UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

March 2, 2007

Chief, Rules Review and Directives Branch
U. S. Nuclear Regulatory Commission
Mail Stop T6-D59
Washington, DC 20555-0001

Re: Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 30 Regarding Vermont Yankee Nuclear Power Station, Draft Report for Comment, CEQ #20060521

Dear Sir/Madam:

In accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act we have reviewed the Nuclear Regulatory Commission's (NRC's) Draft Supplemental Environmental Impact Statement (DSEIS) for relicensing of the Vermont Yankee Nuclear Power Station (Vermont Yankee) in Vernon, Vermont.

As described in the DSEIS, Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Entergy) has submitted an application to the NRC for renewal of the operating license for an additional 20 years. Vermont Yankee began operations in 1972 and the current operating license will expire in 2012. Vermont Yankee is a 650 MW nuclear power steam electric-generating facility located on the western shore of the Connecticut River. Cooling water is drawn from the Connecticut River and is then circulated through the plant in one of three operation modes: open-cycle, hybrid-cycle or closed-cycle.

The DSEIS was prepared to provide site specific information to supplement NRC's 1996 Generic EIS for License Renewal of Nuclear Plants. It contains the NRC staff's preliminary recommendation that adverse environmental effects of license renewal at Vermont Yankee "are not so great that preserving the option of license renewal for energy-planning decisionmakers would be unreasonable."

Our comments on the DSEIS, which are contained in the attachment to this letter, highlight areas where we believe additional information is needed to more fully describe the impacts of Vermont Yankee. Specifically, these comments address the impacts of operation, including entrainment and impingement of fish and other aquatic organisms, and impacts from heat shock. We recommend that the NRC address these issues in the Final Supplemental Environmental Impact Statement (FSEIS). We also recognize that the intake and discharge of water at Vermont Yankee are regulated under the Clean Water Act's National Pollutant Discharge Elimination System (NPDES) permit, administered in Vermont by the Vermont Department of Environmental

Conservation (VTDEC). Entergy has submitted an application to the VTDEC for renewal of the NPDES permit. The comments in this letter are based solely on a review of the information in the DSEIS from the standpoint of what is required by NEPA and are not intended to address the requirements of the Clean Water Act NPDES permit.

For the reasons discussed above (and in the attachment which follows), EPA has rated this DSEIS "EC-2 Environmental Concerns-Insufficient Information" in accordance with EPA's national rating system, a description of which is attached to this letter. We look forward to reviewing responses to the issues highlighted in this letter and technical attachment in the Final Supplemental Environmental Impact Statement (FSEIS). My staff is available to provide additional input, as necessary, to help the NRC respond to the issues discussed in this letter. Please feel free to contact Timothy Timmermann of the Office of Environmental Review at 617/918-1025 if you wish to discuss these comments further.

Sincerely,

Robert W. Varney
Regional Administrator

Attachment

Summary of Rating Definitions and Follow-up Action

Environmental Impact of the Action

LO--Lack of Objections
The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC--Environmental Concerns
The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO--Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3–Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

Detailed Comments
Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 30 Regarding Vermont Yankee Nuclear Power Station
Draft Report for Comment

Comment related to Cooling and Auxiliary Water Systems

1. **(Pg. 2-8).** The DSEIS identifies three modes of operation for the circulation of cooling water through Vermont Yankee: open-cycle, hybrid-cycle, and closed-cycle. Open-cycle withdraws 518 million gallons of water per day (mgd) from the Connecticut River. Closed-cycle mode requires only 14.4 mgd. Hybrid-cycle mode utilizes a range of flows from 14.4 mgd to 518 mgd. According to the DSEIS, the applicant selects the mode of operation needed to comply with temperature limits established in the NPDES permit issued by the VTDEC. Therefore, while the technology is in place at this facility to reduce the withdrawal of water from the Connecticut River by over 97 percent compared to the flow required for open-cycle mode (and consequently minimize entrainment and impingement mortality of aquatic organisms), it is only used when temperature limits dictate. Thus, we recommend that the FSEIS fully discuss and evaluate the comparative environmental impacts of the alternative modes for the circulation of cooling water. While the FSEIS need not suggest the answers to the ultimate permitting questions to be answered by the VTDEC under the Clean Water Act, it should characterize the relative impacts of the alternatives, such as the differing amounts of heat to be discharged, the differing extent and intensities of the thermal plumes, the differing numbers of organisms to be impinged and/or entrained by the intake structure under the different alternatives.

Comments related to the assessment of environmental impact from the entrainment of fish and other aquatic organisms

2. **(Pgs. 2-8, 2-9).** According to the DSEIS, the authorized intake and discharge flow limit for both the open- and hybrid-cycle cooling modes is 543 mgd. The amount of water withdrawn when in hybrid-mode varies depending in part on the water temperature of the Connecticut River. The NRC concludes on page 4-17 that potential impacts from entrainment of fish and shellfish by Vermont Yankee would be "SMALL," based in part by the utilization of the closed- or hybrid-cycle mode during much of the spawning season. Since the hybrid-mode can utilize up to the same flow as open-cycle mode (360,000 gallons per minute), its use does not necessarily assure a reduction in fish entrainment mortality. The FSEIS should include historical flow data for the hybrid-cycle mode during peak periods of icthyoplankton presence in order provide a better assessment of entrainment potential as compared to closed-cycle (10,000 gpm) and open-cycle modes. It should also discuss the impacts that would result if the high end of the intake flows that are permitted were, in fact, withdrawn from the river. Of course, to the extent that those higher flows are not permitted, then impacts from them do not need to be evaluated.

3. **(Pg. 4-15).** The DSEIS states, "When ichythoplankton are at their peak in the Connecticut River (e.g., late spring through early summer), VYPNS is generally operating in an open-cycle or hybrid mode." However, NRC concludes on page 4-17 that potential impacts from entrainment of fish and shellfish by Vermont Yankee would be "SMALL," based in part on the utilization of

the closed- or hybrid-cycle mode during much of the spawning season. These statements appear to contradict each other. If the first statement erroneously states "open-cycle" instead of the intended "closed-cycle", then the FSEIS should reflect that. If, however, the first statement is accurate, then the NRC should re-evaluate its basis for a conclusion of SMALL impact.

4. (Pg. 4-17). The NRC's conclusion related to entrainment potential over the 20-year renewal period suggests that plant operations will continue as they have historically. According to the DSEIS (page 2-6) Vermont Yankee requested and received authorization from the NRC (authorization was granted on March 2, 2006) for a power uprate to increase the gross electrical output of the facility from 540MW to 650MW. It seems that such an increase in electrical output would result in a proportionate increase in waste heat, resulting in additional cooling water withdrawal. If so, this would lead to a corresponding increase in entrainment and impingement, and in the scope of the thermal discharge, possibly during periods when early lifestages of fish and other aquatic organisms are present in the water column. In addition, Vermont Yankee requested and received a seasonal temperature increase from VTDEC that would allow the plant to operate in the closed-cycle mode less frequently during periods when larval and juvenile fish are most vulnerable to entrainment and impingement. The FSEIS should identify and assess impacts from any new or planned modifications in plant operations that may increase impacts to aquatic organisms.

5. (Pg. 4-16). Table 4-3 presents percentages and numbers of fish eggs and larvae entrained at Vermont Yankee. According to the DSEIS (pg. 4-15), sampling for larvae is conducted weekly from early May through mid-July. While Table 4-3 includes quantities of eggs and larvae collected during the sampling period, it does not provide a clear sense of the number of eggs and larvae that are actually entrained. The DSEIS does not describe the sampling procedures so it is unclear what these numbers represent. To develop representative estimates of entrainment, time and flow rates would have to be factored in with larval concentrations on a weekly basis. We recommend that the FSEIS provide total entrainment estimates for the species listed in Table 4-3.

Comments related to the assessment of environmental impact from the impingement of fish and other aquatic organisms.

6. (Pg.4-17). The DSEIS provides no specific information on the cooling water intake structure (CWIS) by which to assess its potential to impinge fish, or assess the likelihood that impinged fish are returned to the river alive and unharmed. The FSEIS should include a detailed description of the CWIS, including the intake velocities under the various operational modes, the water pressure(s) of the spray wash system used to remove fish and debris from the traveling screens, the mesh size and operation frequency of traveling screens, and the design of the fish return system.

7. (Pg. 4-19). Table 4-4 provides the annual percentages and numbers of fish impinged at Vermont Yankee. The same concerns we provided above about the entrainment data provided in Table 4-3 also apply to the impingement data. While impingement is more difficult to estimate than entrainment given the sporadic nature of impingement events, impingement at a particular location is still largely a function of flow, intake flow velocity, and the unique characteristics of the CWIS. We recommend that the FSEIS provide more information on how many of each

species may be impinged in a given year. In addition, an assessment of the fish return system should be included that describes the system's ability to return impinged fish to the river uninjured.

Comments related to the assessment of environmental impact from Heat Shock

8. (Pg 4-20). This section of the DSEIS provides a discussion of some potential environmental impacts associated with the discharge of heated effluent. As we have commented to the NRC in other EIS reviews, the use of the term "heat shock" implies a fairly limited scope of review for a pollutant (i.e., heat) that can affect aquatic organisms and their habitats in many ways other than "shock." We recommend that the discussion in FSEIS on this subject be expanded to address heat's less conspicuous ability to: 1) prevent the use of affected areas by temperature-sensitive species; 2) attract and expose organisms to areas of elevated temperature during spawning periods; and 3) expose eggs and larvae to water temperatures above levels that are optimal for the affected species and life stage or would be typical in the absence of the thermal discharge.

9. (Pg. 4-50). While the DSEIS provides some discussion of the thermal plume's potential to restrict migration of Atlantic salmon and American shad, the fact that fish are passing upstream at the Vernon Dam does not, in itself, demonstrate that migration has not been impeded by elevated temperatures caused by the plant. It's unclear how a delay in upstream migration may ultimately affect the spawning success of American shad or Atlantic salmon, but these species have not been able to re-establish themselves in the Connecticut River basin. There are multiple stressors contributing to their low numbers, and any additional stressors can only further delay the rebuilding of their stocks. We recommend that the FSEIS provide more discussion on the status of these important fish populations, and provide a range of alternatives for Vermont Yankee to further reduce impacts to these species.

10. (Pg. 4-21). The DSEIS focuses on potential thermal impacts to the Vernon Pool, in particular the Lower Vernon Pool, but there is very little information about thermal impacts to habitat below the Vernon Dam. The FSEIS should include temperature data that graphically depicts the spatial extent of the thermal plume below the Vernon Dam, and its behavior within the water column, under various seasonal and flow conditions. This information would provide a sense of when and how much habitat may be unsuitable to certain species less tolerant of heat.