodynamic model, EPA would work with the permittee to substitute this information for the real-time continuous monitoring program now necessary to obtain this information with confidence. This could be accomplished by a permit modification after Mirant has produced such a verifiable model.

Monitoring that was proposed for metals in Part I.A.14.d. has been removed. The purpose of this monitoring was to assess the potential release of metals from the sediments into the water column resulting from the installation and operation of the proposed outfall diffuser. If the outfall diffuser is approved at a later date, then periodic monitoring for metals, as well as other parameters, will be established at such time.

Comment I3: Mirant asserts that the Agencies should reconsider the amount of monitoring and reporting they propose and scale it back to a level commensurate with Kendall Station's size and actual impacts. Further, they should also consider the extensive biological monitoring Mirant Kendall submitted to the Agencies showing that the discharge has not had any significant adverse effects.

Response to I3: In response to this and other comments, EPA has considered each monitoring requirement and have made appropriate adjustments. See response to comments I8, I10, I14, I16, and I19 regarding these adjustments. See the response to Comment I1 and other individual responses in Section I for factors used in maintaining most monitoring and reporting requirements. See response to comment C3 and elsewhere regarding EPA's finding of appreciable harm and adverse impacts. In recognition of the value of push-net data as described in response to C3, the requirement for continued annual collection of push-net data has been included in Part 14.d.1 of the Final Permit.

Comment I4: Mirant asserts that in-stream, real-time monitoring around the intake using monitoring buoys is unnecessary. Mirant asserts that 24-hour average temperatures measured by the existing continuous monitors in the Broad Canal intakes are adequate. Further, continuous, periodically downloaded thermistor data from elsewhere in the ZPH can also provide the necessary in-stream data.

Response to I4: It is not clear from the comment which monitoring buoys Mirant is referring to, as no monitoring stations are required in the Broad Canal around the intake. However, monitoring at the locations required in the permit is appropriate as described in the DD and as modified in the Final Permit. With the approach that EPA has used to delineate the ZPH, EPA has justified that monitoring at these points is necessary to verify compliance with the permit limits. In fact, the reason there are no monitors required at the intake is because this area is not representative of current ambient conditions. Historic water quality information (DD Section 5.9.2b) demonstrates that the thermal plume from the discharge periodically travels to the Broad Canal Intake and is partially re-entrained, which results in intake temperatures that do not accurately reflect ambient, background temperatures. In addition, the thermal plume from the Station has been documented upstream of the Station, upstream of the Longfellow Bridge, and has been measured as far upstream as the Harvard Bridge and beyond. Thus, the establishment of a background monitoring location near the Boston University Bridge is necessary to adequately characterize background temperatures.

Continuous monitoring of the temperature and real-time access to those data in the ZPH is a core requirement of the established monitoring program. This requirement is necessary so that the facility will become aware of exceedances of protective temperatures and will act in a biologically meaningful time period to stay in compliance, thereby limiting adverse effects to the balanced populations of aquatic species in the lower Charles River Basin. The ability of Kendall Station to use the real-time monitoring information to moderate its discharge quickly, when necessary, is a key capability that cannot be duplicated with the temperature system proposed by the permittee. Its periodically downloaded thermistor system contains time delays in data availability which would result in an unacceptable risk that protective temperatures would be exceeded for long periods between data downloads.

Also, as EPA understands the existing continuous monitor at the CWIS, the water temperature at this location is measured after a column of water approximately 12 feet deep (from the surface to near the bottom of the canal) is first mixed and pumped into the Station. A water temperature taken from an “average” of this column of water is not appropriate for habitat characterization in the ZPH.

A 24 hour averaging period is neither sufficient nor scientifically justifiable for maximum temperature compliance. Instead, it is more justifiable to average temperature data over six discrete four hour blocks per day (00:00 [midnight]-03:59, 04:00-07:59, 08:00-11:59, 12:00-15:59, 16:00-19:59, 20:00-23:59) at discrete locations in the water column. Time averaging the water quality data in this manner will dampen the typically observed natural fluctuations in water temperature caused by solar radiation and overnight cooling in the lower Basin. Not only will the

four-hour averaging period provide the permittee with a more stable temperature basis to predict trends, but will also allow sufficient time for the permittee to take operational action to reduce thermal input to the river when necessary to comply with established temperature limits. Based on a review of historical continuous temperature data collected in the lower Charles River Basin from 1994 through 2002, granting a four hour average temperature for the purpose of permit compliance will not compromise the protection and propagation of a balanced population in this water body. See also response to D3 concerning 4-hour averaging.

Comment I5: Mirant asserts that continuous monitoring far upstream is inappropriate and unnecessary. Areas upstream have very different stratification patterns than the waters in the proposed ZPH, so that comparison between those areas is an unreliable basis for evaluating the effects of the discharge. Further, Mirant asserts that due to confounding environmental conditions, it is inherently arbitrary to propose that temperatures in the ZPH should never have more than a 5º F difference from upstream monitoring points.

Mirant Kendall suggests that protection of the BIP can be accomplished by monitoring the area and boundaries of the ZPH. Conditions at an upstream point in the river having different physical characteristics than the ZPH should not define "ambient" conditions.

Comment related to I5 from CRWA: CRWA states that temperatures measured at the Background Station (Station 1) will not represent ambient conditions, due to the presence of MWRA's Cottage Farm CSO Facility, and recommends that Station 1 be moved upstream to avoid the influence of Cottage Farm.

Comment related to I5 from CLF: CLF asserts that it is not sufficient to use just one station to establish background temperatures. Therefore, a minimum of four background temperature monitoring points, including 3 above the BU bridge, should be used and compared at all times so that aberrant measurements can be detected, and so a clear picture of the inflowing thermal conditions can be obtained.

Response to I5 and related comments: EPA has received conflicting comments regarding background temperature monitors. The permittee raises concerns with the concept, need, and applicability of background temperature monitoring anywhere outside the ZPH. CRWA recommends that the background station be placed even further upstream to avoid interferences with other possible thermal sources. CLF suggests increasing the number of background monitoring stations from one to four.

As discussed in Response I4, the periodic upstream movement of the thermal plume and potential for re-entrainment of that plume by the intake requires that an upstream monitoring station be established and located to allow characterization of the ambient, background temperatures outside of the influence of the thermal plume. Based on available data, establishment of a background location near the B.U. Bridge, taken as 24 hour average, is necessary to adequately characterize background temperatures. Although there could be other factors that may periodically affect the data collected at this station, such as CSOs or other

thermal discharges, for the majority of the time, this station is the best option for characterizing background conditions. The disadvantages to moving the station upstream is that there is a change in flow and stratification patterns as the Charles River assumes more riverine characteristics upstream of the B.U. Bridge. The disadvantage to moving the station downstream is that there is a greater chance that the temperature is influenced by the facility's thermal discharge. The location selected in the Draft Permit represents the best location, balancing these factors. Regarding depth, the Charles River near the B.U. Bridge has sufficient depth (approximately 15 feet compared to the Station's intake which withdraws from about the top 12 feet of the water column) to serve as a useful background station. Regarding the number of background stations, one background station for temperature monitoring in this case is necessary and sufficient based on the expected variation in the river temperature. Furthermore, river users who provided feedback regarding floating buoys in the river, recommended installing the fewest number of monitors possible to reduce navigational obstructions to the boating community. If evidence is found that any of the fixed Monitoring Stations were not placed in the appropriate location, there is a mechanism in the permit to correct this situation. Please see Response C4 for additional information.

The Delta T of 5˚F for establishment of monitoring stations along a transect was used in the permit to reflect the intent of state temperature and mixing zone regulations. ("Transect", in this case refers to the permit's requirement for "Four fixed monitoring stations, spaced at equidistant points along a bank-to-bank transect that coincides with the location where the thermal plume impacts the greatest cross-section with a delta T of 5 ˚F or greater, as indicated by the permittee's predictive model. Stations 3 through 6 will be equally spaced along the transect, with Station 3 being closest to the Boston side and Station 6 being on the Cambridge side. (see Part 14(b)(2) and Attachment B)." A Delta T of 5˚F as compliance for this monitoring is well supported and has been generally accepted as a reasonably protective thermal limit and has been included in several NPDES permits and is consistent with state WQS. Under the Massachusetts water use classification system, MassDEP has designated the lower Charles River Basin as a Class B water (314 CMR 4.00). Class B waters are designated as a habitat for fish, other aquatic life, and wildlife and for primary and secondary contact recreation. The state WQS provide that, for such a warm water fishery, the temperature shall not exceed 28.3 ºC (83 ºF), and the rise in temperature due to a discharge shall not exceed 2.8 ºC (5 ºF), based on the minimum expected flow for the month. Because the permittee would likely be unable to meet a Delta T of 2.8 ºC (5º F) at the point of discharge or at the boundary of a mixing zone conforming to WQS, a Section 316(a) thermal variance has been requested by the permittee and granted under the conditions of this NPDES permit. See also responses concerning the 5 ˚F Delta T in Section D.

The 5 ˚F maximum Delta T required in this permit is taken from a 24 hour average of the 2 foot and 6 foot depth temperatures combined at the background station (Station 1) compared with the same time period and depth averaging at Stations 2, 3, 4 and 8. An exception applies to the depths used for Delta T compliance at Station 7. Any concern regarding different depths of stations compared with the background station is not well founded, as the target of the Delta T compliance is the 2 foot to 6 foot water depth column, which makes up a portion of the water column withdrawn by the Station's CWIS. The 2 foot to 6 foot deep water column of the river

also contains most of the thermal plume of the Station's discharge.

Comment I6: Mirant Kendall asserts that there is no basis for the proposed requirements to conduct daily, year round inspections of the Broad Canal and Charles River nor do they feel the required responses if 25 or more dead fish are observed in a 24 hour period are justified. Mirant agrees that it is reasonable to report unusual impingement events and to report the fish caught in its rotating screens, but there is no warrant for imposing a separate requirement for Mirant Kendall to conduct inspections of the Broad Canal and the Charles River for impacts related to the thermal discharge.

Further, Mirant Kendall asserts that there is no reason to expect fish kills from unit chlorination operations or the thermal component of the discharge. Mirant Kendall claims that there is no evidence that the plant's discharge has been or would be responsible for any fish kills in the past. Therefore, the proposed requirements would mandate plant curtailments even if a fish mortality event clearly was not related to the plant's operations.

Mirant Kendall also disagrees with the vaguely defined term "dead fish", and that a more biologically accurate definition of a dead fish is: "a fish that shows no body or opercular movement and that does not respond to gentle prodding."

Comment related to I6 from CLF: CLF asserts that this standard should be set based on what one expects to observe as a significant fish kill in a healthy portion of a river. Observation of 5 dead fish within a 24 hour period is a more realistic standard.

Response to I6 and related comment: EPA is requiring Mirant to monitor and react to fish kill events in part because Mirant's discharges have the potential to compound the impacts of other environmental stressors. This could potentially lead to mortality events when weakened fish enter the discharge area. (CFR 40 CFR 125.73(a) requires EPA to consider "the cumulative impact of [the applicant's] thermal discharge together with all other significant impacts on the species affected"). Upon observing fish mortalities sufficient to require notification, the permittee is required to suspend all unit chlorination operations, and if the discharge temperature is greater than 95 ˚F, the permittee must reduce the discharge temperature to no more than 95 ˚F within two hours of such observation. The quick reduction of heat and chlorine loads to the river (when the threshold number of dead fish is observed) is designed to allow for recovery of stressed individuals and help to minimize the length and severity of such an event, even if Kendall Station is not thought to be directly or solely related to the initial fish kill.

EPA has evidence that discharge temperatures have, in the past, exhibited lethal levels for certain life stages of fish (see Response to F4 (part 2) and related comment from CLF). Furthermore, since there was previously no requirement for routine monitoring of these areas, and since the permittee has presented no data on fish kill monitoring, the permittee cannot state with certainty that no fish kills have occurred as a result of facility discharges. One fish kill was documented on May 27, 1995 by the Massachusetts Division of Fisheries and Wildlife that was characterized as alewives during a spawning run. This fish kill occurred on the Cambridge side of the river in

the location of the first bridge below MIT, and extended one half mile up and down the river. Even if such events may not be directly or solely related to the facility operations, the potential cumulative effects on fish warrant monitoring and action. Thus, EPA is requiring fish kill monitoring in the lower Charles River Basin in the vicinity of the Station.

EPA acknowledges that levels of chlorine are expected to meet in-stream water quality standards under most conditions, but at flows approaching the 7Q10 flow of 22 cubic feet per second (cfs), the chronic WQS for total residual chlorine is likely to be exceeded. This exceedance could contribute to fish stress and increase mortality. This determination was based on the permittee's chlorine modeling discussed on Page 26 of the Fact Sheet. In addition, as discussed in various sections of the DD and the records of 2004 and 2005, EPA has evidence that the permittee's operation has increased to approach full load and has been maintained for longer periods of time than during previous operation (see also Responses to B1, B2 and C3). This level of operation results in high effluent temperatures for longer periods of time and increases thermal stress on various life stages of fish. Therefore, it is appropriate to have the permittee inspect the discharge areas daily for fish kill incidents so that the circumstances related to these events can be thoroughly investigated.

EPA used BPJ to determine the threshold for fish kill reporting (i.e., "25 or more dead fish within a 24 hour period"). This number is large enough to avoid small, localized or natural mortality factors, yet is sufficiently protective to avoid a large number of fish being killed by facility discharges before operations are reasonably modified and the kill is investigated. EPA agrees with the CLF comment that the threshold for action should be based on what would clearly distinguish a significant fish kill from a healthy river, and EPA has attempted to do this in the permit. The number of fish likely to be observed during a mortality event is expected to be some percentage below 100%, as dead fish sink into the limited visibility of the Charles or move downstream with the current. Therefore, an observation of 25 dead fish in 24 hours would likely be indicative of a moderate to large fish kill. This threshold will act as an important trigger that would alert facility personnel that an unusual mortality event is occurring. This facility is located on an important and heavily used water body that provides habitat for recreationally and ecologically important fish species. In addition to the harm to the fish themselves, such a fish kill would also impair the public's ability to use the water for recreation. 25 or more dead fish floating down a narrow, highly visible, recreationally-active segment of the Charles River would interfere with, and possibly render the segment unsuitable for, recreation.

The permit's definition of a "dead fish" (as one that exhibits a loss of equilibrium) will serve as a reasonable trigger that an unusual event is in its early stages. The earlier a fish kill event is detected, the greater the chances that the cause can be determined and appropriate action be taken to minimize the duration and severity of the event. In the case of Kendall Station, reducing the impacts of thermal stress and chlorination at the onset of a fish kill event would likely minimize the number of fish killed, regardless of the primary cause of the fish kill. The ecological function of a fish is severely limited when it is stressed to the point to lose equilibrium and it is not likely that such fish will recover unless the stress is reduced or the stressor is eliminated. Therefore, setting the mortality threshold at the point where 25 or more

fish are sufficiently stressed to lose equilibrium will provide sufficient protection to the fish community by alerting facility personnel that a fish kill event is occurring.

Comment I7: Mirant Kendall contends that the fluorometric methods proposed will yield data that have no consistent correlation with actual chlorophyll *a* levels. Mirant Kendall has submitted data to the agencies showing comparative results which indicate a wide variance between noncorresponding fluorometric and the spectrophotometric results. Therefore, Mirant Kendall asserts that the fluorometric method fails to consistently provide meaningful data. Absent the diffuser, the Agencies must justify why this sampling is necessary.

Response to I7: Mirant Kendall's analysis of the relationship between fluorometric and spectrophotometric chlorophyll *a* data is inconclusive because the fluorometric data were reflective of chlorophyll *a* from both dead and live algae, while the spectrophotometric data were corrected for phaeophytin and represent chlorophyll *a* from only live algae. EPA has learned from reviewing MWRA's chlorophyll *a* data collected from the Basin that the relative percentage of live algae to total algae varies considerably in the Basin (MWRA data 1997-2004). Therefore, it is not surprising that Mirant Kendall's analysis would yield such inconsistent results.

In-situ fluorometric chlorophyll *a* monitoring is credible and could provide reliable data to evaluate algal levels in the lower Basin under a variety of environmental conditions. Moreover, the Draft Permit proposes that the fluorometric data would be collected by identical instrumentation and would be used to make relative comparisons of chlorophyll *a* between an upstream station, where the thermal impacts from the facility are minimal, and a downstream station that is located near the discharge.

EPA has evaluated the ambient temperature and chlorophyll *a* data from the lower Basin and notes that a consistent relationship between temperature and chlorophyll *a* at upstream and downstream stations in the lower Basin is not evident. Other factors including settling, wind induced flow circulation patterns, and the monitoring stations proximity to local nutrient sources are likely causes for the apparent lack of a consistent relationship between chlorophyll a and temperature in the lower Basin. However, after reviewing EPA's 2005 data which were collected during prolonged periods of high thermal loading from the Kendall facility, EPA has reconsidered and removed the requirements in the Final Permit for continuous in-situ chlorophyll *a* monitoring of the lower Basin. The ambient data reviewed are inconclusive for evaluating the effects of the thermal discharge on chlorophyll *a* levels in the downstream portion of the lower Basin. Despite the consistent increase in temperature moving from the upstream to the downstream station, the chlorophyll *a* concentrations are sometimes higher and sometimes lower at the downstream station. At present, other factors, such as nutrient availability, are likely to be more important for algal growth in the lower Basin than temperature. However, as nutrient reductions continue to be made from watershed sources, temperature may become more important and requirements for continuous in-situ chlorophyll *a* monitoring will be re-evaluated for future permitting decisions for this facility. In near future, during the life of this permit, EPA will evaluate the monitoring data collected under other requirements of the Final Permit along

with data from other sources to assess whether the thermal load from the facility is causing chlorophyll *a* to increase noticeably in the downstream portion of the lower basin. EPA has noted from water quality data reviews collected from the Basin that algal blooms consistently occur in the Basin through most of October. As a result, the monitoring period for weekly nutrient and phytoplankton monitoring requirements is extended in the Final Permit to include the month of October. The October data are needed to assist in the assessment of whether the thermal discharge is contributing to algal-related water quality impairments during this period of the growing season.

Comment I8: Fish Mortality Requirements – Mirant Kendall asserts that Agencies' description of inspection area is vague. The more well-defined term "Zone of Initial Dilution" should be used to describe the area that the permittee must visually inspect. As understood by both the Agencies and the permittee, the "Zone of Initial Dilution" contains the area bordered by proposed Monitoring Station 2 at the upstream edge, and proposed Monitoring Stations 3 to 6, at the downstream edge.

Response to I8: This description of the area to be inspected for fish mortality is agreeable to EPA. Therefore, the permit has been modified to delineate the required fish mortality inspection area as the "Zone of Dilution", defined as follows in Part I.A.12 of the Final Permit: "the area bordered by proposed Monitoring Station 2 at the upstream edge, and proposed Monitoring Stations 3 to 6, at the downstream edge."

Comment I9: Mirant Kendall asserts that the proposed responses to finding 25 dead fish in the inspection area would have significant impact on the plant's operations, which means the Agencies must justify why they have selected 25 dead fish/day as the threshold for imposing those impacts on the plant. Further, the Agencies should reconsider use of an absolute number of dead fish as the basis for requiring a response from the plant, and develop a more biologically based approach that accounts for the seasonal variations in the presence of fish in the Charles River or significant departures above a baseline, similar to impingement reporting requirements.

Response to I9: As previously outlined in response I6, EPA selected "25 or more dead fish per day" in this and other permits because this number of dead fish represents a level of mortality that is unlikely to be due to small, localized events and/or natural phenomena, and therefore should be reported as required in the permit. EPA has used BPJ in determining that "25 or more dead fish per day" should be reported to provide adequate protection of the fish community, and to also allow the facility and agencies to follow up accordingly. EPA is not opposed to the concept of setting a more "biologically based approach." However, the permittee has provided no evidence or fish kill monitoring information at this facility to establish baseline levels of mortality or the seasonal deviations suggested by the permittee. Daily monitoring data for fish kill events over the course of several years is required to describe a baseline over a range of conditions. EPA will be open to suggestions, based on the community ecology of the Charles River and the number of dead fish documented as a result of this required surveillance program, once this type of data is gathered and analyzed.

Comment I10: Due to the variation in past studies, the Agencies must be explicit in defining the sampling time, frequency, location, and methods for annual biological monitoring. Furthermore, Agencies must justify the permit requirement for an ongoing monitoring program of the scale that Mirant Kendall voluntarily conducted as it sought to document the condition of the Charles River during 1999 to 2003.

Mirant Kendall is not opposed to conducting biological monitoring but the permit should require an annual biological monitoring program for approval by the Agencies, commensurate with a need for new information due to changes in the facility's operations and a biologically defensible assessment of the potential effects.

Comment related to I10 from CLF: CLF asserts that there is such an obvious conflict of interest in allowing the permit holder to conduct monitoring that any biological, or other environmental, monitoring data collected by the permit holder will be of little scientific value. Data generated in this fashion, with no peer review or other rigorous system for checking its fidelity, is not credible. The permit should require that the applicant provide the funds required for sound scientific monitoring by MassDEP, or another neutral party to be selected by MassDEP.

Response to I10 and related comment: On one hand the permittee appears to be requesting more specificity in explicitly defining sampling times, frequencies, locations, and methods, while on the other hand the permittee appears to be seeking the flexibility to adapt the monitoring plan to changes, including changes in facility operations. EPA has used the data submitted by the permittee, other information and BPJ to develop and tailor a monitoring program which is appropriate to effectively characterize the effects of the discharge and intake as well as ensure compliance with permit limits. It also attempts to address these concerns of the permittee for providing an annual assessment of possible changes as provided in Part I.A.14.f of the permit. Specific sampling frequencies, locations, and methods are not identified by the permittee in this comment. See response to I1 for an overview of the justification for the monitoring program, and, for more responses to more concrete comments, see responses to other comments in this section.

In consideration of the permittee's comment regarding an "excessively vague" proposal to require annual biological monitoring under similar sampling time, frequency, location, and methods used in past sampling conducted by the permittee in 1999, 2000, 2002, and 2003, EPA agrees this requirement is not clear, as there were many significant variations in the sampling conducted by Mirant in 1999, 2000, 2002, and 2003. The applicable permit provisions in Section 14 have been clarified.

In addition, allowances are outlined in permit Section I.A.14.f for monitoring modifications which can be proposed and justified by the permittee and reviewed by EPA and MassDEP. Changes must be approved by EPA and MassDEP, however, before these changes may be adopted by the permittee.

Adopting the changes suggested by CLF would be a notable departure from standard NPDES program practice. The program relies on information collected by the permittee as part of its permit obligations. EPA recognizes the need for establishing and following protocols for data quality assurance and quality control and have including appropriate QA/QC provisions in the permit. Further, there are significant penalties for falsifying information and a required certification for reporting each discharge monthly report. Permit oversight is provided by the two permitting agencies with assistance from state and federal resource agencies. In this particular case, EPA, MassDEP and other state and federal agencies have spent significant time reviewing both the data generated by the permittee and the methods used in data collection. As a practical matter, EPA and MassDEP do not have adequate resources to conduct the monitoring required by NPDES permittees.

Comment I11: Mirant asserts that it would be more effective and meaningful to measure relative abundance, as opposed to estimating population size, as suggested by the Agencies. Standing crop could be estimated, but the significant imprecision and assumptions embedded within those techniques would cause the estimates to be entirely meaningless.

Response to I11: As stated in the permit, a primary objective of the annual biological sampling program is to identify any changes in fish populations and migration patterns resulting from facility operation. Preliminary surveys of in-migrating adult river herring in 2002 were likely of low accuracy due to problems that EPA recognizes; therefore, these data should only be used as a general estimate of population size. This estimate, however, was far below the estimated 203,000 adult river herring used by the permittee as part of an equivalent adult entrainment loss estimate at Kendall Station for 1999 and 2000 (see Table 8.1.2-3 in the DD), implying the potential for a marked impact by this facility on these populations. In order to make any determinations on the impact (or lack of impact) of the facility on fish populations, EPA requires more reliable population estimates. Alewife and yellow perch are the most temperature sensitive species that are presently found in Charles River sampling. Protecting these two species from harmful temperatures will allow for all other resident and anadromous species to be protected in the Charles River.

EPA does not agree that fish populations cannot be estimated in this waterbody in any meaningful manner. With improvements which build upon lessons learned from the 2002 population sampling, this is achievable. Population estimates do have inherent imprecision, as do all measurement techniques of natural phenomena, but population estimates are more useful than relative abundance data because both size and composition are considered in these methods. Relative abundance data could mask mortality problems that are occurring for a certain age class or sex within a population. Knowledge of such information could reveal an impact leading to a population decline that must be managed early in order to avoid a population crash. Also, there is precedent for estimating the populations of these species by the Massachusetts Division of Marine Fisheries. The approximate number of alewives and blueback herring, their size composition, age and sex ratios have been estimated as part of the Anadromous Fish Dynamics Program since 1984. This program was initiated due to the recognition that such estimates are a necessary and basic part of the development of fish stock assessments. Sampling of in-migrating

river herring and yellow perch for the purpose of making reasonable population estimates of these species is, therefore, a permit requirement. The accompanying assumptions associated with the methodology used by the permittee should be acknowledged and discussed in the Annual Monitoring report (AMR). The potential difficulties and variability associated with calculation of fish population estimates do not preclude the validity of this portion of the biological sampling program.

Comment I12: Mirant asserts that the Agencies must explain why installation of costly data buoys, capable of real-time transmittal of data is necessary for measuring compliance given that the thermistors currently in use are equally capable of measuring continuous water quality data for purposes of compliance. Further, the permit writer should consider the costs of sampling that are imposed upon the permittee.

Mirant does concur that some form of the currently proposed real-time, continuous monitoring and reporting could be reasonable if the Agencies authorize operation of the proposed new outfall and diffuser.

A single response is provided below for comments I12 and I13 and other comments related to real-time temperature monitoring and reporting.

Comment I13: Mirant asserts that the proposed real-time data transmission is a significant departure from other permits – not just the permits for water. The Agencies must demonstrate why this proposed real-time transmittal is warranted for this Permit, given the lack of any evidence of adverse impacts from Kendall's discharge, and given the lack of any demonstrated need for real-time transmission of data where thermistors are adequate for continuous measurement of real-time water quality.

Comment related to I13 from MA DMF: MA DMF asserts that EPA and MassDEP should consider having real-time water quality data available in public domain from a web site maintained by the permittee.

Comment related to I13 from CLF: CLF asserts that scientists, and other interested citizens of the Commonwealth, must be allowed timely access to any and all scientific data collected under this permit.

Response to I12, I13, and related comments: EPA has received several comments related to the requirement for real time temperature monitoring and reporting. Elements of this comment are also addressed in responses to Comments I1, I4 and I5.

EPA has determined that the real-time monitoring described in the permit is necessary and appropriately comprehensive in order to allow the permittee and the Agencies to react to permit exceedances in a biologically meaningful time period. This is not possible with monthly DMR reporting or discontinuous reporting. Because various life stages of fish species have been shown to be negatively impacted by exceedances of the permit limits, it is critical that any

violations are identified quickly, and appropriate measures are taken to ensure that such violations and associated harm to the BIP are minimized. With real-time monitoring, the facility is compelled to take immediate action to minimize impacts of exceedances. In making this determination EPA has considered a number of factors, including cost, uncertainties, equipment capabilities, the accessibility of web-based technology, and the facts and discussions presented in responses to Comments I1, I4 and I5.

As described in the response to Comment C3, data provided by Mirant demonstrates that numbers of alewife in the vicinity of the Station are reduced compared to those found in more distant and cooler portions of the lower Charles. Mirant has also provided EPA and MassDEP with site-specific data demonstrating that juveniles of this species avoid using areas as habitat when the water temperature in that habitat exceeds approximately 81^{o} F. As a result of Kendall Station's discharge, portions of the lower Basin are periodically excluded as habitat for juvenile alewives.

Additionally, MA DMF has recently developed plans to re-introduce American shad into the lower Basin. This species has even lower tolerance to elevated temperatures than does the alewife. In order for this species to propagate and become re-established in the Charles, exceedances of the permitted temperature limits must be immediately addressed. Temperature exceedances are one form of impact to aquatic life that can be identified and minimized in a biologically meaningful time period by the real time monitoring program. EPA has determined that real-time monitoring data is necessary for the protection of the aquatic resource.

Although thermistors can be used to collect comprehensive and accurate temperature data in the field, they do not provide real-time temperature data that allow for timely operational responses. Further, the data collected by thermistors must be manually downloaded by a technician on site. Thus, a considerable time-lag exists (at least 24 hours under the best circumstances) between the collection of data and the reporting of that data and any potential actions that may then be taken to mitigate negative impacts associated with elevated temperatures. Thus, while thermistors are equally capable of collecting continuous temperature data, they are not equally capable of reporting real-time continuous data in order to best respond to impending and actual permit exceedences.

As discussed throughout several responses to comments, there is a significant amount of uncertainty with regards to expected water quality impacts associated with this facility. The response to Comment I1 further describes these uncertainties as facility-specific factors contributing to the need for robust monitoring program requirements.

EPA has received several comments on the need for greater access to the real time data. EPA acknowledges the high degree of public interest in the water quality and aquatic resources of the Charles River. Indeed, EPA received comments from more than 20 parties on the Draft Permit. While there is no restriction in the permit to prevent the permittee from making the real time data available in the public domain, EPA has decided that it is appropriate to require the permittee to report this real time information only to the permitting agencies. As with other monitoring data

collected as part of the NPDES permit requirements, to the extent allowable by law, EPA anticipates making data submitted under this permit publicly available within a reasonable time frame.

Comment I14: Mirant asserts that draft permit proposals regarding accepted statistical design are vague and ambiguous (i.e., "where practicable"). Further, the Agencies are too explicit in the requirements dealing with this subject. This proposal represents an unjustified amount of minutia that makes it unprecedented and unnecessarily burdensome. The Agencies should reconsider the draft permit and issue a final permit without burdening the permittee or themselves with such unnecessary details.

Response to I14: During the course of permit development, the permittee has, in many cases, presented data in a disconnected fashion, rather than with appropriate and accepted statistical descriptions of the significance of the data, taking into account study design or factors such as sample size. This permit requirement is intended to ensure that data required by the permit itself is presented with attention to these concerns. EPA agrees that this requirement can be stated with more clarity and in a less explicit manner. However, it is not unjustified or burdensome. In studies dealing with populations, behavior, and probabilities, standard statistical tests must be considered to properly evaluate the data. In consideration of the permittee's comment, EPA has edited this requirement in the Final Permit to provide more clarity and flexibility without sacrificing the intent for scientifically valid presentations when required. Thus, Section I.A.14.a.5 has been modified to state, "In analyzing, summarizing, and/or describing monitoring data in Annual Reports and other reports that interpret environmental data, the permittee shall apply and report accepted, appropriate, and reasonably available statistical tests related to sampling frequency, study design, and the representative nature of the observations."

Comment I15: Mirant asserts that the Agencies exceed their authority by treating the failure to comply with Agencies' comments on the QAPP or QA/QC plans as a permit violation. The proposal to make Agencies' comments on the QAPP and QA/QC a permit requirement without public comment does not comply with the law. Further, the Agencies fail to justify why it is necessary to propose development and submission of a QAPP and QA/QC as a permit requirement.

Response to I15: EPA is requiring a QA Project Plan (QAPP) for this project involving environmental data to ensure the project is documented and reviewed before the work is started. A QAPP (as defined in EPA Order 5360.1 A2) is required in the applicable Federal Regulations when EPA conducts a project directly or when a non-EPA organization conducts a project for EPA under a grant, contract or negotiated agreement. In this case, where information is being submitted to EPA as part of a requirement under a statute, regulation, permit, order or other mandate, EPA is requiring a QAPP to ensure QA/QC procedures are used to generate data of known quality. Other examples of this type of information include required test data for pesticides or chemicals and Toxics Release Inventory (TRI) submissions.

EPA ensures quality control of such information through regulatory requirements, such as

requiring samples to be analyzed by specific analytical procedures and by certified laboratories. Due to the facility-specific circumstances in the permit (described in the response to I1) and the multi-faceted biological and water quality monitoring required by this permit, EPA used BPJ in determining that a QAPP is necessary in order to assure that reliable data are collected pursuant to this permit. In order to use data collected by Mirant Kendall to justify future permit decisions, including reductions in monitoring requirements, EPA must be assured of the quality of the data being collected and reported. The development and submission of a QAPP is an effective way for both EPA and the permittee to ensure that data of adequate quality are being collected and reported. The burden of ensuring that valid data are collected and presented is the responsibility of the permittee. A QAPP will detail sampling procedures, quality control sampling requirements, data quality objectives, and data review and reporting requirements. This will ensure that there is a documented and transparent QA/QC program to support the results and conclusions of the environmental monitoring required in this permit. There have been instances during the development of this permit, that data submitted to EPA and MassDEP by representatives of Mirant Kendall were modified at a later time or found to be incorrectly reported (e.g., see response to E14). Development and adherence to a QAPP, therefore, will give EPA, MassDEP and the public more confidence in the data submitted.

The Final Permit requires the permittee to prepare a QAPP that follows applicable EPA guidance and to submit the QAPP to EPA and MassDEP for review and comment. See http://www.epa.gov/QUALITY/qs-docs/r5-final.pdf for this guidance. Thus, while development and submission of a QAPP remains a permit requirement, EPA has made several minor changes in the Final Permit in consideration of the permittee's comments. First, EPA has removed the language on conducting field audits of the monitoring procedures from the permit, but recommends internal field audits be planned as part of the QAPP. Second, because light penetration measurements have been removed from water quality monitoring requirements in the permit, QA/QC of measurements of the transmissivity in the river has also been removed from the QAPP requirements. Third, EPA has removed explicit language that a permit violation will result from failure to comply with the Agency's comments on the QAPP.

Comment I16: Mirant asserts that the Agencies have failed to provide any justification for why continuous, rather than periodic, dissolved oxygen monitoring is necessary. This requirement should be removed in the final renewal permit.

Response to I16: In the Draft Permit, EPA established continuous real-time DO monitoring as part of the ZPH compliance program, but stated a willingness to consider alternatives to this monitoring requirement, which could be submitted during the public comment period. The permittee did not submit a detailed alternate proposal for DO monitoring. Upon further consideration, EPA has determined that real-time continuous monitoring of DO is not necessary to ensure compliance with the ZPH requirements. Instead, EPA has instituted the following DO monitoring program, which in this case is designed to document whether there is sufficient DO (greater than or equal to 5.0 mg/l) at a Monitoring Point for it to be considered part of the ZPH. At a minimum, the permittee will be required to conduct DO monitoring at least once a week at each real-time continuous temperature Monitoring Station. Samples must be taken at the surface

and at depths of 2 feet, 6 feet, and every three feet from 6 feet to the bottom. All DO monitoring must be conducted on the same day within a reasonable time period. The permittee may conduct DO monitoring more than once a week at the prescribed Monitoring Stations but, if so, must collect samples at all required Monitoring Stations and depths. The most recent DO data collected at the Monitoring Stations will be used to document whether there is sufficient DO (greater than or equal to 5.0 mg/l) for a Monitoring Point to be considered part of the ZPH. When a real-time continuous temperature Monitoring Station is not required (for example, Monitoring Station 8 from November 1 through March 31), then DO monitoring at that station is not required. The permit has been modified to reflect this change.

Comment I17: Mirant asserts that monitoring Station 9 is unnecessary because placement of a Monitoring Station at or around this location provides no additional, material information about water conditions that could not be inferred or predicted from the data gathered at the other monitoring stations. Further, the Agencies have failed to explain why a fixed, 24-hour a day 365-day a year continuous real-time monitoring station is necessary at that point if the station's sole purpose is to measure temperatures during the short time associated with in-migration.

Response to I17: EPA has determined that monitoring at Monitoring Station 9 (MS9) is necessary for a portion of the year because this is the only proposed monitoring station capable of monitoring the saltwater conditions at the mouth of the river and downstream of the New Charles River Dam and locks. As described on Page 20 of the permit, monitoring at Station 9, as well as Stations 7 and 8, are required for the period of April 1 to October 31 only, not for the entire year. Further, as explained in the DD at Section 5.10.2f, this station will provide information to ensure that water with excessive temperature or degraded water quality characteristics are not part of the attractant flow from the dam. Finally, MS9 will not be used as a compliance point for temperature limits.

Comment I18: Mirant asks the Agencies for clarification on placement of MS9. Placement just downstream of the dam necessarily results in the monitoring station being in the direct influence of the Charles River water while placing the Station outside the direct influence of Charles River water, would require it to be so far out in the Harbor that it would be meaningless and could not possibly be described as "just downstream from the dam."

Response to I18: The language in the permit regarding the location of MS9 has been modified to help clarify the intended location of this monitoring station. The word "just" was removed to alter the original sentence of "A fixed monitoring station just downstream of the New Charles River Dam, in Boston Harbor" to "A fixed monitoring station downstream of the New Charles River Dam, in Boston Harbor." MS9 shall be placed on the harbor side of the lock, but not mid-channel. Such placement will allow the data collected at this station to be representative of conditions in Boston Harbor outside of the direct influence of the Charles River.

Comment I19: Mirant believes that absent the diffuser, any measurement of light penetration is unnecessary. Further, the Agencies have failed to explain how light penetration should be measured or justify why light penetration readings must be taken every hour, 365 days a year.

Response to I19: EPA agrees and is not requiring light penetration measurements. The relevant language has been removed from Part I.A.14.b.10 of the permit.

Comment I20: Mirant Kendall asserts that it did not and does not accept the use of an in-situ, real-time continuous water quality monitoring and compliance program in lieu of end-of-pipe limits. Further, Mirant Kendall asserts that the Agencies proposal of a set of in-situ monitoring requirements and compliance temperatures is not justified and disregards the several in-situ monitoring proposals submitted by Mirant Kendall during permit development communications.

Further, the Agencies have no basis for claiming that Mirant Kendall either proposed or accepted the Agencies proposed in-situ compliance approach. The in-situ program in the draft permit is wholly unacceptable to Mirant Kendall and must be justified without any reliance on supposed acceptance by the permittee.

Response to I20: The permittee submitted a draft Discussion Document on May 11, 2001 (AR #452) describing a continuous monitoring program comprising in-stream monitoring stations. EPA understood that this program would remove some of the uncertainty caused by the permittee's decision to abandon its efforts to submit an acceptable hydrodynamic model. This in-stream monitoring approach was discussed throughout the permitting process and all parties proceeded with the understanding that some form of this monitoring program was appropriate and would be established in the permit. The permittee has the option to develop an acceptable hydrodynamic model to describe the potential impacts of the discharge on the lower Charles River and Boston Harbor. This model would lead to the establishment of real time end-of-pipe limits that would continually ensure the attainment of the in-stream compliance temperatures. This would reduce the monitoring required in this permit. However, in the absence of any such model, EPA has determined that the proposed monitoring program is essential, reliable, and reasonable given the complexity of this system.

Setting aside the history, the goal of this program is to collect pertinent information and measure compliance with permit limits and is necessary to ensure the propagation and protection of balanced populations of aquatic species in the lower Charles River Basin. The monitoring data collected not only will allow the permittee to take timely operational action to reduce thermal input to the river when necessary to comply with established permit limits, but also will provide the Agencies with a more stable basis from which to characterize trends and assess predictive models.

See also responses to I1, I4, I5, I12 and I13.

Comment I21: Mirant asserts that there is need for clarification of the unusual impingement events reporting. This proposal needs to be clarified so that it does not apply while the barrier nets are in place because when the nets are in place, there will be no impingement of fish at all on the screens. The proposal also needs to be clear that it is not changing the current frequency for inspecting the screens, which is every eight hours on the shift-change. To the extent that the

Agencies propose something different than the current practice for unusual impingement event reporting, Mirant objects on the grounds that the Agencies failed to justify why the past practice is no longer acceptable.

Response to I21: EPA understands that Mirant Kendall has been recording impingement events, including types and number of fishes, from 1999 through 2005. Initially, the permit has set the number of 25 or more total fish per hour impinged as an "unusual impingement event" (UIE) value which would require reporting. This number reflects the same number of dead fish that triggers the fish mortality notification. The permit requires the permittee to review all historical impingement data and propose an appropriate "unusual impingement event" value. The Final Permit has added additional language to this effect, also suggesting that the permittee may use a statistical approach, whereby a UIE may be a number above the 90% or 95% confidence level of past data. The permittee's comments on impingement reporting while the barrier nets are in place are not relevant to this reporting requirement. If the nets are functioning properly, then no impingement on the intake screens will occur and no unusual impingement reporting would be required. Additionally, the level of impingement that constitutes an unusual event does not impact the screen inspection frequency.

Comment I22: Mirant asserts that daphnids (*Ceriodaphnia dubia*) and fathead minnows (*Pimephales promelas*) are inappropriate organisms to use for testing the toxicity of a discharge that draws from and discharges to waters with higher levels of salinity than freshwater.

Response to I22: In the *Technical Support Document for Water Quality-based Toxics Control* (EPA/505/2-90-001), EPA recommends that freshwater organisms be used in WET testing when the receiving water salinity is less than 1 ppt, and that marine organisms are used when the receiving water salinity equals or exceeds 1 ppt. If the salinity in the lower Charles River at the time of sampling does indeed exceed 1 ppt (salinity levels have been documented at 2 ppt during the late summer; See Response E20), the use of *C. dubia* and fathead minnows is inappropriate. The osmotic stress on the test organisms resulting from exposure to salt water is likely to act as a test interference and prevent accurate measurement of potential toxicity related to the intake and discharge of cooling water. EPA recommends a scaled approach whereby marine organisms would be used when salinity levels in the epilimnion equaled or exceeded 1 ppt and freshwater organisms would be used when salinity levels were less than 1 ppt. Attachment C, the WET testing protocol for freshwater species included with the Draft Permit, is now Attachment C1. The marine species WET testing protocol has been included in the Final Permit as Attachment C2.

Comment I23: Mirant states that the Agencies have failed to justify why they need comprehensive chlorophyll a data given the fact that Mirant Kendall has already provided the Agencies with this data from the Lower Charles River Basin for 2002 and 2003.

Further, the Agencies have failed to justify why Mirant Kendall should be responsible for this monitoring given the fact that the data EPA and Mirant Kendall have gathered fails to provide any evidence that the Kendall Station discharge makes any material contribution to the nuisance

blooms.

Response to I23: See responses for Comments I7, E3, E18 and E19. Weekly nutrient and phytoplankton monitoring conducted during the growing season (June 1 - October 31) will aid EPA in determining whether the facility's thermal discharge is contributing to algal-related water quality impairments in the Basin and whether additional controls on the thermal discharge are needed.

Comment I24: Mirant asserts that the term "fish" should be defined. Mirant assumes because these fish must be observable from a visual inspection that "fish" refers to free swimming, readily observable fish and not larvae or other life stages that cannot swim or that are not readily observable by a visual inspection.

Comment related to I24 from MA DFW: MA DFW asserts that they, as the lead agency for fish kill investigations, should be the first agency contacted in the event of a fish kill as well as DEP and EPA.

Response to I24 and related comment: EPA agrees that for the purposes of this requirement, in Paragraph 12 of the Final Permit, fish will refer to juvenile and adult fish, but not eggs or larvae. The Final Permit requires that the MA DFW shall be contacted regarding any fish kills.

Comment I25: Mirant asserts that the Draft Permit proposes an unprecedented and incredibly broad array of biological monitoring and sampling that is not authorized by the Clean Water Act or its implementing regulations. The Agencies fail to explain why it is reasonable, as a matter of law, for the current Draft Permit to contain a substantial increase in monitoring from the previous Permits without a showing of any adverse effects on the BIP, or any other relevant changes in the Lower Charles River Basin. Further, the Agencies fail to consider or justify the substantial costs of monitoring and sampling.

Mirant asserts that not only is the extensive monitoring proposed by the Draft Permit unauthorized by law, but it is also rendered unnecessary by the other provisions in the Draft Permit itself. Throughout the Determination Document, the Agencies have stated in great detail why they believe the temperature limits proposed by the Draft Permit are fully protective of the BIP. But if the temperature limits in the permit are in fact fully protective of the BIP, as the Agencies claim, then extensive monitoring to study the effects of the discharge on the BIP cannot be justified. Mirant asserts that the Agencies must explain why Mirant is required to gather more field data when previously submitted data have already been ignored or discounted by the Agencies.

Mirant asserts that the level of monitoring and sampling proposed by the Draft Permit, listed above, far exceeds any monitoring or sampling requirements in any other NPDES Permit. The Agencies have failed to explain this different and unprecedented treatment.

Mirant asserts that the agencies must justify their unauthorized and unprecedented departure

from the well-accepted interpretation of the NPDES Program especially considering in the present case where: (a) Mirant is an existing discharger not seeking an increase from its existing permit limits, (b) there is no evidence suggesting the discharge is having any adverse effects on the BIP, and (c) heat is not a novel, mysterious, unknown, or unstudied pollutant.

Response to I25: In-stream temperature limits and biological monitoring of populations impacted by the Mirant Kendall facility location and operations are appropriate in order to assure the protection of the BIP in this waterbody. In consideration of the permittee's comments, however, EPA has altered the permit to reduce some of the biological monitoring requirements. EPA has expended substantial effort to tailor the required biological monitoring plan to provide the necessary data to ensure that the fish species in the lower Basin are adequately monitored and protected, without requirements for unnecessary monitoring. In developing this biological monitoring plan, EPA fully considered all data (from both field and laboratory studies) submitted by the permittee, the characteristics of the waterbody, and also consulted the U.S. EPA NPDES Permit Writers' Manual (December, 1996, AR #579) on this topic.

1. Authority for monitoring: The legal authority for all monitoring requirements in this permit derives from sections 308 (monitoring, reporting and entry) and 402 (National Pollutant Discharge Elimination System) of the Clean Water Act, 40 CFR 122.44(i) (which authorizes, inter alia, "To assure compliance with permit limitations, requirements to monitor . . . [o]ther measurements as appropriate"), and 40 CFR 122.48 (which authorizes, inter alia, continuous monitoring). Moreover, as noted in the responses to I1 and I20, the in-stream monitoring regime became necessary because the permittee elected to discontinue modeling efforts in favor of an approach based on actual in-stream compliance. Under 40 CFR 122.44(d)(1), EPA must impose effluent limits that will achieve state water quality standards, including narrative criteria. Typically, a permittee of Mirant Kendall's size and impact provides a verifiable hydrodynamic model that enables EPA to work backwards from a desired in-stream compliance temperature and determine end-of-pipe effluent limits that will achieve that temperature sufficiently often. In this case, because Mirant Kendall discontinued its modeling efforts for several years, EPA requires actual measurement to ensure the attainment of state water quality standards.

With respect to the increase in monitoring from the prior permit, the facility has substantially increased its production and correspondingly has a much greater impact on the lower Basin. See Responses B1-B3 and C3.

With respect to costs, neither the CWA nor the regulations require EPA to evaluate costs when establishing monitoring conditions in a permit. Moreover, Mirant Kendall is in a poor position to complain about the costs of the compliance regime, because the regime stems directly from Mirant's own decision to abandon modeling and proceed based on in-stream compliance monitoring. Most large thermal dischargers develop, in some cases at considerable expense, high-quality predictive models that enable the permitting agency to select an end-of-pipe temperature that will satisfy all permit requirements – thus, such dischargers spend on modeling but save on monitoring. Mirant elected not to develop a verifiable model for this renewal permit, perhaps saving money on modeling, but incurring greater costs in monitoring than it would have

if it had developed a usable model in the first place. Nevertheless, in evaluating this comment, EPA has carefully considered the impact of Mirant Kendall's discharge on the lower Charles River, the need for additional data to characterize that impact more precisely, the need to assure compliance with permit limits, and the costs to the facility as represented by Mirant Kendall, and has concluded that the monitoring program is justified despite such costs.

With respect to the temperatures deemed protective of the BIP, EPA's best scientific judgement, in light of literature and available field data, is that the final permit's temperature limits will protect the BIP. That said, the monitoring data is needed to characterize the facility's impact more precisely and to ensure that protective temperatures are actually achieved.

2. Mirant's claim that the Agencies ignored Mirant's field data: EPA and MassDEP recognize the substantial effort undertaken by the permittee to collect, analyze and present a substantial amount of environmental data from the Charles River. This data has been extremely useful in the permitting process. Many aspects of the Final Permit were supported by data submitted by the permittee. Specific examples of where Mirant data were used in developing this permit are: 1) determining that a 2˚ delta T buffer in excess of thermal limits was protective under certain conditions, 2) allowing for a 24 hour mean delta T at the BU site vs. the ZPH, 3) discussion sections (e.g., response to C3) regarding appreciable harm to alewife, 4) establishing thermal limits for different life stages of alewife and yellow perch, 5) establishing the appropriate time periods when thermal limits must be in place to protect different life stages of alewife and yellow perch, 6) the development of several allowances of spring exceedances over the facility's maximum temperature, and 7) documentation of the increase in heatload and water usage from Kendall Station over the past several years compared with historical operation of the facility. Characterizing Mirant Kendall's discharge and its effect is complex for reasons described in the response to comment I1. With the continued thermal discharge, and in consideration of the factors described in the response to I1 and the DD, the level of biological monitoring required in this permit is appropriate.

3. Precedent for similar biological monitoring: As a legal matter, EPA is not required to justify a requirement in a NPDES permit that is necessary to attain water quality standards by showing that an unrelated permit contains a similar condition. That said, Mirant Kendall errs in claiming that the permit requires biological monitoring that "far exceeds any monitoring or sampling requirements in any other NPDES Permit." A few examples of NPDES permits in EPA Region 1 that in the past required or currently require approximately the same level of biological monitoring as well are: Pilgrim Nuclear Power Station (MA0003557), Brayton Point Station (MA0003654), and Seabrook Nuclear Power Station (NH0020338).

4. Use of in-stream monitoring to measure compliance: In order to know whether a discharge will violate state WQS, the permitting agency must have a firm basis for characterizing the impact of the effluent on the receiving water. Most large permittees provide a predictive computer model that characterizes the relationship between the end-of-pipe concentration or quantity of the effluent, and the concentration in the receiving water. Mirant began down this path, but then abandoned it. Without a reliable model, the only other reasonable basis available

to a permitting agency is actual measurement. As noted above, on May 11, 2001, Mirant proposed to pursue exactly this option, via a continuous monitoring program consisting of in-stream monitoring stations. See response to I20, and paragraph 1 of this response.

With respect to Mirant's prior permit limits and historical discharge, see responses B1-B3. With respect to Mirant's claim that it has not caused any adverse effects to the BIP, see response to C3.

Comment I26: Section 5.10 (Specific Monitoring In Permit Necessary To Comply With Zone of Passage and Habitat Limits) details the comprehensive monitoring plan proposed in the draft permit. The plan as proposed is excessive, unnecessary, based on outdated and incomplete data and should be revised. Mirant Kendall proposes an alternative compliance monitoring concept.

Response to I26: EPA has considered the alternative compliance monitoring concept proposed by Mirant Kendall in this comment, as well as Mirant Kendall's commitment to refine the details in consultation with EPA. Many of the elements of Mirant's proposed alternative compliance monitoring concept are consistent with the provisions of the Draft and Final Permit. These include real-time, continuous temperature monitoring at the intake and discharge; continuous in-stream temperature monitoring at multiple levels at certain locations; and postponing more intensive monitoring if and when the diffuser is installed. Furthermore, EPA has adopted at least one element of Mirant's concept (reduction of DO monitoring requirements) as a change in the Final Permit and generally appreciates Mirant's "commitment to refine the [monitoring] details in consultation with the Agencies."

However, much of the overall concept is not being adopted in the Final Permit. The overall rationale for requiring, at this facility, a more intensive monitoring program than proposed by Mirant, is described in the response to comment I1. Additional reasons are provided below.

The need for reporting real-time data collection and reporting is described in the response to comment I4. Real-time reporting is not a component of Mirant's proposal, which provides for continuous monitoring of river temperatures at multiple fixed thermistors which would be downloaded weekly and reported monthly.

Mirant proposes two years of weekly vertical profiling and reporting of temperature, DO, pH and salinity at seven fixed locations. EPA agrees with the intent of this monitoring to supplement continuous monitoring with more detailed profiles obtained on a less frequent basis. The Draft Permit's provision to address this need is primarily captured in the requirement for periodic water quality monitoring for contour mapping. See Part I.A.14.c.1. EPA has retained this more flexible approach which does not prescribe fixed locations for vertical profiling. This requirement is necessary for several reasons, including to confirm that the real time monitoring at fixed points is capturing a realistic characterization of the water quality in the Basin, and to evaluate patterns in variations among related parameters. EPA acknowledges that Mirant's proposal allows for "additional profiling to be conducted on an as-needed basis if there is a demonstrated need based on the above results." However, in this case, EPA is retaining the

Draft Permit requirement based on obtaining the necessary result which is to "complete, periodic water quality contour maps of the lower basin" (Part I.A.14.c.1), rather than based on future "demonstrations" of data needs as proposed by Mirant. Also, rather than Mirant's proposal for two years of weekly vertical profile sampling, EPA has retained monitoring for contour mapping as a monthly requirement for two years (weather permitting), followed by quarterly. EPA sees this duration as necessary to fulfill the objectives described in the response to I1. However, in light of the likelihood of changing circumstances as data is collected, EPA has provided a mechanism for reducing monitoring requirements in Part I.A.14.f of the Final Permit.

Finally, Mirant has proposed for monitoring in general, and in some cases specifically for biological monitoring, a) that further monitoring be undertaken on "an as-needed basis in consultation with the Agencies", b) that EPA accept as a permit condition Mirant's "commitment to refine the details in consultation with the Agencies", and c) that additional monitoring be limited to situations where "there is a demonstrated need based on past or on-going results." EPA is not including these provisions because EPA does not see that such provisions would provide sufficient certainty for EPA, MassDEP, the permittee or the interested public. Mirant itself objected to similar indefinite provisions in its comments. For example, see Comment I10. EPA's approach is to establish the need and certainty in the monitoring requirements to the degree possible in the Final Permit, while allowing for unforeseen circumstances through the provisions of Parts I.A.14.f, I.A.15, and I.A.16.a.

Comment I27: Mirant asserts that the permit should also allow the flexibility for the permittee to make other adjustments to the Toxicity Test Procedure and Protocol, after consultation with and the approval of, EPA New England, if the results of the WET testing program show such adjustments to be necessary in the future.

Response to I27: Beyond decisions as to the appropriate dilution water for use in testing water used in cooling at this facility, modification of the EPA WET methods is not appropriate. These methods were developed and intended to be used as described in the appropriate method manual (e.g., *Short-term Methods for Estimating the chronic Toxicity of Effluents and Receiving waters to freshwater Organisms*, EPA-821-R-02-013).

Comment I28 (from MA DMF): MA DMF asserts that the statistical basis for one duplicate beach seine among all other single net samples is unclear. We request clarification on this, or recommend single or duplicate net samples at all stations.

Further, we advise that the fyke net mesh of 0.5 inch will not adequately sample for American eel escapement as well as other small anadromous fish species, and recommend a net mesh of 0.375 or 0.25 inch..

We request receiving a copy of the proposed monitoring plan in advance of this study with time to review and comment to reduce excessive fish mortality resulting from the use of a gill net at Lock Number 3 at the Charles River Dam. Further, we request the opportunity for review and comment on this effort prior to use of the gill net.

The method used for suction sampling of ichthyoplankton should be more clearly defined to prevent re-sampling of previously filtered water. Any fine-mesh barrier study should collect samples under a full range of actual operating conditions including full withdrawal of 80 MGD.

Response to I28: Many of the specifications included in the permit's biological sampling requirements are included to provide the necessary standardization so that future results will be comparable to the results of past data collection efforts. In the case of the fyke net mesh size, the 0.5 inch net mesh was selected in order to allow a meaningful comparison with the gillnet sampling. Gillnet mesh size used in past sampling and specified in the permit are identified as 0.5 inch, 0.75 inch, 1.0 inch and 1.5 inch bar mesh.

The stated rationale for two hauls at the Hyatt Station as opposed to single hauls at the other stations is not based on statistics, but rather, "since previous sampling showed that the bottom at the Hyatt Station was generally free of obstruction during previous sampling events." (Part I.A.14.e.1) Thus, Hyatt Station is a sampling station relatively free from the sampling bias that bottom obstructions can present in sampling.

EPA agrees with the concern raised by MA DMF regarding excessive fish mortality as a result of gill netting. In consideration of this concern for all biological monitoring, a condition has been added to Part I.A.14.d of the Final Permit which requires that this monitoring be consistent with any State or Federal efforts to limit the collection of certain fish species, such as the current recreational moratorium on taking river herring from the Charles River. In this regard, the use of gill netting and other sampling methods will be subject to MA DMF review and conditions. Regarding the method used in ichthyoplankton sampling, including suction sampling, these sampling methods will be selected based on the plan review process defined in the State Water Quality Certification and stipulated in Part I.A.14.d.11 of the Final Permit.

Comment I29 (from MA CZM): CZM recommends that the "refinements and quality assurance of the hydroacoustic program" (Section I.A.14.e.5) utilized to monitor migrating river herring include a thorough calibration of the hydroacoustic monitoring technique.

CZM suggests that impingement monitoring described in Section I.A.14.e.9 occur on the same three-times-per-week schedule as required for the entrainment sampling.

Response to I29: EPA recognizes the importance of proper calibration of the hydroacoustic monitoring equipment. The requested requirement for the calibration of the hydroacoustic monitoring technique standard operating procedures is covered by the general requirement for a Quality Assurance Project Plan. Guidance on documenting sampling methods is included in EPA QA/R-5 which is referenced in Part I.A.14.a.6 of the Final Permit. Regarding the scheduling of entrainment sampling, the schedule will be determined based on the plan review process defined in the State Water Quality Certification and stipulated in Part I.A.14.d.11 of the Final Permit.

Comment I30 (from MA DMF): MA DMF recommends beginning weekly nutrient sampling

on March 1st, during the period of the spring peak in nutrient loading.

Response I30: EPA acknowledges that peak nutrient loading to the Basin occurs during the spring period when river flow is high and the wastewater treatment facilities in the upper watershed are providing less treatment for removing phosphorus. However, critical conditions for algal blooms in the Basin occur during July, August, and September, several months after the typical high-flow spring season. Spring conditions are not typically a concern for algal blooms in the Basin because of several factors including lower temperatures, shorter water residence times, lower water clarity, and lower light intensity. The purpose of the proposed nutrient monitoring requirements is to supplement the chlorophyll *a* and algal data collected during the critical growing season in order to be able to more fully evaluate the effects of the thermal discharge on algal levels in the lower Basin. Water quality data collected by the MWRA and EPA from the upstream and downstream ends of the Basin show that much of the nutrient loading that enters the Basin during high flow conditions pass through the Basin to Boston Harbor. Therefore, the weekly nutrient monitoring will continue to be required beginning in June.