B. Response to Comments Concerning Mirant Kendall's Operations

Introduction to Section B

Before delving into the specific comments and responses of Section B, some overall context is helpful. In its February 2001 permit renewal application, Mirant Kendall applied for a thermal discharge variance, which required it to demonstrate that any technology- or water-quality-based thermal effluent limit will be "more stringent than necessary to assure the [protection] and propagation of a balanced, indigenous population (BIP) of shellfish, fish, and wildlife." 33 U.S.C. § 1326(a). In Section B, Mirant Kendall challenges EPA's analysis of Kendall Station's electricity-generating operations. In particular, Mirant Kendall suggests in several places that EPA has erred by analyzing the risk to the BIP by evaluating the quantities of heat and flow that Mirant Kendall, in its own NPDES permit renewal application, requested permission to discharge. Mirant Kendall contends that it will not actually discharge as much as it has requested permission to discharge in its application, presumably due to market conditions and/or other factors not regulated by the NPDES permit. Mirant Kendall urges that EPA estimate how much heatload Kendall Station will actually discharge, and analyze the thermal stress on the Charles River's fish and wildlife assuming this lower number.

Moreover, Mirant Kendall repeatedly (e.g., in comments B1, B2, and B5) assures EPA that its future discharges will approximate those of July 2003, during which the plant "operate[d] at close to full capacity." The average heatload for this month was 394 MMBtu/hr and the maximum heatload possible under the permit in effect in 2003 was 486.5 MMBtu/hr. Despite the repetition and confidence of these assurances, they are contradicted by the plant's recent operational record. Data from the summer of 2005 reveal that Mirant Kendall's heatload far exceeded that of July 2003. For example, the monthly average heatload for June and August 2005 was 20% above what Mirant Kendall claimed to be "close to full capacity," in July of 2003, yet strikingly, just 3% shy of the enforceable NPDES permit limit.

While a heatload value has never been explicitly listed as the maximum value allowed as part of the permit compliance profile for Kendall Station, its components (flow and temperature change across the condenser) are limited. Therefore, throughout the response to comments, when the "maximum permitted heatload" is referenced, it is understood that EPA is referring to the product of the permitted maximum cooling water flow limit and the permitted maximum change in water temperature from the intake to the discharge, which in effect results in a maximum calculated heatload which cannot be exceeded without violating one or both of these two regulated parameters.

In summary, Mirant Kendall appears to argue that EPA should authorize Mirant Kendall to discharge at the levels requested in the permit application, but assume in its biological analysis under CWA § 316(a) that Mirant Kendall will actually (but non-enforceably) discharge at much lower levels. Even without the 2005 data, this thesis was unconvincing. The 2005 data demonstrate that Mirant Kendall's discharge will, when conditions are favorable, very nearly approach the enforceable permit limit. With this in mind, EPA takes very seriously its

responsibility to base its analyses on the lawful maximum discharge that Mirant Kendall has requested and, quite possibly, will produce.

To buttress this argument, Mirant Kendall challenges EPA's description of Kendall Station's electric power production profile. EPA is not a power-licensing agency, and does not generally regulate a facility's output in megawatts. EPA's mandate under the Clean Water Act is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a). To that end, EPA must attempt to reach a long-overdue national goal of "water quality which provides for the protection and propagation of fish, shellfish, and wildlife." Id. § 1251(a)(2).

As explained in Section 4.2.3 of the DD, the permit applicant seeking a thermal discharge variance has the burden of demonstrating that a limit less stringent than that required by water quality standards will nevertheless "assure the [protection] and propagation of a balanced, indigenous population of shellfish, fish, and wildlife." 33 U.S.C. § 1326(a). Mirant Kendall's approach to this demonstration was somewhat oblique. Mirant Kendall did initially submit a hydrothermal model of the Basin. However, as explained more fully in Section 5.5.1 of the DD and the Introduction to Section E of these responses to comments, that model was scientifically inadequate. EPA pointed this out to Mirant Kendall at an early stage. Mirant Kendall elected not to revise its model, but instead requested that EPA rely on an in-situ, real-time water quality monitoring regime. See DD, Section 5.5.1. Since Mirant Kendall did not submit a credible demonstration of the impact of its heat discharge on the Basin, and EPA does not generally develop thermal models for the benefit of dischargers that decline to do so on their own, EPA decided to develop the permit based on actually achieving biologically protective temperatures instream.

Because EPA did not develop permit limits in terms of the facility's production capacity, but rather in terms of sensitive species' heat tolerances, many of Mirant Kendall's arguments in Section B are legally irrelevant. The permit limits are based on the least stringent in-stream temperatures needed to maintain a biologically protective section of the lower Charles Basin. For purposes of this analysis, it is largely irrelevant whether Mirant Kendall is characterized as "peaking" or "base load"; whether, given its historical discharges since December 2002 and expected energy market conditions over the next five years, it can be expected to discharge at or below its permitted limits, and if below, by how much; whether any factors outside of the NPDES program (e.g., electricity and natural gas prices) guarantee that Mirant Kendall will not achieve its maximum permit limits; and so on. Of course, EPA desires the most accurate information about Mirant Kendall's electrical generation operations. But in the context of this permit, based on meeting in-stream temperature limits, precise forecasting of Mirant Kendall's future electrical generation is not particularly relevant to the § 316(a) variance determination.

Comment B1: Mirant Kendall cites 40 C.F.R. § 122.45(b)(2) for the proposition that EPA must develop the permit limitations based on a reasonable measure of the level of thermal discharge Kendall Station is likely to experience, and suggests that, instead of the thermal load authorized by the NPDES permit, EPA focus on the historical monthly average thermal load since

December 2002. Mirant Kendall cites legal precedent involving the interpretation of "potential to emit" under the Clean Air Act for renovation of an existing facility.

Response to B1:
1. The upgrade to the Mirant Kendall Station (MKS) has enabled Mirant to run the facility at close to its maximum flow of 80 MGD for longer periods of time and more economically than that characterized by previous operations. The plant may reasonably be expected to operate at high levels of electrical production for longer periods of time.

2. Although over a particular month, the average flow may be 70 MGD, there could be periods of several days in a given month during which the plant operates close to its maximum of 80 MGD. This flow, combined with high ambient temperatures, would represent conditions of greatest concern with respect to fish and protection of the BIP. Since the permit allows Mirant Kendall to reach its daily maximum of 80 MGD so long as the 70 MGD annual average (or 70 MGD monthly average for April through June) is satisfied, it is entirely appropriate to analyze the impacts of 80 MGD flow.

3. The daily flow limit of 80 MGD was carried forward from the prior permit. Mirant Kendall did not, in its renewal application, request a lower limit. Furthermore, while the prior permit imposed a 70 MGD monthly average 12 months of the year, the new permit only imposes this as a monthly average for three months, and for the other 9 months, allows Mirant Kendall to achieve 70 MGD as a rolling annual average. See DD, Section 4.4.1. Mirant Kendall did not request a lower flow limit and EPA did not see a basis for imposing a lower flow limit. If Mirant Kendall wishes to submit a request to modify the permit to impose a more stringent enforceable flow limit, EPA will consider that request. Absent such a request, EPA cannot rely on Mirant Kendall's avowals that it will not reach its permitted limits.

4. If Wisconsin Electric Power Co. v. Reilly, 893 F.2d 901, 917 (7th Cir. 1990) is at all relevant, then Puerto Rican Cement Co. v. EPA, 889 F.2d 292, 297-98 (1st Cir. 1989) (Breyer, J.), where the facts were closer to those here, is even more relevant. Broadly speaking, that case suggests that EPA may reasonable compare a facility's actual historical production to its potential future production. That said, EPA doubts the applicability of these Clean Air Act cases because they involve interpretation of quite different regulatory programs.

5. Mirant Kendall has suggested at various points during the permit renewal process that its expected thermal discharge after the upgrade will be consistent with past discharge. EPA and MassDEP analyzed historical data to identify whether any meaningful changes to the profile of the Station's thermal discharge over time have taken place since the upgrade. The following final response is the joint product of both agencies.

For the purposes of this historical versus current heatload analysis, the time period associated with historical conditions was identified as from 1988 through 2000, and "current condition" was specified as 2001 through 2005, the time period during which the permit renewal process was

actively proceeding. This must be done to determine whether current station heatload to the lower Basin is consistent with, or at least no higher than, thermal discharge reported in the past (1988 through 2000).

Past Thermal Discharge (1988-2000)

First, a reasonable determination of the Station's past thermal discharge was made. Heatload values for the summer months (defined here as June, July, August and September) were exclusively examined as part of this analysis. The assessment was based in large part on Figure 2-7 of the Mirant Kendall Supplemental Application, Volume I, (February, 2001), also included as Figure 3.1.1-1 of the DD. The graph is included in this document as Figure B1-1. An examination of the monthly average Station heatload showed average monthly values consistently approaching 400 MMBTU/hr in late 1988 and early 1989. The average monthly heatload declined from this level and demonstrated more variability through 1992, but generally remained between 200 and 300 MMBTU/hr. Since 1992, average monthly heatload values generally stayed in the 200 MMBTU/hr range, with some drop in heatload noted in mid to late 1998. Since the graph ended in August of 1999, the last three months of heatload data (June, July and August, 1999) were easily identified. These data points also maintained the same level, at approximately 250 to 260 MMBTU/hr. Subsequent data submissions by the permittee, calculated in the same way that heatload was calculated for Figure B1-1, revealed September 1999 as having an average heatload value of 294 MMBTU/hr. When June, July, August and September of the year 2000 were calculated using the same method used in Figure B1-1, their monthly heatload values were approximately 318, 198, 358, and 295 MMBTU/hr. Upon examining heatload data from approximately mid-1992 through the summer of 1999, the summer of 1999 values could be argued to be slightly higher than the average of other summer months in this time period. However, these levels were seen to be lower than monthly values in 1988 and 1989. When compared with monthly heatload values from Figure B1-1, the June, August and September 2000 monthly average heatloads appeared to be relatively higher than the heatload values of the majority of summertime averages.

Since all average monthly heatload values were calculated in the same way in Figure B1-1 (and for September 1999 and the summer months of 2000), the comparative relationship and relative positions among the historical datasets were considered to be generally correct, although the absolute thermal loading number was overestimated. For this reason, June, July, August and September of 1999 were judged, through visual inspection, to reasonably represent the historical heatload from Kendall Station during the summer months. For reasons that are explained below, the associated heatload values of 250 to 294 MMBTU/hr could not be used as the corresponding heatload numbers for those months.

When the supplemental permit application was originally submitted in February of 2001, thermal discharge data from the Station was estimated in a way that was ultimately seen to overstate the average monthly thermal loading from the Station (MMBTU/hr; Figure 2-7, Mirant Kendall Supplemental Application, Volume I, February, 2001). Later in the permitting process, hourly

and daily values of Station Delta T (difference in water temperature between the intake and the discharge of the Station) and once through cooling water flow - the two operational components needed to calculate heatload - were made available. When this more refined raw data were used to determine heatload, the recalculated, more accurate Station average monthly heatload values were much lower than originally represented in Figure B1-1.

When the average heatload values for these four summer months in 1999 were calculated using the refined raw data, the more exact monthly average values were 115, 131, 137 and 112 MMBTU/hr, for June through September, respectively. An average of these four average monthly values resulted in a summer time historical heatload value of approximately 124 MMBTU/hr.

Current Thermal Discharge (2001-2005)

For the purposes of the historical versus current heatload evaluation, the time period associated with all summer months after the summer of 2000 was identified as representing "current condition." Heatload data representing current conditions and calculated using the more refined, representative raw data, were assembled from the summers of 2001 through 2005. Daily average heatload values from the historical summer (June, July, August and September of 1999) were represented graphically along with the corresponding thermal heatloads (June through September of 2001 through 2005) in Figure B1-2 to provide a visual comparison of heatload over time. Heatload levels from1998 and 2000 were also included in the comparison for information only, as well as providing a continuous view of heatload levels from the summers of 1998 through 2005. Monthly average heatload values for these summer months from 1998 through 2005 were included in Figure B1-3. The interim owner of Kendall Station did not take possession of the Station until December of 1998. Station operation in the summer of 1998 was seen to contribute less heatload to the lower Basin when compared with the historical "average" summer of 1999. Through inspection of Figures B1-2 and B1-3, it appeared that compared to the summer of 1999, overall heatload was slightly less in the summer of 2000, somewhat greater in 2001 and 2002 and greater still in 2003, 2004 and 2005. Of these years, the lower Basin received the greatest summer heatload from Kendall Station in 2003 and 2005.

In order to gain a clearer picture of the number of days the average heatload reached specific ranges of heatload, Figure B1-4 was assembled. Through inspection of these pie charts, it can be seen that when compared to the historical year of 1999, Station heatload to the Basin was notably greater in the summers of 2001 through 2005. In the summer of 1999, Station heatload dropped below 101 MMBTU/hr approximately half of the time. In 2001, the thermal discharge was below 101 MMBTU/hr only about one percent of the time. Similarly, the thermal discharge dropped below 101 MMBTU/hr about 32% of the time in 2002, 9% of the time in 2003 and at no time in the summers of 2004 and 2005 (Figure B1-4).

Based on an examination of the historical heatload versus the "current heatload" of the Station, it appears that heatload rates in the summers of 2001, 2002, 2003 and 2004 did not reflect a discharge that was "consistent with past discharges"or reflected a "normal component " of the

discharge. Based on this analysis, any Station summer heatload to the lower Basin over 124 MMBTU/hr is considered inconsistent with past discharge.

If there was any measure of doubt in this analysis, a closer examination of the data from the summer of 2005 eliminates it. That is because the heatloads in 2005 were, comparing equivalent months from 2004, 66% (August) to 320% (June) higher than those of the previous year (Figure B1-3). Thus, even if 2004 could be said to be "consistent with past discharges" – which, EPA has explained above, it cannot – the same could not be said for 2005. See Response to B2 for a more detailed discussion of 2005 data.

Comment B2: Mirant Kendall argues that EPA has incorrectly characterized the repowering of Kendall Station as a shift from a peaking facility to a base load facility. Moreover, Mirant Kendall argues that, but for the NPDES permit's biologically-based in-stream temperature limits, the plant's future operations will approximate those of July 2003.

Response to B2:
1. Page 4-1 of Mirant Kendall's permit renewal application (Part I of II) stated: "The proposed plant will be run at a design level of 234 MW on a continual basis as opposed to the current partial and peak load operation at a capacity up to 64 MW." EPA interpreted this sentence to mean that Mirant Kendall intended to run the proposed plant "on a continual basis as opposed to the current partial and peak load operation." The permit applicant has a duty to use clear language in its permit application and not conceal within a seemingly unambiguous sentence a hidden or unexpected meaning. EPA is entitled to rely on Mirant Kendall's description of its own operations in its permit renewal application.

2. EPA agrees that there has not been any increase in the plant's physical capacity to withdraw and discharge cooling water, and EPA never stated or implied that there was such an increase. Rather, based on Mirant Kendall's submissions, EPA reasonably concluded that there has been an increase in the plant's electricity output. The upgrade that resulted in this increased output potential allows the plant to operate more efficiently and to therefore produce electricity on a much more continuous basis and at correspondingly high flows, effluent temperatures and delta Ts for longer periods of time than in the past, or prior to the upgrade.

Because this permit is based on a § 316(a) variance application, the permit's thermal discharge regime must protect the aquatic communities that form the BIP. As explained in the Response to C3, the BIP is already stressed from a variety of factors, including, but not limited to, heat. Some of this information is new and was not available when the prior permit was developed. Even if Mirant Kendall's flow and heat discharge were to remain exactly the same as in prior years, Mirant Kendall would have to demonstrate a lack of prior appreciable harm. Mirant Kendall has not made such a demonstration and, in fact, EPA and MassDEP's review of the evidence indicates that there has been appreciable harm. See Response to C3. Given that flow can reasonably be expected to be high for more days and for longer periods of time than those which the river has experienced in previous years, Mirant Kendall's burden is that much steeper.

3. Mirant's web site notes that this facility is operating under a "Reliability Must Run" agreement with NSTAR for local system reliability to address periods of peak demand. See http://www.mirant.com/our_business/where_we_work/kendall.htm (last visited September 6, 2006). As market conditions change, power plants like Kendall Station adjust their operations. Whether or not Kendall Station is characterized as a "base load" plant is unimportant. What matters is that the plant's upgrade has made it more efficient, and allows it to operate at closer to its capacity for longer periods of time.

4. As noted earlier, EPA cannot rely on Mirant Kendall's unenforceable assurances that its heatload will fall well below maximum permit levels. In Comment B2 (submitted in October 2004), Mirant Kendall confidently predicted that operating data for July 2003 provides "a good approximation of the future maximum actual monthly discharge that the Station might expect during the summer months in the absence of the Agencies' proposed in-stream temperature limits." However, data indicates that Mirant Kendall's heatload from the summer of 2005 far exceeded that of July 2003, and very nearly approached the applicable permit load.

The July 2003 monthly average was 394 MMBtu/hr, which did in fact fall well below the facility's maximum heatload of 486.5 MMBtu/hr. Moreover, the heatload during the other summer months in 2003 was well below that of July; the next highest was June 2003, with an average of 267 MMBtu/hr, and in September 2003 the heatload was 148 MMBtu/hr, less than half that of July.

But, the plant's 2005 summer heatloads were far above those of July 2003. The monthly average heatloads for June through September 2005 were, respectively, 474, 460, 474, and 467 MMBtu/hr (see Figure B1-3). July 2003's figure of 394 MMBtu/hr, far from representing a maximum, actually fell well below the minimum summer monthly average heatload in 2005. Moreover, unlike 2002 and 2003, where one month's average was high but the other months experienced significantly less heatload, in 2005 the difference between the highest and the lowest month was approximately 3%. Finally, the summer monthly heatloads in 2005 came perilously close to the maximum heatload the facility is capable of discharging under its flow and facility Delta T limits: June and August were within 3% of this maximum, and even July, the summer month with the lowest heatload, was within 5% of the maximum.

This illustrates that Mirant Kendall's assurances that its discharges will not exceed some hypothetical, unenforceable figure below the allowable maximum cannot be the basis for permit development. Experience indicates that, when conditions are favorable, Mirant Kendall will operate the plant at nearly the maximum permitted load. Therefore, EPA must analyze the impact on the river of the plant operating at maximum permit conditions and, based on its upgrade, for longer periods of time than in the past.

Again, if Mirant Kendall believes that the maximum permit conditions that it requested allow it to draw or discharge too much cooling water, Mirant Kendall may request a permit modification to impose more stringent flow limits.

Comment B3: Mirant Kendall (1) argues that EPA erred by referring to the prior permit as the permit "previously in effect," (2) notes that the existing permit does not regulate Kendall Station as a peaking facility, but rather authorizes Kendall to discharge at its full capacity with a maximum temperature of 105ºF and a temperature rise of 20º F in the discharge pipe, without respect to whether the Station operates all the time or only for portions of a day or month or year, and (3) emphasizes that Kendall Station "will sometimes operate at full capacity but more often will not."

Response to B3:
1. The characterization of the plant's operation as "base load" or "peaking" is not important under the NPDES program. As previously noted, it is reasonable to issue this permit with conditions appropriate for the potential that the plant will operate at high levels and for longer periods of time than in the past. See Response to B2.

2. EPA agrees that, until this final permit becomes effective, the 1998 permit remains in effect.

3. See Responses to B1-B2.

Comment Related to B3 from Mark Jaquith: Mirant has stated its intent to change Kendall from a peak load provider to a constant supplier to the grid. This will vastly increase the overall heat output to the river. It is my request that your final permit not allow Mirant to discharge more heat than was done in years when the plant was run as a peak load provider.

Response to Comment Related to B3 from Mark Jaquith: The increase in permitted heatload is limited to the allowance for an annual average flow limit of 70 MGD, rather than a monthly average flow limit of 70 MGD. (The 70 MGD monthly average limit has been retained in the months of April, May and June only.) This indeed may result in an increased permitted heatload in certain months. In the Final Permit, however, EPA and MassDEP are relying primarily on the in-stream monitoring and temperature compliance limits as a more precise and protective means of monitoring and regulating the plant's thermal discharge in a manner that protects the balanced indigenous population, while allowing operational flexibility to the permittee. See also Responses B1, B2, B8, and B9(3).

Comments B4 and B5: Mirant Kendall argues that EPA has made various misleading comparisons of data from past years.

Responses to B4 and B5: Operations since the upgrade have occurred only for 4 years, and this time period cannot be relied upon exclusively to project future generation and heatloads. In its comments, Mirant Kendall does not discuss whether it would have generated higher levels of electricity if it would have been physically feasible and economically profitable to have done so. Both the price of electricity and the cost of natural gas fluctuate. In an area as unpredictable as energy markets, past performance is not always a predictor of future performance. For purposes of the CWA § 316(a) variance application, it suffices to note that the facility can produce greater levels of electricity for longer stretches of time, resulting in greater heatloads to the river, than it

has done to date since the upgrade.

Finally, while the monthly average figure of 487 MMBTU/hr is not likely to be reached for the months of April, May and June, it could certainly be approached in other months when the monthly average limit of 70 MGD does not apply.

Comment B6: Mirant Kendall argues that analyzing monthly average BTU discharge obscures multiple days of high operational levels. During any month, as Kendall Station responds to the energy marketplace, often there are several days in a row the facility operates at much higher levels than during lower market demand times on other days during the month. Mirant Kendall also claims that "the river has not seen any temperature effects of those higher level operations."

Response to B6:
1. EPA agrees that a given month will typically incorporate some days where the discharge falls below the monthly average, and other days where the discharge rises above the monthly average.

2. EPA and MassDEP do not agree with Mirant Kendall's claim that "the river has not seen any temperature effects of those higher level operations." The biological studies reviewed by EPA and MassDEP scientists have reached the opposite conclusion. See Response to C3.

3. It appears Mirant Kendall is urging EPA to assume, for purposes of biological analysis, that Mirant Kendall's operations will be constrained by unenforceable assurances that Mirant Kendall will not actually do what it is requesting legal permission to do. The only "hard" limits on Mirant Kendall's discharge are the plant's physical capacity and the constraints imposed by the NPDES permit's conditions. Market conditions, other business conditions, and even world events may lead the plant to operate at these physical and legal maxima, or below them. These factors cannot be accurately predicted and cannot be relied upon in developing legally and scientifically defensible permit conditions. Rather, EPA is required to assume, in analyzing the potential operations of the plant, that external conditions may lead the plant to operate at its physical and legal maximum capacity for certain periods of time.

Comment B7: Mirant Kendall asserts that EPA has exaggerated the plant's impact by analyzing the plant's future thermal effects on the basis of discharges at 80 MGD. While the plant's existing permit allows discharges of 80 MGD, in fact Kendall Station's existing pumping capacity is only 77 MGD. At a Delta T of 20˚ F, the plant's maximum actual thermal discharge is 12,828 mmBTUs/day, not 13,328 mmBTUs/day.

Response to B7:
1. EPA based the 80 MGD figure on (a) Mirant Kendall's permit renewal application, (b) its actual reported flow in 2003-04, and (c) a very modest (and, in the end, non-determinative) margin of safety.

a. In its February 2001 re-application, Mirant Kendall listed Outfalls 001 and 002 as having a

maximum flow of 40 MGD each.

b. The permittee is required to estimate discharge flows using pump capacity curves and operational hours. In order to verify the actual or estimated maximum discharge flow, the permittee is required to either directly measure its maximum flow through the facility's discharge or otherwise document, e.g. through pump curves, the estimated maximum discharge flow for its discharge pumps. EPA assumes that Mirant Kendall has correctly applied these requirements and truthfully reported the resulting data to EPA without exaggeration.

In its monthly Discharge Monitoring Reports (DMRs), Mirant Kendall reported a flow of 79.2 MGD for July 2003 and 78 MGD for August 2003 to May 2004, with the exception of October 2003. Consequently, EPA is entitled to assume that the plant's maximum flow is at least as high as its reported July 2003 flow, 79.2 MGD.

c. Allowing a very modest margin of safety to account for any data uncertainty and the possibility that Mirant Kendall may make slight improvements that would not require a permit modification, EPA rounded 79.2 MGD up to 80 MGD for purposes of analysis. However, the impact of this upward rounding is quite modest. The heatload difference between 79.2 MGD and 80 MGD is about 5.6 MMBTU/hr. This value is not significant enough to change any of the analysis or conclusions regarding this permit.

For these reasons, the facility's potential thermal effects have not been exaggerated.

2. If Mirant Kendall is certain that its flow will never exceed its supposed actual pumping capacity of 77 MGD, and is willing to commit to that figure, Mirant Kendall may apply for a permit modification to impose 77 MGD as a legally enforceable daily maximum flow limit. Absent a legally enforceable limitation on its potential to discharge, EPA cannot base its scientific analysis on an unenforceable assurance that Mirant Kendall will not exceed a supposed maximum capacity that it has already, according to its own DMRs, exceeded for portions of 2003 to 2004.

Comment B8: Mirant Kendall argues that plant operations data from 1998 to 2000 are the least representative of recent past years and should not be a basis for analysis.

Response to B8:

1. See Responses B1 and B2 for EPA's detailed heatload analysis.

2. The permitted flow limit has been changed from 70 MGD as a monthly average to 70 MGD as an annual average, with the exception of the months of April, May and June, where the monthly average still applies. Previously, the permittee was limited to a monthly average of 70 MGD for the summer months and would have to limit the amount of time that it operated at its maximum flow of close to 80 MGD. The revised permit, however, allows the permittee to operate near its maximum flow for the majority of days in the months of July, August and

September and still meet its annual average of 70 MGD by operating at lower levels during the lower electricity demand months. Since the summer months are those during which we expect the greatest impacts due to temperature, EPA focused on the potential heatload generating increases during this period.

Comment B9: Mirant Kendall argues that anadromous fish passage coincides with the high flow conditions in the spring, when flows typically are 10-20 times higher than summertime low flow conditions. Mirant Kendall also asserts that "EPA has made no showing that the past discharges or future discharges consistent with past discharges would have any adverse impact or cause 'appreciable harm.'"

Response to B9: EPA agrees that anadromous fish passage is expected to coincide with the high flow conditions that characterize the spring. Response C31 discusses this assumption in more detail. This high flow expectation is taken into account in EPA's approach to setting protective thermal limits. The Final Permit includes flow limits and discharge limits for maximum temperature and maximum delta T through the facility. However, EPA is not relying on these thermal load limits as being environmentally protective of thermal impacts. Rather, in the Final Permit EPA is relying primarily on the in-stream monitoring and temperature compliance limits as a more precise and protective means of monitoring and regulating the plant's thermal discharge in a manner that protects the BIP, while allowing operational flexibility to the permittee.

It is not EPA's burden to demonstrate that there <u>has</u> been prior appreciable harm. It is Mirant Kendall's burden to demonstrate that there <u>has not</u> been prior appreciable harm. See 40 C.F.R. § 125.73 (c)(1)(i).

Based on a review of all the scientific data, EPA and MassDEP have concluded that there has, in fact, been appreciable harm from Mirant Kendall's thermal discharge (taking into account the interaction of that discharge with other pollutants and the additive effect of other thermal sources) to a balanced, indigenous population of shellfish, fish and wildlife in and on the lower Charles Basin. See Response C3.

Comment Related to B9 (1) from Rae Steining: The maximum permissible heatloading of 556 million BTU/hour is approximately equal to the July daily average solar flux on the surface of the Charles bounded by the original dam and the Longfellow Bridge. The maximum pumping rate of 70 MGD permits Mirant to pass the same region of the Charles to a depth of 3 meters through the station's heat exchangers in about a week. These numbers suggest a large environmental impact. I do not believe that the draft permit is compatible with the goal of making the Charles safe and suitable for recreational use.

Response to Comment Related to B9 (1) from Rae Steining: EPA and MassDEP acknowledge that the facility's thermal discharge can cause a significant environmental impact on the aquatic population of the lower Basin. To limit this impact, the Final Permit contains protective limits and monitoring conditions to assure that the BIP is protected and that Federal

and State WQS are met. See Response to B9.

Comment Related to B9 (2) from CLF: The facility has recently undergone an upgrade in its power production, which will allow MKS to increase its generation from 64 MW to 234 MW, an increase of over 350 percent. As a result, MKS is expected to increase thermal load to the river by approximately 400% over historic levels. This increase in thermal load, combined with other existing stresses to aquatic life, will interfere with the seasonal migration and breeding of fishes and diminish the overall ecology of a public resource that the community has worked hard to restore. The specific concerns that CLF has with the development of this proposal include: (1) failure to appropriately utilize the best available science in setting appropriate thermal limits that will protect indigenous aquatic species, (2) failure to rigorously analyze the interaction of new thermal stresses with existing stresses, (3) failure to develop a reliable system for monitoring ongoing impacts to the river and (4) the extreme conditions that would be allowed within a large zone of dilution (ZD).

Response to Comment Related to B9 (2) from CLF: See Responses B2 and B3. There has not been any increase in the design capacity of this plant to withdraw and discharge cooling water, but there has been an increase in electricity output. The upgrade that resulted in this increased output potential allows the plant to operate more efficiently and to therefore produce electricity on a much more continuous basis and at correspondingly high flows, effluent temperatures and delta Ts for longer periods of time than in the past, or prior to the upgrade. Under this operational profile, the resulting thermal discharge closely approximates the heatload limit regulated under the former permit. Regarding CLF's specific concerns:

1. EPA has performed an extensive literature search and considered in-stream conditions and biological monitoring results as outlined in the Determination Document. Based on this evaluation, EPA and MassDEP have established temperature limits appropriate to protect the most sensitive resident and anadromous fish species in the lower Charles River Basin.

2. EPA agrees that the stress caused by the facility's thermal plume interacts with non-thermal stresses, such as organic enrichment/low DO, noxious aquatic plants, contaminated sediments, harmful bacteria, and increased turbidity. In many cases, EPA lacks quantitative data by which to assess the specific impacts of these other stresses to temperature sensitive species. However, pursuant to Section 316(a) of the CWA and 40 CFR 125.73, EPA has considered the cumulative impact of these stresses along with heat when assessing the impacts of high temperatures to the BIP, and crafted a temperature compliance regime that protects the BIP given these other stresses. See Response C7 and related comments, and Section 5.4 of the Determination Document.

3. The Final Permit contains an extensive and thorough in-stream temperature limit regime as well as an appropriate water quality and biological monitoring program. Specific concerns about the temperature monitoring and compliance regime are addressed more fully in the responses to comments in sections D, I, and J1.

4. The Section 316(a) variance indeed permits conditions in the ZD that are inhospitable to fish. However, the permit also contains rigorous real-time temperature criteria to ensure adequate passage and habitat in the Zone of Passage and Habitat (ZPH). The premise of the variance is that degradation of habitat in the narrow confines of the ZD is tolerable if the ZPH is large enough and cool enough, often enough. Taken as a whole, the permit protects the BIP in the lower Basin. See also responses in Section D regarding justification for conditions on the ZD.

Comment Related to B9 (3) from CLF: The draft permit would allow excessive withdrawals from the Basin. The draft permit changes the terms of the original permit, which required a monthly average of 70 MGD, to terms requiring a yearly average of 70 MGD, thus allowing increased usage during critical summer months. Further, EPA and DEP states that MKS has proposed to withdraw up to 80 MGD for longer periods during the critical months of May through August than it has in the past, which would clearly increase entrainment and impingement rates. As the river's 7Q10 flow is only 14 MGD, the plant will take in an amount of water equal to the flow of the Charles River in certain summer months, and up to five times the flow of the river during low flow conditions. In fact, when MKS is operating at full capacity, the draft permit would allow the entire volume of water in the lower Basin to circulate through the plant once every 36 days. In effect, the plant will function as a filter, essentially cleansing a substantial fraction of the Basin volume of aquatic life every day.

Comment Related to B9 (3) from MA CZM: CZM's comment was similar to that of the comment from CLF cited immediately above.

Response to Comments Related to B9 (3) from CLF and MA CZM: Although the 70 MGD limit has changed from a monthly average to an annual average, potentially allowing increased flow for certain months, the permit contains additional conditions that limit this impact. First, the months of April-June retain 70 MGD as a monthly average. Second, the effluent and instream temperature limits are more stringent than in the prior permit (i.e., the permit under which the facility currently operates), and thus will protect the BIP more than the prior permit. Third, the addition of barrier nets on the CWIS will minimize the Station's impingement rate, and thus protect the BIP more than the prior permit. See also Response Related to B3 from Mark Jaquith.

Comment B10 (from Dr. Stephen Kaiser): EPA should clarify those periods when heat dumping is not a priority. I presume these would include the winter months December through March and also October and November. The more steam that is sold (within an effective 3 mile radius of Kendall) the less heat is dumped to the river. EPA should encourage steam sales in the final permit.

Response B10: Although the summer period is the most critical time as far as representing the greatest potential for impact on the BIP and potential for eutrophication, there are temperature requirements established year round which correspond to different conditions related to varying life stages of anadromous and resident fish species. The permittee may use its discretion on how to meet these limits. This permit has been written to be protective of the BIP and to comply with

State and Federal water quality standards. It is generally up to the permittee to determine how it will comply with such permit requirements. To the extent that increased steam sales can result in a decreased heatload to the river, EPA and MassDEP would expect the permittee to consider this among other options to meet the temperature limits of this permit.

Comment B11 (from Dr. Stephen Kaiser): The EPA should identify the difference between energy and power. On Page 4 the plant is identified as a 113 MW per hour plant, and that "All other power figures are per hour, unless otherwise noted." The units of megawatts are already in power terms. Energy is power multiplied by time and would have units of Megawatt-hours or million BTUs.

Response B11: EPA appreciates and acknowledges this clarification. Although the fact sheet cannot be changed after the public comment period, it is noted here for the record that the pre-upgrade plant was rated at 113 MW, not MW per hour.