



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Metropolitan Boston – Northeast Regional Office

ARGEO PAUL CELLUCCI
Governor

JANE SWIFT
Lieutenant Governor

BOB DURAND
Secretary

LAUREN A. LISS
Commissioner

June 23, 2000

Robert Durand, Secretary
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, MA 02202

RE: Cambridge
Kendall Square Station
FEIR/EOEA #11754

Attn: MEPA Unit

Dear Secretary Durand:

The Department of Environmental Protection (DEP) has reviewed the Final EIR submitted on behalf of Southern Energy Kendall, L.L.C. for the Kendall Square Station Equipment Upgrade project at 265 First Street in Cambridge, MA: (EOEA #11754).

The Kendall Square Station, as described in the FEIR, proposes to upgrade, increasing its electrogenerating capacity from approximately 64 megawatts (MW) to about 234 MW. Heated water, used for condensing steam, is currently discharged into the Charles Basin and the discharge of this "cooling water" will increase if the facility upgrades. Due to the planned use of gas-fired combustion turbine generators in the upgrade, the BTU increase to the Charles will not increase in proportion to the megawatt increase. EPA has estimated that the increase in BTUs of the cooling water discharge will be approximately 72% over what is currently released.

In comments submitted in response to the Draft EIR, the Department noted the potential impact this project could have on the aquatic ecosystem. If the additional BTU load to the Charles were to be discharged at the current discharge site, the facility would re-entrain significant amounts of heated water. Re-entrainment of heated water would lower the cooling capacity of the intake water and decrease the ability of the station to generate electricity. The FEIR describes Kendall Square Station's proposal to reconfigure the discharge in order that heated water is not re-entrained into the intake port. Kendall Square has proposed to send 50% of its discharge to the middle of the Charles Basin and retain 50% of the discharge along the north wall of the Charles in its existing configuration.

A layer of high salinity water is found on the bottom of the lower Charles Basin for much of the year. It leaks into the basin via the Charlestown dam through locking activities associated

This information is available in alternate format by calling our ADA Coordinator at (617) 574-6872.

205A Lowell St. Wilmington, MA 01887 • Phone (978) 661-7600 • Fax (978) 661-7615 • TTD# (978) 661-7679

Printed on Recycled Paper

with boat passage. The presence of a high salinity layer has been shown to halt the exchange of oxygenated water with bottom sediments. The combined oxygen demand from river sediments and this lack of exchange with overlying waters leads to anoxic conditions throughout the lower water column in much of the Charles Basin. By discharging the heated water into the middle of the basin, the project proponent expects that the salt layer along much of the bottom of the Charles Basin will be destratified. Modeling conducted by TRC, consultants to Kendall Square Station, projects that mixing with upper, more oxygenated, water will result from the new discharge and that the salt layer in much of the Charles Basin will disappear. This situation could greatly benefit aquatic life in the Charles Basin.

Although the proponent has provided extensive data in response to our comments on the DEIR, the Kendall Square Station's proposal carries with it potentially undesirable effects that have not been comprehensively addressed in the FEIR. These include thermal pollution and potential adverse effects to fish, eggs, larvae and fry through entrainment and impingement. These impacts remain a serious concern to the Department which must be addressed through the permit process or a Supplemental FEIR.

DEP's primary aquatic life concerns relative to this project are as follows:

Temperature Effects

Droughts often bring about low flow conditions in surface waters. As low-flow conditions provide the least amount of dilution for pollutants discharged in wastewaters, permit writers use these conditions to evaluate potential impacts from discharges and to set permit limits. 7Q10 river flow, i.e., the annual minimum 7-day mean discharge for a 10-year recurrence interval, is typically used to set permit conditions. This low-flow condition has been shown to occur, on average, about 3 days per year. During drought conditions, low flow conditions may persist. For example, according to USGS records from the Waltham flow gage in July of 1997, river flows in the Charles were very near 7Q10 flows for a period of 19 consecutive days. Persistent low flows combined with high ambient air temperatures are predicted to be worst case conditions for the Kendall Square Station, as it is under these conditions that Massachusetts standards for temperature will most likely be exceeded.

Kendall Square Station's discharge, compared to the river flow at 7Q10, will be substantial. In terms relative to the river flow, it will be one of the largest heated discharges in Massachusetts. Kendall Square's discharge volume will be about 5.6 times the estimated 7Q10 flow of the river at point of discharge when the station is at full power. As the temperature rise of the discharge will be 20 degrees F. over ambient, there appears to be a large potential for excessive heating of the Charles Basin in the summer months when river flows are typically at their lowest.

A graphic simulation of river water "delta T"; i.e., the rise in water temperature over ambient that is due to the discharge, appears in Volume II of the FEIR, under the section labeled "Results for Proposed DEIR Case". The title of this graphic is "Simulated 50:50 Split, 7Q10 Low Flow, Longitudinal Cross Section Temperature Above Ambient Under Full Heat Loading".

This graphic depicts the delta T after two weeks of discharge to the river when the river is at 7Q10 flow. A vertical cross-section of the river along a two mile stretch of the Charles Basin from the Harvard Bridge to the Charlestown dam is depicted. In the graphic, a column of very warm water, up to 20 degrees over ambient, is shown to rise vertically. Outside of this very warm column of water, the warmest temperatures seen are between 6 and 7 degrees F. However, about 2/3 to 3/4 of the water column from the Charlestown dam to the Longfellow Bridge (approximately 1 mile of river) exceeds a delta T of 5 degrees F, the Water Quality Standard.

Thermal effects of the discharge are expected to extend both upstream as well as downstream of the discharge. Temperature effects of up to 4 degrees are depicted to exist in the 1 mile of river extending from the Longfellow Bridge upstream to the Harvard Bridge. TRC personnel relate that under these conditions, the warming effect of the discharge is expected to reach the Boston University Bridge, another mile upstream of the Harvard Bridge. In summary, Water Quality Standards violations are expected to extend 1 mile upstream of the Charlestown dam, and effects of the discharge are expected to extend 3 miles upstream of the Charlestown dam.

Although the thermal impact projected to occur in this graphic seems extensive, DEP is concerned that the modeling may actually under-predict the extent of the thermal effects. Two important variables which act to remove heat from the basin are ambient air temperature and wind speed. Data from Logan Airport were used in the model. We expect that wind speed, projected to be constant at 11.1 miles per hour over entire the 2-week modeling exercise may be too high. Although the August wind speed at Logan averaged over the past 5 years is about 10 mph worst-case average wind speed over the past 5 years is about 8.8 miles/hr., and may be less in the Charles Basin. A value for air temperature could not be found in the FEIR. The Massachusetts Institute of Technology may have records of both wind speed and temperature in the basin that would be more typical of the area. We would like to see this particular modeling scenario be reconstructed with more local information, or with wind speeds and air temperatures that are conservative. In addition, DEP requests that several transverse cross-sections of the worst-case conditions in the vicinity of the discharges be submitted which will depict delta T at 300 feet upstream, 300 feet downstream, and at the two discharges. Our concern is that the parameters used in the model were not sufficiently conservative to reflect worst-case conditions. As worst-case modeling of delta T is important to an assessment of the effects of the facility, this issue would need to be addressed before a permit could be issued, or could be addressed within a Supplemental FEIR should one be required. The Department reserves the right to request additional information that may be necessary during the permitting phase.

Entrainment/Impingement

DEP posed a series of questions regarding entrainment and impingement in its review of the Draft EIR that were not sufficiently addressed in the FEIR. These included requests for information on a detailed evaluation of the intake structure and the method of dealing with fish impingements.

The FEIR appears to imply that Kendall Square Station's planned use of a fish screening system over the months of late April through early July will obviate the need for any other operational or structural changes at the facility to address fish impingement. Data from one year (1999) of entrainment and impingement monitoring were used to justify this plan.

DEP recently had conversations with personnel from DMF to discuss impingement/entrainment concerns at the Kendall Square Station. We were told that the Charles River has one of the largest blueback herring runs in the state. Alewives and shad also migrate up the Charles, but to a lesser degree. Juveniles of these species return to the sea from July through November, the biggest return runs occurring in the fall. In addition to these three species of "river herring", rainbow smelt also come into the basin in early March. DEP was also told that blueback herring are in decline throughout the northeast and that DMF was concerned that this run should receive as much protection as possible. Smelt and shad populations, not considered to be important species in the FEIR due to their low numbers in 1999, are reduced at present from historical levels. Impingement and entrainment of these species are also of concern as plant effects to these populations may greatly lessen their ability to rebound.

Several issues should be addressed with regard to impingement of adult smelt and juveniles of all four species mentioned above. First, if the barrier net will only be in place from April through July, the facility should present plans for dealing with smelt impingements prior to that time. Second, the current plans for net deployment will not protect against impingement of juvenile bluebacks and alewives in the summer and fall. As the net will not be in place during that time and no screen modifications are planned, approach velocity at the intake screens will be about 1 ft/sec., which is twice the recommended velocity for best technology available. This must also be addressed. Third, other facilities in the state have been required to install both low and high pressure screen washes, fish holding devices on the screens, screens that are capable of rotating on a continuous basis in the event of a fish impingement event as well as a fish return systems to remove fish from the intake screens and transport them away from the intake. Facilities without these modifications or technologies that act to otherwise minimize impingement and deal with unplanned impingement events, are not considered to employ Best Technology Available (BTA). To our knowledge, there is currently no method of properly dealing with unplanned impingement events at this facility and no method of returning impinged fish to the Charles to a point away from the intake. These deficiencies must be corrected for DEP to consider this facility to employ BTA.

Although the FEIR implies that the bulk of the impingement concerns will be addressed by the deployment of the barrier net, this judgement was based on data collected over only one year. Based on experience with other facilities, fish impingement events are often unpredictable and numbers of fish involved in these events can vary over orders of magnitude from year to year. The best technology available must be used to deal with unplanned impingement events. In the event a Supplemental FEIR is required, plans for dealing with the deficiencies discussed above should be addressed.

Other DEP concerns include the fact that pre-operational data on the use of the barrier net were not included in the FEIR. Data from the spring assessment should be included in a

Supplemental FEIR. In addition, DEP feels that it is important to continue assessment of impingement, entrainment throughout the summer and fall; and that data from these assessments should be presented to state and federal agencies by the end of February, 2001 in the appropriate course of permit reviews.

NPDES Permit Considerations

The Department issues surface water discharge permits jointly with EPA NPDES permits. Kendall Square should be aware that, although DEP has considered waivers to its temperature standards in marine waters through the Federal 316a process, it has not done so regarding its Water Quality Standards for inland waters such as the Charles Basin. The standards that must be met are 83 degrees F. maximum temperature and 5 degree F. rise in temperature due to a discharge. The state may allow a zone of mixing within which these temperature standards can be exceeded.

Kendall Square Station should also be aware that, should a draft permit be developed, DEP may attach conditions that will allow for a thermal mixing zone, but which will also require monitoring at fixed locations to ensure that Water Quality Standards are not exceeded. DEP will require that a temperature monitoring program for Maximum Temperature and Change in Temperature over Ambient be developed that will have instantaneous feedback to the station. To ensure that standards are met, Kendall Square must demonstrate that it can cut back the BTU output through its discharges should standards violations be imminent. If a viable monitoring program and feedback system cannot be put in place to safeguard against standards violations, DEP will not sign a 401 Water Quality Certification. We wish to make this clear so that the company can conduct any additional modeling that may be needed to ensure that the discharge will not cause exceedances of Water Quality Standards relating to temperature. As mentioned above, both transverse and longitudinal cross-sections of the worst-case modeling effort will be required for the mixing zone analysis within a NPDES permit application, or within a Supplemental FEIR, should one be required.

Operational restraints of this sort mentioned above were not considered in the FEIR Methods for addressing restriction of thermal input to the river will have to be addressed in order to issue a NPDES permit, or can be described in a Supplemental FEIR and revised Section 61 Findings should those be required.

In summary, DEP requests that if a Supplemental FEIR is required:

- a. data on the effectiveness of the fish barrier screen, and methods of dealing with impingement and entrainment be described;
- b. one modeling run be reconstructed using more local, or more conservative, meteorological data, and that graphics and a discussion of this modeling be presented; and
- c. operational restraints should also be described that will be used should the facility need to cut back BTU loadings to the Charles to avoid standards violations.

As the project proceeds DEP will continue to evaluate the environmental benefits and costs of the proposed system as proposed and explore the feasibility of alternatives or additional mitigation, and will work to ensure that potential adverse effects of the project are avoided. In particular DEP plans to work with the Kendall Square Station and state and federal agencies to develop a mixing zone and a thermal monitoring program. The monitoring program will be used to characterize thermal conditions outside of the mixing zone and will be used by Kendall Square Station to trigger cutbacks in thermal load to the basin to ensure that Water Quality Standards violations for maximum and delta temperature do not occur.

Water Management Act

The project has been revised significantly since the submittal of the Draft EIR to eliminate the need for increased water withdrawals for cooling. This will be accomplished by the addition of a fin fan cooler and will obviate the need to increase water withdrawals by 16 million gallons per day (MGD) over the present withdrawal rate. This is a substantial improvement in the proposal, and will result in less withdrawal and environmental impact than was proposed in the DEIR.

Issues do remain, however, related to the project pursuant to the Water Management Act. The facility is currently authorized to withdraw 52.82 MGD by a Nonconsumptive Use Statement for its non contact cooling water. This authorized volume was determined by the submittal of information by the applicant in 1987. The FEIR indicates that average day withdrawals are actually 70 MGD with maximum withdrawals of 80 MGD during peak periods. The discrepancy between the authorized withdrawal volume and the actual withdrawal volume must be explained.

The information submitted in 1987 by the applicant did not indicate that steam was also sold by the company to customers in the area resulting in consumptive loss. Although a proposed water budget is included in the FEIR (Table 3-17), no existing water budget could be located by this writer. Steam sales to customers are proposed to increase from a current level of 0.14 MGD (personal telephone communication of Drew Smithe to Lealdon Langley on 6/22/00) to 0.55 MGD (FEIR, Table 3-17). These consumptive losses, and the potential to exceed Water Quality Standards for temperature lead to the conclusion that a Water Management Act permit will be required.

AIR QUALITY

In addition to concerns this project could have on aquatic ecosystems, the Department also reviewed the proposed project for air pollution control issues. The proponent proposes to employ contemporaneous decreases in ozone precursor emissions at contiguous existing emission sources so as to "net out" of Nonattainment New Source Review (NSR) and Prevention of Significant Deterioration (PSD). However, it is not clear to the Department if this is currently achievable, since these "net reductions" must be real, surplus, permanent, quantifiable, and

federally enforceable. If the proponent is unable to "net out" of nonattainment NSR, then the proponent is required to meet the Lowest Achievable Emission Rate (LAER) for any nonattainment precursor pollutant which will be emitted by the proposed modification at or above a "significant" emission rate of 25 tons per year, and obtain emission offsets, as follows:

- The offset requirement for this facility must be met by obtaining offsets that are real, surplus, permanent, quantifiable, and federally enforceable.
- Rules for obtaining offsets in Massachusetts are set forth in Regulation 310 CMR 7.00 Appendix B(3), which require the Applicant to obtain an amount of credit equal to five (5) percent more than the amount needed for offsets.
- In addition, 310 CMR 7.00 Appendix A(6) requires the proponent to obtain emission offsets at a ratio of 1.2 to 1.0.
- Finally, offsets must be obtained from other sources within the Ozone Transport Region (OTR).

Finally, the Department will need clarification of a discrepancy between air modeling data in the FEIR and Draft Environmental Impact Report (DEIR). Table 5-12 of the FEIR lists emission rates (as exhaust parameters) that vary from Table 6-13 of the DEIR. The Department requests an explanation for these revisions between the DEIR and FEIR.

The DEP Northeast Regional Office appreciates the opportunity to comment on this proposed project. If you have any general questions regarding these comments, please do not hesitate to contact me at 978-661-7675 or Philip Weinberg at 617-292-5972. Specific questions regarding impact to the aquatic ecosystem should be directed to Gerald Szal at 508-792-7470 or Lealdon Langley at 617-574-6882. Questions concerning air quality issues should be directed to Jim Belsky, Edward Braczyk or Ted Saad at 978-661-7600.

Sincerely,

John Felix, Deputy Regional Director

cc: Philip Weinberg, DEP/Commissioner's Office, Boston
Gerald Szal, DEP/BRP CERO
Lealdon Langley, DEP/BRP Boston
Dave Murphy, DEP/O&P Boston
James Belsky, DEP/BWP NERO
Kevin Brander, DEP/BAS NERO
Glenn Haas, DEP/BRP Boston
Paul Hogan, DEP/BRP CERO