United States Environmental Protection Agency New England

Mirant Kendall Power Plant Final NPDES Permit – Public Q & A

EPA New England and the Massachusetts Department of Environmental Protection (MassDEP) have issued a Final National Pollutant Discharge Elimination System (NPDES) Permit No. MA 0004898 for the Mirant Kendall (MKS) power plant in Cambridge, Massachusetts. The facility withdraws water for cooling from, and discharges the heated water back to, the lower Charles River Basin. This new permit, which will be in effect for five years, includes appropriate regulatory conditions to:

- Sufficiently control the facility's discharges of heated water, and resulting temperature changes in the Charles River, so as to ensure the protection of a balanced indigenous population (BIP) of fish in the lower Charles River.

- Ensure the facility's withdrawals of water from the Charles River for cooling are consistent with both state water quality requirements and federal requirements that such water withdrawals are undertaken using the Best Technology Available for minimizing adverse environmental impacts.

- Protect the ecological health and recreational water uses of the lower Charles River Basin and Boston Harbor.

Note: This document provides only a brief summary of the main components, protective requirements, and major issues of this permit. For more specific permit requirements and details, please refer to EPA's Final Permit attachments and "Response to Public Comments," which can be accessed at www.epa.gov/ne/npdes/mirantkendall/.

1. Why is the issuance of this permit important?

Mirant-Kendall Station (MKS) is a 256-megawatt (MW), four unit power plant, which is the largest industrial discharger on the Charles River. Acquired by Mirant in 1999, the power plant is powered by a combination of natural gas, oil, and jet fuel. The plant uses a once-through cooling system that is permitted to withdraw an average of 70 million gallons a day from the Charles River and discharges it back into the river at temperatures up to 105 degrees Fahrenheit. The plant's current water usage is up to five times greater than the flow of the Charles River during low flow periods. Cooling system operations ecologically damage a water body in at least two ways. First, when water is withdrawn for cooling, the aquatic life in the water (including fish eggs and larvae, as well as adult and juvenile fish) can be killed or injured either by being trapped against the facility's

intake screens or by being drawn through the entire cooling system and discharged back to the water body with the heated discharge water. Second, the heated discharge can alter water temperatures sufficiently to degrade the quality of the habitat for resident or migrating fish.

In developing the final permit conditions, EPA and MassDEP paid especially close attention to the facility's potential environmental impacts to both the river and its most sensitive fish populations- in particular resident fish such as yellow perch and migrating fish such as river herring. After an extensive multi-agency analysis and public review process, this final permit carries stringent seasonal discharge temperature limits, enhanced water withdrawal screening requirements, and real-time biological and water quality monitoring systems that were not present in the previous permit. Together, these new permit conditions will ensure safe conditions for migratory and resident fish, create specific protective standards and requirements to control fish from being trapped or drawn into the power plant's cooling water system, and protect water quality and fish habitat and recreational uses in the Charles River.

2. How many people commented on this draft permit?

EPA received a total of twenty-two sets of public comments on this draft permit. Specific responses to these public comments can be viewed at www.epa.gov/ne/npdes/mirantkendall/.

3. What are the major protective requirements and conditions in this new permit?

In summary, the major permit conditions to protect the fish, water quality and recreational use of the lower Charles River are as follows:

- **In-stream temperatures**: Maximum temperature limits at specific, continuously monitored locations and depths in the river that vary by the seasonal sensitivity of resident and migratory fish. These limits maintain temperatures that create a safe "zone of passage and habitat" in roughly half of the lower River Basin so that the water body can support a balanced, indigenous population of fish. In addition, temperature limits have been set to ensure overall river temperatures do not contribute to excessive algae growth and blooms, which can cause public health risks, deplete oxygen levels, impair fish viability, and decrease recreational opportunities in the river.

- **Discharge Temperature and Location**: An annual average of 70 million gallons a day of power plant cooling water can be discharged at temperatures of up to 105 degrees Fahrenheit from the facility's current discharge pipes as long as maximum seasonal in-stream temperatures are not exceeded. If the monitoring indicates that the in-stream temperatures may be exceeded, the

power plant will need to modify its operations to reduce thermal discharges to the river.

- **Barrier Net**: A fine-mesh barrier net system or similar device must be installed in front of the facility's cooling water intake structure to reduce the number of fish that are trapped against the facility's intake screens and the number of fish larvae that are drawn through the plant's cooling system. The device must be deployed except when precluded by the formation of river ice. The intake structure, located just below the Longfellow Bridge, trapped 2,400 fish during portions of 1999 and 2000, according to sampling done by the plant owners. Tens of million of fish eggs and larvae were drawn into the plant during the same period.

- **Water Quality, Biological and Toxicity Monitoring:** Kendall Station will be required to undertake continuous water quality monitoring in the lower Basin- including real-time temperature readings at eight strategic locations, sampling for fish abundance, and quarterly effluent toxicity testing to ensure that the Charles River is being protected. None of these monitoring requirements existed in the previous permit.

- **No Discharge Diffuser in the River:** Mirant Kendall will not be allowed to discharge heated water (up to 35 million gallons per day) from a proposed diffuser that would be constructed at the Charles River bottom. Based on a careful and extensive review of the most recent available water quality and river sediment data from the Charles Basin, EPA has currently determined that the operation of the proposed heated water diffuser has the potential to increase circulation of phosphorus (an essential nutrient for algal growth) through the water column, which in turn would increase algal blooms – particularly of noxious and harmful blue-green algae. In addition, the dispersal of heated water from the diffuser would have a reasonable potential to re-suspend toxic historical materials (e.g. metals) from the deep river bottom into cleaner, oxygenated water above. More comprehensive river modeling and scientific analysis will be needed in order to effectively assess and permit this potential discharge option in the future.

4. What changes have been made in the draft permit based on public comment?

EPA considered numerous comments and benefited from a number of thoughtful comments and suggestions. EPA made about fifty minor changes to the permit as a result. One important change was to give the permittee increase flexibility the design and location of the barrier net system. Another is lower certain summer in-stream temperature limits from 83 degrees Fahrenheit to 81 degrees Fahrenheit.

5. In general, what are the new maximum seasonal temperature limits in the "safe zone of passage and habitat"?

The new permit sets forth the following specific maximum seasonal temperature limits at designated in-stream locations to ensure sufficient safe zones of passage and habitat.

Time Period	Final Temperature Limits
November 1 – April 1	50 ° F
April 2 – 14	61 ° F
April 15 – 30	65 ° F
May 1 – 10	66.4 ° F
May 11 – 22	68 ° F
May 23 – 31	70 ° F
June 1 – 7	72 ° F
June 8 – 11	75 ° F
June 12 – October 31	83 ° F and 81 ° F

6. Why is EPA allowing roughly half the river to exceed safe temperatures for fish? Shouldn't EPA protect the whole river?

EPA and MassDEP must ensure that the permit protects the river's balanced indigenous fish population. After extensive analysis, the two agencies have concluded that even if some areas of the river are allowed to have temperatures too hot for fish habitat or passage, the river's balanced indigenous population of fish can be protected so long as a sufficient cross-section of the river is required to provide protective temperatures. EPA and MassDEP believe the fish can be protected as long as the water temperature in roughly 50% of the cross-sectional area of the lower Charles River Basin remains below protective limits (assuming that excessive temperatures are avoided near the surface and in important habitat areas).

Real time continuous temperature monitors placed at eight strategic locations, both upstream and downstream of this discharge, will ensure a safe zone of passage and habitat for sustaining fish populations in the lower Charles Basin. Thus, while some areas of the River will have temperatures above levels preferred by resident and migrating fish, adult and juvenile fish should be able to swim to other parts of the River maintaining suitable temperatures.

7. At times, the Charles River gets naturally warmer than some of the temperature limits. Does that mean the limits are too low?

No. During times of extreme meteorological conditions (heat wave, drought, etc.), natural water bodies are expected to briefly experience extreme conditions. This occurrence is stressful to the fish populations. The documentation of infrequent high upstream river temperatures is not a justification to allow these

temperatures to be maintained in the Charles River for extended periods of time due to the Station's thermal discharge. In preparing the permit, EPA closely examined the record of ambient temperatures in the Charles River and has incorporated this information into appropriate permit conditions.

8. What is the NPDES permit process for the Mirant Kendall Station?

The power plant needs permits under federal and state law. EPA and MassDEP administer similar, but not identical, permitting programs. Consequently, EPA New England and MassDEP worked closely together to develop the federal and state permits for the power plant. As an administrative convenience for all concerned, EPA and MassDEP are jointly issuing the permits in one combined document. As a regulatory step, MassDEP also reviews the federal permit and provides a certification, which lists any additional conditions needed to ensure compliance with specific state clean water act requirements (Massachusetts Water Quality Standards). Also, the Massachusetts Office of Coastal Zone Management (MCZM) must certify that the final renewal Permit No. MA 0004898 is consistent with MCZM's enforceable policies under the Coastal Zone Management Act.

In addition, federal and state fishery agencies provided extensive technical review, biological data analysis and comments during the permit development process. EPA New England and MassDEP began work to reissue the permit in 1999, issued a draft permit for public comment in June of 2004, held a public hearing in September of 2004, and closed the public comment period in October of 2004. EPA's and MassDEP's Response to Public Comments document can be found at: www.epa.gov/ne/npdes/mirantkendall/**.**

This new permit becomes effective on or about December 1, 2006 (first day of month following 60 days from issuance).

8. Mirant Kendall Station has been there for so long, why make the permit more restrictive now?

Currently, the plant operates more frequently and at higher capacity factors than it has in the past. As a result, more water is used for cooling for longer periods of time and the water being discharged is at higher temperatures. This is due to increased electric demand in the area and on-going constraints with NSTAR's electric local distribution system. There is site-specific evidence that this operating profile is causing appreciable harm to the balanced indigenous fish population of the Charles River.

10. Why is so much environmental monitoring necessary?

The monitoring approach was originally proposed by Mirant as a way to ensure compliance without having to submit a hydrodynamic model that would address EPA's questions about the Station's heat load effects on the river. EPA has determined that the real-time monitoring described in the permit is necessary and appropriately comprehensive in order to allow Mirant and the Agencies to track the facility's impacts and react to any permit exceedances in a biologically meaningful time period. This would not be possible relying solely on monthly Discharge Monitoring Reports (DMR) or some other intermittent reporting scheme. Because various life stages of fish species have been shown to be negatively impacted by temperatures above the levels allowed by the permit, it is critical that any violations are identified quickly and appropriate measures taken to ensure that such violations and associated harm to the BIP are minimized.

Under the permit's real-time monitoring approach, the facility will be compelled to take immediate action to minimize the impacts of any exceedances. In making this determination EPA has considered a number of factors, including cost, uncertainty, equipment capabilities, the accessibility of web-based technology and environmental effects. The monitoring is not excessive compared with permit requirements for comparable power plants.

11. What specific permit requirements are set up to prevent fish mortality in the lower Charles River Basin?

EPA has set protective in-stream temperature limits, required a barrier net system to reduce the number of fish that are trapped on the cooling water intake structure, and established continuous water quality monitoring and fish abundance sampling requirements to ensure the protection of a balanced indigenous fish population in the lower Basin.

12. What are the water quality impairments to the lower Charles River?

MassDEP has classified the lower Charles River Basin as impaired for organic enrichment, dissolved oxygen, nutrients, oil/grease, taste/odor/color, priority organics (such as PCBs and pesticides found in the lower Basin sediments), metals (among others - such as lead, cadmium, and mercury), pathogens (bacteria), unknown toxicity, and increased turbidity. MassDEP's 2004 Integrated List of Waters can be accessed at http://www.mass.gov/dep/water/resources/tmdls.htm

13. Why won't EPA allow the deep-water discharge diffuser proposed by Mirant?

Mirant proposed a diffuser in order to more fully mix the heated water discharged from the Station with the Charles River, on the theory that this would allow the Station to generate more electricity without exceeding the temperature limits in the permit. However, the proposed diffuser also has the potential to exacerbate a condition of excessive summertime algae in the Charles River, caused in part by high levels of nutrients. Mixing the top and bottom of the river in summer may make more nutrients available and contribute to severe algal blooms. Furthermore, mixing isolated low-oxygen, high-salinity deep river water with surface water may harm freshwater fish in the river. Before issuing the draft permit, EPA repeatedly informed Mirant of these concerns and asked Mirant to develop a credible water quality model to demonstrate that this proposal would not harm the River, but Mirant has not done so. Recently, Mirant has expressed interest in adapting for its own use a complex hydrodynamic model of the Charles River that EPA developed for a forthcoming Nutrient Total Maximum Daily Load (TMDL), and EPA has provided technical assistance in this long-term project.

14. What are EPA New England and MassDEP doing to address the water quality impairments associated with algal blooms in the lower Charles River?

EPA New England and MassDEP are developing a *Draft 2006 Nutrient Total Maximum Daily Load (TMDL)* for the lower Charles River Basin. The objective of this TMDL is to determine what pollutant load reductions are necessary to address excess nutrients, mainly phosphorus. Phosphorus is the primary cause of eutrophication that chokes fresh water bodies with harmful algae, depletes oxygen for fish, and reduces swimming, fishing, and boating opportunities throughout the lower Charles River. Thermal discharges from Kendall Station, which warm the lower Basin, may also contribute to this problem.

15. Why is the permit so complicated?

Mirant did not produce a credible hydrodynamic model necessary to predict impacts to the river from Mirant Kendall Station's thermal discharges. With such a model, EPA and MassDEP potentially could have proposed a simpler permit with one effluent temperature limit based on worst-case conditions. Instead, EPA and MassDEP have proposed a more complicated permit, which includes various in-stream temperature limits applicable at different places and depths in the water column, in order to allow the Station more flexibility and greater potential to generate electricity while also providing adequate protection to the ecology of the Charles River.

16. Mirant states that tightened temperature limits might require reduced power generation on many summer days. Would this lead to electric system reliability concerns in Cambridge and Boston?

Due to a combination of increased electric demand and long-standing transmission constraints in the area, Mirant Kendall is currently a critical power supplier for the area. Therefore, several of Mirant's power units are currently operating under a Reliability-Must-Run (RMR) agreement with ISO New England to maintain the reliability of NSTAR's local distribution system.

NSTAR has initiated upgrades to its local distribution system that are expected to alleviate these concerns. In particular, NSTAR has embarked on a project to rebuild an electric substation in East Cambridge and bring more cabeling into the area. The project was originally slated to be completed by the summer of 2006; however significant delays have been encountered. Pending completion of this project, the RMR agreement will remain in effect.

If Mirant loses its RMR status, the plant will operate as a competitive supplier in the ISO New England energy market. Its use will be largely dependent on the price of fuel - natural gas or oil in the case of Mirant Kendall. However, while the plant may lose its RMR status and its use may decrease from 2004-2005 levels, the Combustion Turbine – which supplies 170 MW – is still considered critical to address certain short-term power needs of the Boston area, as a resource that can be called upon within 10-30 minutes in the event of the sudden and unexpected loss of a significant resource (transmission line or power plant).

Finally, with the implementation of ISO New England's new Forward Capacity market, we expect to see the siting of new capacity in the Boston area, which might reduce the need for Mirant Kendall's units' altogether. However, this is speculative, and the results will be unknown for several years.