Appendix E

Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc. Compliance Status and Consultation Correspondence

Appendix E

Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc. Compliance Status and Consultation Correspondence

Consultation correspondence related to the evaluation of the renewal of the operating license for Vermont Yankee Nuclear Power Station (VYNPS) is identified in Table E-1. Copies of the correspondence are included at the end of this appendix.

The licenses, permits, consultations, and other approvals obtained from Federal and State authorities for VYNPS are listed in Table E-2.

Table E-1. Consultation Correspondence

Source	Recipient	Date of Letter
U.S. Nuclear Regulatory Commission (R.L. Franovich)	National Marine Fisheries Service (P. Kurkul)	May 5, 2006
U.S. Nuclear Regulatory Commission (R.L. Franovich)	U.S. Fish and Wildlife Service (M. Moriarty)	May 5, 2006
U.S. Nuclear Regulatory Commission (R.L. Franovich)	Director, Advisory Council on Historic Preservation (D. Klima)	May 8, 2006
U.S. Nuclear Regulatory Commission (R.L. Franovich)	Vermont State Historic Preservation Officer (J. Lendway)	May 8, 2006
U.S. Nuclear Regulatory Commission (R.L. Franovich)	Boldwing Clan (N. Bolding)	May 10, 2006[(a)]
U.S. Nuclear Regulatory Commission (R.L. Franovich)	U.S. Fish and Wildlife Service (M. Moriarty)	July 21, 2006
U.S. Fish and Wildlife Service (M.J. Amaral)	U.S. Nuclear Regulatory Commission (R.L. Franovich)	August 10, 2006
National Marine Fisheries Service (L.A. Chiarella)	U.S. Nuclear Regulatory Commission (R.L. Franovich)	September 15, 2006
U.S. Nuclear Regulatory Commission (P.T. Kuo)	National Marine Fisheries Service (P. Kurkul)	December 12, 2006
U.S. Nuclear Regulatory Commission (R.L. Franovich)	U.S. Environmental Protection Agency	December 13, 2006

Table E-1. (contd)

Source	Recipient	Date of Letter
U.S. Nuclear Regulatory Commission (R.L. Franovich)	Vermont State Historic Preservation Officer (J. Lendway)	December 13, 2006
National Marine Fisheries Service (P.D. Colosi)	U.S. Nuclear Regulatory Commission (P.T. Kuo)	January 4, 2007
U.S. Environmental Protection Agency (R.W. Varney)	U.S. Nuclear Regulatory Commission	March 2, 2007
U.S. Department of the Interior (A.L. Raddant)	U.S. Nuclear Regulatory Commission (M. Lesar)	March 6, 2007

(a) Similar letters were sent to seven other Native American Tribes listed in Appendix C.

In the letter to the National Marine Fisheries Service (NMFS) dated May 5, 2006, the NRC requested that the NMFS determine if any species needed to be evaluated under the essential fish habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act for the VYNPS license renewal review. In the letter to the NRC dated September 15, 2006, the NMFS indicated that the Connecticut River and tributaries are designated essential fish habitat for Atlantic salmon; therefore, the NMFS instructed the NRC to evaluate the impact of the operation of VYNPS on the essential fish habitat of the Atlantic salmon. The NRC staff's assessment of impacts to essential fish habitat for the Atlantic salmon is included in this appendix for review by the NMFS. The draft SEIS, which included the EFH assessment, was submitted to the NMFS by letter dated December 12, 2006, requesting concurrence on the determination. The NMFS stated in a letter dated January 4, 2007, that it would be unable to undertake an EFH consultation for the VYNPS license renewal review.

Table E-2. Federal, State, Local, and Regional Licenses, Permits, Consultations, and Other Approvals for Vermont Yankee Nuclear Power Station

Agency	Authority	Description	Number	Issue Date	Expiration Date	Remarks
NRC	10 CFR Part 50	Operating license, Vermont Yankee Nuclear Power Station	DPR-28	04/09/72	03/21/12	Authorizes operation of the VYNPS.
FWS	Section 7 of the Endangered Species Act (16 USC 1536)	Consultation	NA	NA	NA	Requires a Federal agency to consult with the FWS regarding whether a proposed action will affect endangered or threatened species.
NMFS	Section 7 of the Endangered Species Act and Essential Fish Habitat	Consultation	NA	NA	NA	Requires a Federal agency to consult with the NOAA fisheries regarding whether a proposed action will affect endangered or threatened species and essential fish habitat.
Vermont Division of Historic Preservation	Section 106 of the National Historic Preservation Act	Consultation	NA	NA	NA	The National Historic Preservation Act requires Federal agencies to take into account the effect of any undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the *National Register of Historic Places*.
VDEC	Section 112 of the Clean Air Act	Air Contaminant Source Registration Certificate	WM2335	03/08/07	06/30/08	Operation of air emission sources (diesel generators, boilers, and oil burners).
VDEC	Section 402 of the Federal Water Pollution Control Act	NPDES Permit	VT0000264 (VDEC #3-1199)	09/28/04	03/31/06[a]	Plant wastewater discharges to Connecticut River.

Table E-2. (contd)

Agency	Authority	Description	Number	Issue Date	Expiration Date	Remarks
VDEC	Subtitle C of the Resource Conservation and Recovery Act	Hazardous Waste Generator	VTR000504167	NA	NA	Hazardous waste generation.
VDEC	Title 10 V.S.A., §1259 and §1263	Indirect Discharge Permit	ID-9-0036-2	12/14/05	09/30/10	Indirectly discharge treated domestic sewage and other wastes to the groundwater and indirectly into the Connecticut River.
VDEC	Title 10 V.S.A., §1671 and §1675(b)	Public Water System Permit to Operate (Construction Office Building Water System)	20559	05/21/02	05/21/08	Withdrawal of groundwater for drinking and plant purposes.
VDEC	Title 10 V.S.A., §1671 and §1675(b)	Public Water System Permit to Operate (Main Plant Water System)	8332	05/21/02	05/21/08	Withdrawal of groundwater for drinking and plant purposes.
VDEC	Title 10 V.S.A., §1671 and §1263	Public Water System Permit to Operate (New Engineering Office Building Water System)	20738	05/21/02	05/21/08	Withdrawal of groundwater for drinking and plant purposes.
USACE	Section 404 of the Clean Water Act	Dredging Permit	200302129	10/15/02	10/15/07	Fill in of the Connecticut River in conjunction with the maintenance of security wires at the intake structure.
VDEC	RCRA-Subtitle 1	Underground Storage Permit	806	10/01/04	10/01/09	Underground diesel and gasoline storage.
VDEC	Section 405 (d) and 40 CFR 503 of the Clean Water Act	Solid Waste Management Facility Certification	F9906-A1	12/03/04	09/30/09	Land application of septage.
DOT	49 CFR 107, Subpart G	Hazardous Materials Certificate of Registration	063003 006 013LN	03/21/72	03/21/12	Radioactive and hazardous materials shipments.

Table E-2. (contd)

Agency	Authority	Description	Number	Issue Date	Expiration Date	Remarks
CVDEM	Title 44, Code of Virginia, Chapter 3.3, Section 44-146.30	Application for Registration to Transport Hazardous Radioactive Materials	VY-S-123107	12/27/05	12/21/07	Transportation of radioactive waste into the Commonwealth of Virginia.
SCDHEC	Act No. 429 of 1980, South Carolina Radioactive Waste Transportation and Disposal Act	South Carolina Radioactive Waste Transport Permit	0002-44-04-07	01/01/07	12/31/07	Transportation of radioactive waste into the State of South Carolina.
TDEC	Tennessee Department of Environment and Conservation Regulations	Tennessee Radioactive Waste-License-for-Delivery	T-VT001-L07	11/20/06	12/31/07	Shipment of radioactive material into Tennessee to a disposal/processing facility.

(a) Application pending.

CFR = *Code of Federal Regulations*
CVDEM = Code of Virginia, Department of Emergency Management
DOT = U.S. Department of Transportation
FWS = U.S. Fish and Wildlife Service
NA = not applicable
NMFS = National Marine Fisheries Service
NPDES = National Pollutant Discharge Elimination System
NRC = U.S. Nuclear Regulatory Commission
RCRA = Resource Conservation and Recovery Act
SCDHEC = South Carolina Department of Health and Environmental Control
TDEC = Tennessee Department of Environment and Conservation
USACE = U.S. Army Corps of Engineers
USC = *United States Code*
VDEC = Vermont Department of Environmental Conservation
VNNHP = Vermont Nongame and Natural Heritage Program
VYNPS = Vermont Yankee Nuclear Power Station

May 5, 2006

Ms. Patricia A. Kurkul, Regional Administrator
NOAA's National Marine Fisheries Service
Northeast Regional Office
One Blackburn Drive
Gloucester, MA 09130-2298

SUBJECT: REQUEST FOR LIST OF PROTECTED SPECIES AND ESSENTIAL FISH HABITAT WITHIN THE AREA UNDER EVALUATION FOR THE VERMONT YANKEE NUCLEAR POWER STATION LICENSE RENEWAL APPLICATION REVIEW

Dear Ms. Kurkul:

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application submitted by Entergy Nuclear Operations, Inc. (Entergy) for the renewal of the operating license for the Vermont Yankee Nuclear Power Station (VYNPS). VYNPS is located in the town of Vernon, Vermont, in Windham County on the west shore of the Connecticut River. As part of the review of the license renewal application (LRA), the NRC is preparing a Supplemental Environmental Impact Statement (SEIS) under the provisions of Title 10 of the *Code of Federal Regulations* Part 51 (10 CFR Part 51), the NRC regulation that implements the National Environmental Policy Act (NEPA) of 1969. The SEIS includes an analysis of pertinent environmental issues, including endangered or threatened species and impacts to marine resources and habitat. This letter is being submitted under the provisions of the Endangered Species Act of 1973, as amended, and the Fish and Wildlife Coordination Act of 1934, as amended, and the Magnuson-Stevens Fishery Conservation and Management Act.

The proposed action would include the use and continued maintenance of existing plant facilities and transmission lines. VYNPS stated that no major refurbishment activities have been identified as necessary to support the continued operation of VYNPS beyond the end of the existing operating license term. VYNPS is situated on approximately 125 acres of land on the west shore of the Connecticut River 0.75 miles upstream of the Vernon Hydroelectric Station. This section of the river is known as Vernon Pool. The areas adjacent to the station are primarily farm and pasture lands. The area within a five mile radius is predominantly rural with the exception of a portion of the town of Brattleboro, Vermont, and the town of Hinsdale, New Hampshire. Between 75 percent and 80 percent of the area within five miles of the station is wooded. The remainder is occupied by farms and small industries. Enclosure 1 shows the layout of the general area near the VYNPS site and Enclosure 2 presents an overview of the site location.

The VYNPS utilizes a once-through cooling system and mechanical draft cooling towers to remove waste heat from the condensers. The three circulating water pumps are located in the enclosed intake structure at the river bank. Water from the main condensers is returned to the discharge structure where it is either discharged through an aerating structure to the river or is diverted to the cooling towers. Water circulated through the towers may be either discharged through the aerating structure to the river or recirculated in a closed loop path to the intake structure, or a combination of both, known as hybrid cycle mode. The discharge path is manually selected by the operator and is contingent upon seasonal variation in environmental parameters.

The only transmission lines considered to be in scope for the review are located inside the 125 acre plant site. These transmission lines were constructed to connect VYNPS to the New England transmission grid. The transmission lines exiting the switchyards are part of the New England transmission grid that was constructed to supply purchased power to the State of Vermont. The New England transmission grid is not considered to be in scope of the license renewal review.

To support the SEIS preparation process and to ensure compliance with Section 7 of the Endangered Species Act, the NRC requests information on Federally listed, proposed and candidate species, and critical habitat under the jurisdiction of the National Marine Fisheries Service that may be in the vicinity of the VYNPS site.

In addition, please provide any information you consider appropriate under the provisions of the Fish and Wildlife Coordination Act. Also in support of the SEIS preparation and to ensure compliance with Section 305 of the Magnuson-Stevens Fishery Conservation and Management Act, the NRC requests a list of essential fish habitat that has been designated in the vicinity of the VYNPS site.

From May 23-25, 2006, the NRC staff plans to conduct a site audit at the VYNPS. On June 7, 2006, the NRC staff plans to hold two public NEPA scoping meetings at the Latchis Theatre, 50 Main Street, Brattleboro, Vermont 05301. The first session will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second session will convene at 7:00 p.m., with a repeat of the overview portions of the meeting, and will continue until 10:00 p.m., as necessary. In addition to the environmental scoping meeting described above, the NRC will hold an informal open house at the Quality Inn & Suites, 1380 Putney Road, Brattleboro, Vermont 05301, on Tuesday, June 6, 2006, from 2:00-8:00 p.m., as necessary. You and your staff are invited to attend both the site audit and the public meetings. Your office will receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is December 2006.

If you have any questions concerning the NRC staff review of this LRA, please contact Mr. Richard L. Emch Jr., Senior Environmental Project Manager at 301-415-1590 or RLE@nrc.gov.

Sincerely,

/RA/

Rani Franovich, Branch Chief
Environmental Branch B
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosures:
1. Layout of General Area near VYNPS Site
2. Overview of the Site Location

cc w/encls.: See next page

May 5, 2006

Mr. Marvin Moriarty, Regional Director
Northeast Regional Office
U.S. Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035-9589

SUBJECT: REQUEST FOR LIST OF PROTECTED SPECIES WITHIN THE AREA UNDER EVALUATION FOR THE VERMONT YANKEE NUCLEAR POWER STATION LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Moriarty:

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application submitted by Entergy Nuclear Operations, Inc. (Entergy) for the renewal of the operating license for the Vermont Yankee Nuclear Power Station (VYNPS). VYNPS is located in the town of Vernon, Vermont, in Windham County on the west shore of the Connecticut River immediately upstream of the Vernon Hydroelectric Station. As part of the review of the license renewal application (LRA), the NRC is preparing a Supplemental Environmental Impact Statement (SEIS) under the provisions of Title 10 of the *Code of Federal Regulations* Part 51 (10 CFR Part 51), the NRC regulation that implements the National Environmental Policy Act (NEPA) of 1969. The SEIS includes an analysis of pertinent environmental issues, including endangered or threatened species and impacts to fish and wildlife. This letter is being submitted under the provisions of the Endangered Species Act of 1973, as amended, and the Fish and Wildlife Coordination Act of 1934, as amended.

The proposed action would include the use and continued maintenance of existing plant facilities and transmission lines. VYNPS stated that no major refurbishment activities have been identified as necessary to support the continued operation of VYNPS beyond the end of the existing operating license term. VYNPS is situated on approximately 125 acres of land on the west shore of the Connecticut River 0.75 miles upstream of the Vernon Hydroelectric Station. This section of the river is known as Vernon Pool. The areas adjacent to the station are primarily farm and pasture lands. The area within a five mile radius is predominantly rural with the exception of a portion of the town of Brattleboro, Vermont, and the town of Hinsdale, New Hampshire. Between 75 percent and 80 percent of the area within five miles of the station is wooded. The remainder is occupied by farms and small industries. Enclosure 1 shows the layout of the general area near the VYNPS site and Enclosure 2 presents an overview of the site location.

The VYNPS utilizes a once-through cooling system and mechanical draft cooling towers to remove waste heat from the condensers. The three circulating water pumps are located in the enclosed intake structure at the river bank. Water from the main condensers is returned to the discharge structure where it is either discharged through an aerating structure to the river or is diverted to the cooling towers. Water circulated through the towers may be either discharged through the aerating structure to the river or recirculated in a closed loop path to the intake structure, or a combination of both, known as hybrid cycle mode. The discharge path is manually selected by the operator and is contingent upon seasonal variation in environmental parameters.

The only transmission lines considered to be in scope for the review are located inside the 125 acre plant site. These transmission lines were constructed to connect VYNPS to the New England transmission grid. The transmission lines exiting the switchyards are part of the New England transmission grid that was constructed to supply purchased power to the State of Vermont. The New England transmission grid is not considered to be in scope of the license renewal review.

To support the SEIS preparation process and to ensure compliance with Section 7 of the Endangered Species Act, the NRC requests information on Federally listed, proposed, and candidate species and critical habitat that may be in the vicinity of the VYNPS site. In addition, please provide any information you consider appropriate under the provisions of the Fish and Wildlife Coordination Act.

From May 23-25, 2006, the NRC staff plans to conduct a site audit at the VYNPS. On June 7, 2006, the NRC staff plans to hold two public NEPA scoping meetings at the Latchis Theatre, 50 Main Street, Brattleboro, Vermont 05301. The first session will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second session will convene at 7:00 p.m., with a repeat of the overview portions of the meeting, and will continue until 10:00 p.m., as necessary. In addition to the environmental scoping meeting described above, the NRC will hold an informal open house at the Quality Inn & Suites, 1380 Putney Road, Brattleboro, Vermont 05301, on Tuesday, June 6, 2006, from 2:00 p.m.-8:00 p.m., as necessary. You and your staff are invited to attend both the site audit and the public meetings. Your office will receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is December 2006.

M. Moriarty -3-

If you have any questions concerning the NRC staff review of this LRA, please contact Mr. Richard L. Emch Jr., Senior Environmental Project Manager at 301-415-1590 or RLE@nrc.gov.

Sincerely,

/RA Michael Masnik For/
Rani Franovich, Branch Chief
Environmental Branch B
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosures:
1. Layout of General Area near VYNPS Site
2. Overview of the Site Location

cc w/encls.: See next page

May 8, 2006

Mr. Don L. Klima, Director
Advisory Council on Historic Preservation
Office of Federal Agency Programs
1100 Pennsylvania Ave, NW, Suite 803
Washington, DC 20004

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Klima:

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing an application to renew the operating license for the Vermont Yankee Nuclear Power Station (VYNPS). VYNPS is located in the town of Vernon, Vermont, in Windham County on the west shore of the Connecticut River. VYNPS is operated by Entergy Nuclear Operations, Inc. (Entergy). The application for renewal was submitted by Entergy in a letter dated on January 25, 2006, as supplemented by letter dated March 15, 2006, pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54).

The NRC has established that, as part of the staff's review of any nuclear power plant license renewal action, a site-specific Supplemental Environmental Impact Statement (SEIS) to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS), NUREG-1437, will be prepared under the provisions of 10 CFR Part 51, the NRC regulation that implements the National Environmental Policy Act of 1969 (NEPA). In accordance with 36 CFR 800.8, the SEIS will include analyses of potential impacts to historic and cultural resources.

On June 7, 2006, the NRC will conduct two public NEPA scoping meetings at the Latchis Theatre, 50 Main Street, Brattleboro, Vermont 05301. In addition to the environmental scoping meeting described above, the NRC will hold an informal open house at the Quality Inn & Suites, 1380 Putney Road, Brattleboro, Vermont 05301, on Tuesday, June 6, 2006, from 2:00 p.m. to 8:00 p.m., as necessary. You and your staff are invited to attend. Your office will receive a copy of the draft SEIS along with a request for comments. The staff expects to publish the draft SEIS in December 2006.

D. Klima 2

If you have any questions or require additional information, please contact the Senior Environmental Project Manager, Mr. Richard L. Emch, Jr., by telephone at 301-415-1590 or by e-mail RLE@nrc.gov.

Sincerely,

/RA/

Rani L. Franovich, Branch Chief
Environmental Branch B
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-271

cc: See next page

May 8, 2006

Ms. Jane Lendway
State Historic Preservation Officer
Vermont Division for Historic Preservation
National Life Building, Drawer 20
Montpelier, VT 05620-0501

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION LICENSE RENEWAL APPLICATION REVIEW (SHPO NO. DHP NO. WD03-001)

Dear Ms. Lendway:

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing an application to renew the operating license for the Vermont Yankee Nuclear Power Station (VYNPS). VYNPS is located in the town of Vernon, Vermont, in Windham County on the west shore of the Connecticut River. VYNPS is operated by Entergy Nuclear Operations, Inc. (Entergy). The application for renewal was submitted by Entergy in a letter dated on January 25, 2006, as supplemented by letter dated March 15, 2006, pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54).

The NRC has established that, as part of the staff's review of any nuclear power plant license renewal action, a site-specific Supplemental Environmental Impact Statement (SEIS) to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS), NUREG-1437, will be prepared under the provisions of 10 CFR Part 51, the NRC regulation that implements the National Environmental Policy Act of 1969 (NEPA). In accordance with 36 CFR 800.8, the SEIS will include analyses of potential impacts to historic and cultural resources.

In the context of the National Historic Preservation Act of 1966, as amended, the NRC staff has determined that the area of potential effect (APE) for a license renewal action is the area at the power plant site and its immediate environs that may be impacted by post-license renewal land-disturbing operations or projected refurbishment activities associated with the proposed action. The APE may extend beyond the immediate environs in those instances where post-license renewal land-disturbing operations or projected refurbishment activities specifically related to license renewal may potentially have an effect on known or proposed historic sites. This determination is made irrespective of ownership or control of the lands of interest.

On June 7, 2006, the NRC will conduct two public NEPA scoping meetings at the Latchis Theatre, 50 Main Street, Brattleboro, Vermont 05301. In addition to the environmental scoping meeting described above, the NRC will hold an informal open house at the Quality Inn & Suites, 1380 Putney Road, Brattleboro, Vermont 05301, on Tuesday, June 6, 2006, from 2:00 p.m.- 8:00 p.m., as necessary. You and your staff are invited to attend. Your office will receive a copy of the draft

Ms. Lendway -2-

SEIS along with a request for comments. The staff expects to publish the draft SEIS in December 2006.
If you have any questions or require additional information, please contact Mr. Richard L. Emch, Jr., Senior Environmental Project Manager, by telephone at 301-415-1590 or by e-mail at RLE@nrc.gov.

Sincerely,
/RA/

Rani L. Franovich, Branch Chief
Environmental Branch B
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-271

cc: See next page

May 10, 2006

The Honorable Nelson Bolding, Chief
Boldwing Clan
357 Tirrell Hill Road
Goffstown, NH 03045

SUBJECT: REQUEST FOR COMMENTS CONCERNING THE VERMONT YANKEE NUCLEAR POWER STATION LICENSE RENEWAL APPLICATION REVIEW

Dear Chief Bolding:

The U.S. Nuclear Regulatory Commission (NRC) is seeking input for its environmental review of an application from Entergy Nuclear Operations, Inc. (Entergy) for the renewal of the operating license for the Vermont Yankee Nuclear Power Station (VYNPS), located in the town of Vernon, Vermont, in Windham County on the west shore of the Connecticut River. VYNPS is in close proximity to lands that may be of interest to the Boldwing Clan. As described below, the NRC's process includes an opportunity for public and inter-governmental participation in the environmental review. We want to ensure that you are aware of our efforts and, pursuant to Title 10 of the *Code of Federal Regulations* Part 51.28(b) (10 CFR 51.28(b)), the NRC invites the Boldwing Clan to provide input to the scoping process relating to the NRC's environmental review of the application. In addition, as outlined in 36 CFR 800.8, the NRC plans to coordinate compliance with Section 106 of the National Historic Preservation Act of 1966, through the requirements of the National Environmental Policy Act of 1969.

Under NRC regulations, the original operating license for a nuclear power plant is issued for up to 40 years. The license may be renewed for up to an additional 20 years, if NRC requirements are met. The current operating license for VYNPS will expire in March 21, 2012. Entergy submitted its application for renewal of the VYNPS operating license in a letter dated January 25, 2006, as supplemented by letter dated March 15, 2006.

The NRC is gathering information for a VYNPS site-specific supplement to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS), NUREG-1437. The supplement will contain the results of the review of the environmental impacts on the area surrounding the VYNPS site that are related to terrestrial ecology, aquatic ecology, hydrology, cultural resources, and socioeconomic issues (among others) and will contain a recommendation regarding the environmental acceptability of the license renewal action. Provided for your information is the layout of the general area near the VYNPS site (Enclosure 1) and an overview of the site location (Enclosure 2).

The NRC will hold two public scoping meetings for the VYNPS license renewal supplement to the GEIS on June 7, 2006, at the Latchis Theatre, 50 Main Street, Brattleboro, Vermont 05301. There will be two sessions to accommodate interested parties. The first session will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second session will convene at 7:00 p.m., with a repeat of the overview portions of the meeting, and will continue until 10:00 p.m., as necessary. Additionally, the NRC staff will host informal discussions one hour before the start of each session. To be considered, comments must be provided either at the transcribed public meetings or in writing. No formal comments on the proposed scope of the supplement to the GEIS will be accepted during informal discussions.

In addition to the environmental scoping meeting described above, the NRC will hold an informal open house at the Quality Inn & Suites, 1380 Putney Road, Brattleboro, Vermont 05301, on Tuesday, June 6, 2006, from 2:00 p.m. to 8:00 p.m., as necessary. At the open house, NRC staff will be available to provide information about the environmental review process for license renewal of nuclear plants. During the open house, members of the public will have the opportunity to provide formal comments on the proposed scope of the supplement to the GEIS either verbally or in writing to a transcriptionist. Comments provided to the transcriptionist will be considered in the same manner as comments provided during the scoping meetings described above. No formal comments on the proposed scope of the supplement to the GEIS will be accepted at the open house during informal discussions with the staff.

The license renewal application (LRA) is publicly available at the NRC Public Document Room (PDR), located at One White Flint North, 11555 Rockville Pike, Rockville, Maryland, 20852, or from the NRC's Agencywide Documents Access and Management System (ADAMS). The ADAMS Public Electronic Reading Room is accessible at http://adamswebsearch.nrc.gov/dologin.html. The Accession Number for the LRA is ML060300086. Persons who do not have access to ADAMS, or who encounter problems in accessing the documents located in ADAMS, should contact the NRC's PDR Reference staff by telephone at 1-800-397-4209, or 301-415-4737, or by e-mail at pdr@nrc.gov.

The VYNPS license renewal application is also available on the Internet at www.nrc.gov/reactors/operating/licensing/renewal/applications/vermont-yankee.html. In addition, the LRA is available for public inspection near the VYNPS site at the following four public libraries: Vernon Free Library, 567 Governor Hunt Road, Vernon, VT 05354; Brooks Memorial Library, 224 Main Street, Brattleboro, VT 05301; Hinsdale Public Library, 122 Brattleboro Road, Hinsdale, NH, 03451; and Dickinson Memorial Library, 115 Main Street, Northfield, MA 01360.

The GEIS, which assesses the scope and impact of environmental effects that would be associated with license renewal at any nuclear power plant site, also can be found on the NRC's website or at the NRC's PDR.

Please submit any comments that the Boldwing Clan may have to offer on the scope of the environmental review by June 23, 2006. Written comments should be submitted by mail to the Chief, Rules and Directives Branch, Division of Administrative Services, Mail Stop T-6D59, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. Electronic comments may be submitted to the NRC by e-mail at VermontYankeeEIS@nrc.gov. At the conclusion of the scoping process, the NRC staff will prepare a summary of the significant issues identified and the conclusions reached, and mail a copy to you.

The staff expects to publish the draft supplement to the GEIS in December 2006. The NRC will hold another set of public meetings in the site vicinity to solicit comments on the draft. A copy of the draft supplemental environmental impact statement (SEIS) will be sent to you for your review and comment. After consideration of public comments received on the draft, the NRC will prepare a final SEIS. The issuance of a final SEIS for VYNPS is planned for August 2007. If you need additional information regarding the environmental review process, please contact Mr. Richard L. Emch, Jr., Senior Environmental Project Manager, at 301-415-1590 or by e-mail at RLE@nrc.gov.

Sincerely,
/RA/

Rani L. Franovich, Branch Chief
Environmental Branch B
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosures:
1. Layout of General Area near VYNPS Site
2. Overview of the Site Location

cc w/encls: See next page

July 21, 2006

Mr. Marvin Moriarty, Regional Director
Northeast Regional Office
U.S. Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035-9589

SUBJECT: AMENDED REQUEST FOR LIST OF PROTECTED SPECIES WITHIN THE AREA UNDER EVALUATION FOR THE VERMONT YANKEE NUCLEAR POWER STATION LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Moriarty:

In a letter dated May 5, 2006, the U.S. Nuclear Regulatory Commission (NRC) staff requested information on Federally listed, proposed, and candidate species and critical habitat that might be in the vicinity of the Vermont Yankee Nuclear Power Station (VYNPS) site. In that letter the staff indicated that the only area considered to be in scope for the license renewal environmental review was the 125 acre plant site. The letter further stated that no transmission lines were considered to be in scope for the review.

After obtaining additional information related to the construction of the transmission lines, the staff has reconsidered its initial position and come to the conclusion that two transmission lines exiting the VYNPS will be considered within the scope of the environmental review.

The reconsidered transmission lines are the 115 Kv transmission lines from VYNPS to the Coolidge Substation in Vermont (51 miles) and from VYNPS to the Chestnut Hill Substation in New Hampshire (2 miles).

To support the Supplemental Environmental Impact Statement (SEIS) preparation process and to ensure compliance with Section 7 of the Endangered Species Act of 1973, the NRC requests information on Federally listed, proposed, and candidate species and critical habitat that might be in the vicinity of the VYNPS site and the previously mentioned transmission lines. In addition, please provide any information you consider appropriate under the provisions of the Fish and Wildlife Coordination Act.

M. Moriarty - 2 -

VYNPS is situated on approximately 125 acres of land on the west shore of the Connecticut River 0.75 miles upstream of the Vernon Hydroelectric Station. This section of the river is known as Vernon Pool. Enclosure 1 shows the transmission line from VYNPS to the Coolidge Substation in Vermont. Enclosure 2 shows the transmission line from VYNPS to the Chestnut Hill Substation in New Hampshire.

Sincerely,

/RA/

Rani Franovich, Branch Chief
Environmental Branch B
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosures:
As stated

cc w/encls: See next page

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

SEP 15 2006

Rani Franovich, Branch Chief
Environmental Branch B
Division of License Renewal
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

RE: Vermont Yankee Nuclear Power Station Renewal Application Review

Dear Mr. Franovich:

The National Marine Fisheries Service (NMFS) has reviewed the letter dated May 5, 2006 pertaining to the Vermont Yankee Nuclear Power Station (VYNPS) license renewal application. VYNPS is located on the Connecticut River in Vernon, Vt. The Nuclear Regulatory Commission (NRC) is preparing a Supplemental Environmental Impact Statement (SEIS) as part of the license renewal application. As part of the development of the SEIS, the NRC is seeking comments from NMFS pertaining to the Endangered Species Act (ESA), Fish and Wildlife Coordination Act, and Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Therefore, NMFS has the following comments.

Endangered Species
While a population of the federally endangered shortnose sturgeon (*Acipenser brevirostrum*) occurs in the Connecticut River, this species does not occur upstream of the dam at Turners Falls. As such, no federally listed or proposed threatened or endangered species and/or designated critical habitat for listed species under the jurisdiction of NMFS are known to exist in the project area. Therefore, no further consultation pursuant to section 7 of the ESA is required. If project plans change or new information becomes available that changes the basis for this determination, then consultation should be reinitiated.

Fish and Wildlife Coordination Act
The Fish and Wildlife Coordination Act (FWCA) requires federal agencies to consult with federal and state natural resource agencies regarding activities or licensing that impact fish and wildlife resources. The Connecticut River supports a diverse array of aquatic species that help maintain a healthy ecosystem. American shad and sea lamprey, for instance, pass above the Vernon dam. Impacts on anadromous fish resources from facility operations should be fully evaluated in the SEIS.

Essential Fish Habitat
The EFH provisions of the MSA require federal agencies to consult with NMFS on projects such

as this which may adversely affect EFH. The consultation process is guided by the requirements of our EFH regulation at 50 CFR 600.905, which mandates the preparation of EFH assessments and generally outlines each agency's obligations in this consultation procedure. The Connecticut River and tributaries are designated EFH for Atlantic salmon. Impacts on Atlantic salmon and their habitat occurring from facility operations should be fully evaluated in the SEIS.

Should you have any questions about this matter, please contact Sean McDermott at 978-281-9113.

Sincerely,

Louis A. Chiarella

Louis A. Chiarella
New England Field Office Supervisor
for Habitat Conservation

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087

August 10, 2006

Rani Franovich
Division of License Renewal
Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Mr. Franovich:

This responds to your recent correspondence requesting information on the presence of federally-listed and/or proposed endangered or threatened species in relation to the Vermont Yankee Nuclear Power Station.

Bald eagles (*Haliaeetus leucocephalus*) are known to nest less than 1 mile downstream of the plant. No other federally-listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area. Preparation of a Biological Assessment or further consultation with us under Section 7 of the Endangered Species Act is not required.

Based upon our knowledge, no impacts to the eagles are known to occur at this site that could be attributed to the power station or its transmission lines. This concludes our review of listed species and critical habitat in the project location and environs referenced above. No further Endangered Species Act coordination of this type is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

We will be providing comments with regard to the Fish and Wildlife Coordination Act under separate cover.

Thank you for your coordination. Please contact us at 603-223-2541 if we can be of further assistance. **In the future, in order to expedite your reply, please direct any inquiries of this nature to this office at the above address.**

Sincerely yours,

Michael J. Amaral

Michael J. Amaral
Endangered Species Specialist
New England Field Office

December 12, 2006

Ms. Patricia Kurkul
Regional Administrator
NOAA Fisheries Service
Northeast Regional Office
One Blackburn Drive
Gloucester, MA 01930-2237

SUBJECT: REQUEST INITIATION OF AN ESSENTIAL FISH HABITAT CONSULTATION REGARDING LICENSE RENEWAL OF VERMONT YANKEE NUCLEAR POWER STATION (TAC NO. MC9670)

Dear Ms. Kurkul:

The U.S. Nuclear Regulatory Commission (NRC) staff has completed the enclosed draft Supplement 30 to NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS), to evaluate the proposed renewal of the Vermont Yankee Nuclear Power Station (VYNPS) operating license for a period of an additional 20 years. The Supplemental Environmental Impact Statement (SEIS) evaluates the proposed action of license renewal for VYNPS, and the NRC is requesting initiation of an essential fish habitat (EFH) consultation regarding this proposed action of license renewal.

We have enclosed a copy of the VYNPS draft SEIS for your review. The VYNPS draft SEIS contains the EFH assessment in Appendix E. We are requesting your concurrence with our determination and look forward to receiving any conservation recommendations you may submit. In reaching our conclusion, the NRC staff relied on information provided by the applicant, on research performed by NRC staff, and on information from National Marine Fishery Service. If you have any questions regarding the enclosed EFH assessment or the staff's request, please contact Mr. Richard L. Emch, Jr., Senior Project Manager, at 301-415-1590 or via e-mail at rle@nrc.gov.

Sincerely,

/RA/

Pao-Tsin Kuo, Acting Director
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosure:
as stated

cc w/encl: See next page

Vermont Yankee Nuclear Power Station

cc:

Regional Administrator, Region I
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406-1415

Mr. David R. Lewis
Pillsbury Winthrop Shaw Pittman, LLP
2300 N Street, NW
Washington, DC 20037-1128

Mr. David O'Brien, Commissioner
Vermont Department of Public Service
112 State Street
Montpelier, VT 05620-2601

Mr. James Volz, Chairman
Public Service Board
State of Vermont
112 State Street
Montpelier, VT 05620-2701

Chairman, Board of Selectmen
Town of Vernon
P.O. Box 116
Vernon, VT 05354-0116

Operating Experience Coordinator
Vermont Yankee Nuclear Power Station
320 Governor Hunt Road
Vernon, VT 05354

G. Dana Bisbee, Esq.
Deputy Attorney General
33 Capitol Street
Concord, NH 03301-6937

Chief, Safety Unit
Office of the Attorney General
One Ashburton Place, 19th Floor
Boston, MA 02108

Ms. Carla A. White, RRPT, CHP
Radiological Health
Vermont Department of Health
P.O. Box 70, Drawer #43
108 Cherry Street
Burlington, VT 05402-0070

Mr. James M. DeVincentis
Manager, Licensing
Vermont Yankee Nuclear Power Station
P.O. Box 0500
185 Old Ferry Road
Brattleboro, VT 05302-0500

Resident Inspector
Vermont Yankee Nuclear Power Station
U. S. Nuclear Regulatory Commission
P.O. Box 176
Vernon, VT 05354

Director, Massachusetts Emergency
Management Agency
ATTN: James Muckerheide
400 Worcester Road
Framingham, MA 01702-5399

Jonathan M. Block, Esq.
Main Street
P.O. Box 566
Putney, VT 05346-0566

Mr. John F. McCann
Director, Licensing
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Gary J. Taylor
Chief Executive Officer
Entergy Operations
1340 Echelon Parkway
Jackson, MS 39213

cc:

Mr. John T. Herron
Sr. VP and Chief Operating Officer
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Oscar Limpias
Vice President, Engineering
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Christopher Schwartz
Vice President, Operations Support
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Michael J. Colomb
Director of Oversight
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Travis C. McCullough
Assistant General Counsel
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Theodore Sullivan
Site Vice President
Entergy Nuclear Operations, Inc.
Vermont Yankee Nuclear Power Station
P.O. Box 0500
185 Old Ferry Road
Brattleboro, VT 05302-0500

Mr. James H. Sniezek
5486 Nithsdale Drive
Salisbury, MD 21801

Mr. Garrett D. Edwards
814 Waverly Road
Kennett Square, PA 19348

Ms. Stacey M. Lousteau
Treasury Department
Entergy Services, Inc.
639 Loyola Avenue
New Orleans, LA 70113

Mr. Norman L. Rademacher
Director, NSA
Vermont Yankee Nuclear Power Station
P.O. Box 0500
185 Old Ferry Road
Brattleboro, VT 05302-0500

Mr. Raymond Shadis
New England Coalition
Post Office Box 98
Edgecomb, ME 04556

Mr. James P. Matteau
Executive Director
Windham Regional Commission
139 Main Street, Suite 505
Brattleboro, VT 05301

Mr. William K. Sherman
Vermont Department of Public Service
112 State Street
Drawer 20
Montpelier, VT 05620-2601

Mr. Michael D. Lyster
5931 Barclay Lane
Naples, FL 34110-7306

Ms. Charlene D. Faison
Manager, Licensing
440 Hamilton Avenue
White Plains, NY 10601

Mr. James Ross
Nuclear Energy Institute
1776 I Street, NW, Suite 400
Washington, DC 20006-3708

cc:

Diane Curran, Esq.
Harmon, Curran, Spielberg &
Eisenberg, L.L.P
1726 M Street, NW, Suite 600
Washington, DC 20036

Ronald A. Shems, Esq.
Shems, Dunkiel, Kassel & Saunders, PLLC
91 College Street
Burlington, VT 05401

Karen Tyler, Esq.
Shems, Dunkiel, Kassel & Saunders, PLLC
91 College Street
Burlington, VT 05401

Sarah Hofmann, Esq.
Director of Public Advocacy
Department of Public Service
112 State Street - Drawer 20
Montpelier, VT 05620-2601

Jennifer J. Patterson, Esq.
Office of the New Hampshire Attorney
General
33 Capitol Street
Concord, NH 03301

Matias F. Travieso-Diaz, Esq.
Pillsbury Winthrop Shaw Pittman LLP
2300 N Street, NW
Washington, DC 20037-1128

Matthew Brock, Esq.
Assistant Attorney General
Office of the Massachusetts Attorney
General
Environmental Protection Division
One Ashburton Place, Room 1813
Boston, MA 02108-1598

Anthony Z. Roisman, Esq.
National Legal Scholars Law Firm
84 East Thetford Rd.
Lyme, NH 03768

December 13, 2006

U.S. Environmental Protection Agency
Office of Federal Activities
NEPA Compliance Division
EIS Filing Section
Ariel Rios Building (South Oval Lobby)
Mail Code 2252-A, Room 7241
1200 Pennsylvania Avenue, NW
Washington, DC 20460

SUBJECT: NOTICE OF AVAILABILITY OF THE DRAFT PLANT-SPECIFIC SUPPLEMENT 30 TO THE GENERIC ENVIRONMENTAL IMPACT STATEMENT FOR LICENSE RENEWAL OF NUCLEAR PLANTS (GEIS) REGARDING VERMONT YANKEE NUCLEAR POWER STATION

Dear Sir or Madam:

The following documents are enclosed for official filing with the U.S. Environmental Protection Agency:

1. Five copies of the draft Supplement 30 to NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," regarding the license renewal of Vermont Yankee Nuclear Power Station.

2. Five copies of the U.S. Nuclear Regulatory Commission's distribution list for the draft Supplement 30 to NUREG-1437.

Simultaneously with this filing, a copy of the draft Supplement 30 is being mailed to interested Federal and State agencies, industry organizations, interest groups, and members of the public. A copy of this document also has been placed in the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is located on the NRC's Website at http://adamswebsearch.nrc.gov/dologin.htm. The Accession Number for the draft Supplement 30 to the GEIS is ML063390344. Please note that the public comment period for the draft Supplement 30 to the GEIS ends on March 7, 2007.

If further information is required, please contact Mr. Richard L. Emch, Jr., Senior Project Manager, at 301-415-1590 or by e-mail at rle@nrc.gov.

Sincerely,

/RA/

Rani L. Franovich, Branch Chief
Environmental Branch B
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosures:
As stated

cc w/encls: See next page

Vermont Yankee Nuclear Power Station

cc:

Regional Administrator, Region I
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406-1415

Mr. David R. Lewis
Pillsbury, Winthrop, Shaw, Pittman, LLP
2300 N Street, N.W.
Washington, DC 20037-1128

Mr. David O'Brien, Commissioner
Vermont Department of Public Service
112 State Street
Montpelier, VT 05620-2601

Mr. James Volz, Chairman
Public Service Board
State of Vermont
112 State Street
Montpelier, VT 05620-2701

Operating Experience Coordinator
Vermont Yankee Nuclear Power Station
320 Governor Hunt Road
Vernon, VT 05354

Mr. G. Dana Bisbee, Esq.
Deputy Attorney General
33 Capitol Street
Concord, NH 03301-6937

Chief, Safety Unit
Office of the Attorney General
One Ashburton Place, 19th Floor
Boston, MA 02108

Ms. Deborah B. Katz
Box 83
Shelburne Falls, MA 01370

Ms. Carla A. White, RRPT, CHP
Radiological Health
Vermont Department of Health
P.O. Box 70, Drawer #43
108 Cherry Street
Burlington, VT 05402-0070

Mr. James M. DeVincentis
Manager, Licensing
Vermont Yankee Nuclear Power Station
P.O. Box 0500
185 Old Ferry Road
Brattleboro, VT 05302-0500

Resident Inspector
Vermont Yankee Nuclear Power Station
U. S. Nuclear Regulatory Commission
P.O. Box 176
Vernon, VT 05354

Director, Massachusetts Emergency
Management Agency
ATTN: James Muckerheide
400 Worcester Rd.
Framingham, MA 01702-5399

Mr. Jonathan M. Block, Esq.
Main Street
P.O. Box 566
Putney, VT 05346-0566

Mr. John F. McCann
Director, Licensing
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Gary J. Taylor
Chief Executive Officer
Entergy Operations
1340 Echelon Parkway
Jackson, MS 39213

Mr. John T. Herron
Sr. VP and Chief Operating Officer
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Oscar Limpias
Vice President, Engineering
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

cc:

Mr. Christopher Schwartz
Vice President, Operations Support
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Michael J. Colomb
Director of Oversight
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Travis C. McCullough
Assistant General Counsel
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Jay K. Thayer
Site Vice President
Entergy Nuclear Operations, Inc.
Vermont Yankee Nuclear Power Station
P.O. Box 0500
185 Old Ferry Road
Brattleboro, VT 05302-0500

Mr. James H. Sniezek
5486 Nithsdale Drive
Salisbury, MD 21801

Ms. Stacey M. Lousteau
Treasury Department
Entergy Services, Inc.
639 Loyola Avenue
New Orleans, LA 70113

Mr. Raymond Shadis
New England Coalition
Post Office Box 98
Edgecomb, ME 04556

Mr. James P. Matteau
Executive Director
Windham Regional Commission
139 Main Street, Suite 505
Brattleboro, VT 05301

Mr. William K. Sherman
Vermont Department of Public Service
112 State Street
Drawer 20
Montpelier, VT 05620-2601

Mr. Michael D. Lyster
5931 Barclay Lane
Naples, FL 34110-7306

Ms. Charlene D. Faison
Manager, Licensing
440 Hamilton Avenue
White Plains, NY 10601

Mr. James Ross
Nuclear Energy Institute
1776 I Street, NW, Suite 400
Washington, DC 20006-3708

Mr. Peter Deyo
Chairman, Vernon Select Board
567 Governor Hunt Road
Vernon, VT 05354

Mr. Jerry Remillard
Brattleboro Town Manager
230 Main Street, Suite 208
Brattleboro, VT 05301

Mr. Steven A. Steidle
Chair, Brattleboro Select Board
108 Meetinghouse Lane
Brattleboro, VT 05301-8985

Sen. Roderick M. Gander
Senator, Windham District
43 Tyler Street
Brattleboro, VT 05301

Sen. Jeanette K. White
Senator, Windham District
35A Old Depot Road
Putney, VT 05346

cc:

Mr. Ed Anthes
Vermont Nuclear Free by 2012
P.O. Box 6325
Brattleboro, VT 05302

Mr. John D. Smith
Chairman Board of Selectmen
P.O. Box 13
Hinsdale, NH 03451

Ms. Diana Sidebotham
The New England Coalition
P.O. Box 545
Brattleboro, VT 05302

Ms. Christina Laine
P.O. Box 3347
Stowe, VT 05672

Mr. John Dougherty
120 Manning Hill Rd.
Winchester, NH 03470

Mr. Steven Naeck
291 Cobble Hill Rd.
W. Swanzey, NH 03446

Mr. Michael Carrier
230 Main St.
Brattleboro, VT 05301

Mr. Thomas Simon
2230 Higley Hill Rd.
Wilmington, VT 05363

Ms. Janice Healy
1350 Main Street
Springfield, MA 01103

Ms. Kari Finnell
21 Dummerston Station
E. Dummerston, VT 05346

T. J. Poor
Dept. of Public Service
State St., Drawer 20
Montpelier, VT 05602

Mr. Charles Jenks
103A Keets Rd.
Deerfield, MA 01342

Mr. Anthony L. Stevens
40 Lathrop St.
South Hadley, MA 01075

Mr. William Irwin
VT Dept. of Health
108 Caerry St.
Burlington, VT 05402

Ms. Terri C. Smith
779 Brattleboro Rd.
Hinsdale, NH 03451

Ms. Carrol Ann Twetan
13 Revere Dr.
Hinsdale, NH 03451

Ms. Jane Michand
129 Forrest St., Apt. 2
Brattleboro, VT 05301

Mr. Salvador Hancola/Ms. Deborah Reger
149 Grist Mill Rd.
Corinth, VT 05039

Ms. Martha Drala
1480 Union Village
Norwich, VT 05055

Mr. Jon Blode
94 Main St.
P.O. Box 566
Putney, VT 05346

Ms. Cora Brooks
P.O. Box 43
Chelsea, VT 05038

Mr. Bunder Mabkan
P.O. Box 960
Manchester Center, VT 05255

cc:

Ms. Joan C. Shaw
49 Coltage St.
Manchester Center, VT 05255

Ms. Anne Elizabeth Howes
52 South Main
Brattleboro, VT 05301

Mr. Richard Denby
P.O. Box 253
Hinsdale, NH 03451

Ms. Megg Rogers
24 River Rd.
Hinsdale, NH 03452

A.J. Madkour
P.O. Box 960
Manshester Center, VT 05255

Ms. Julie Moore
VT Agency of Natural Resources
103 S. Main St.
Center Bldg., 3rd Flr.
Waterbury, VT 05671

Ms. Ruth E. Clark
955 Barney Hill Rd.
Guilford, VT 05301

Mr. Timothy M. Jones
MA Attorney General
W Mass Division
1350 Main St.
Springfield, MA 01103

Mr. Michael Flory
2031 B Ft. Bridgeman Rd.
Vernon, VT 05354

Ms. Eesha Williams
111 Dutton Farm Rd.
Brattleboro, VT 05301

Mr. Dennis Girroir
860 Lakeridge Dr.
Guilford, VT 05301

Mr. Dan Jeffries
163 Carriage Hill Rd.
Brattleboro, VT 05301

Mr. Chris Nord
14 North Main St.
Newton, NH 03858

Ms. Emma Stamas
Box 12
Colrain, MA 01340

Mr. Clay Turnbull
1799 Simpson Brk Rd.
Townshend, VT 05353

Mr. Bernard Buteau
1836 Petersham Rd.
Athol, MA 01331

Mr. Evan Mulholland
1645 Eagle Peak Rd.
Randolph, VT 05060

Ms. Jeanne Walsh
Ref. Librarian, Brooks Memorial Library
224 Main Street
Brattleboro, VT 05301

Ms. Debra Kern
Director, Dickinson Memorial Library
115 Main Street
Northfield, MA 01360

Ms. Mary Major
Library Director, Hinsdale Public Library
P.O. Box 6
Hinsdale, NH 03451

Ms. Adrienne Boudreau
Library Director, Vernon Free Library
567 Governor Hunt Road
Vernon, VT 05354

cc:

Mr. Mike Hamer
Licensing Specialist, VYNPS
P.O. Box 0500
185 Old Ferry Road
Brattleboro, VT 05302-0500

Mr. George Clain
86 Maple Crest
Barre, VT 05641

Mr. Ronald A. Shems, Esq.
Shems, Dunkiel, Kassel & Saunders, PLLC
91 College Street
Burlington, VT 05401

Ms. Karen Tyler, Esq.
Shems, Dunkiel, Kassel & Saunders, PLLC
91 College Street
Burlington, VT 05401

Ms. Sarah Hofmann, Esq.
Director of Public Advocacy
Department of Public Service
112 State Street - Drawer 20
Montpelier, VT 05620-2601

Ms. Jennifer J. Patterson, Esq.
Office of the New Hampshire Attorney General
33 Capitol Street
Concord, NH 03301

Mr. Matias F. Travieso-Diaz, Esq.
Pillsbury Winthrop Shaw Pittman LLP
2300 N Street, NW
Washington, DC 20037-1128

Mr. Matthew Brock, Esq.
Assistant Attorney General
Office of the Massachusetts Attorney General
Environmental Protection Division
One Ashburton Place, Room 1813
Boston, MA 02108-1598

Mr. Anthony Z. Roisman, Esq.
National Legal Scholars Law Firm
84 East Thetford Rd.
Lyme, NH 03768

Ms. Elizabeth Higgins
Environmental Review Coordinator
Office of Environmental Review
USEPA New England, Region 1
1 Congress Street, Suite 1100
Boston, MA 02114-2023

Mr. Timothy Timmerman
Environmental Scientist
Office of Environmental Review
USEPA New England, Region 1
1 Congress Street, Suite 1100
Boston, MA 02114-2023

December 13, 2006

Ms. Jane Lendway
State Historic Preservation Officer
Vermont Division of Historic Preservation
National Life Building, Drawer 20
Montpelier, VT 05620-0501

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION LICENSE RENEWAL APPLICATION REVIEW (DHP NO. WD03-01)

Dear Ms. Lendway:

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing an application to renew the operating license for Vermont Yankee Nuclear Power Station, which is located in the town of Vernon, Vermont, in Windham County on the west shore of the Connecticut River. Vermont Yankee (VY) is operated by Entergy Nuclear Operations, Inc. (Entergy). As part of its review of the proposed action, the NRC staff has prepared a site-specific Supplemental Environmental Impact Statement (SEIS) to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS), NUREG-1437. The SEIS includes analyses of relevant environmental issues, including potential impacts to historic, archaeological, and cultural properties for the extended period of operation. In accordance with our letter to you dated May 8, 2006, a copy of the draft supplement is enclosed. Pursuant to 36 CFR 800.8(c), we are requesting your comments on the draft supplement and on our preliminary conclusions regarding historic properties.

As stated in our May 8, 2006 letter, the NRC staff has determined the area of potential effect (APE) for a license renewal action is the area at the power plant site and its immediate environs, which may be impacted by post-license renewal land disturbing operation or projected refurbishment activities associated with the proposed action. The staff views the APE for the Vermont Yankee license renewal as including the VY site and the immediate environs.

The NRC staff has conducted an environmental audit at the site and has reviewed historic and archaeological records. The NRC staff also contacted eight Native American Tribes identified as having potential interest in the proposed undertaking. To date, no comments have been received.

In the context of the National Environmental Policy Act of 1969, under which the draft environmental impact statement was prepared, the NRC staff's preliminary determination is that the impact of license renewal on historical and archaeological resources is small and additional mitigation is not warranted. The Governor Hunt House, which is eligible for listing under the National Historic Preservation Act, is located within the APE; however, Entergy has a protective procedure to ensure proper care of the house. Under the provisions of the National Historic Preservation Act of 1966, the NRC staff's preliminary determination is that there will be no historic properties affected by the proposed action.

J. Lendway -2-

Please note that the period for public comment expires on March 7, 2007. If your office requires additional time, or if there are any other questions regarding this correspondence, please have your representative contact Mr. Richard L. Emch, Jr., Senior Project Manager, at 301-415-1590 or via email at rle@nrc.gov.

Sincerely,

/RA/

Rani Franovich, Branch Chief
Environmental Branch B
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosure:
As stated

cc:

Regional Administrator, Region I
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406-1415

Mr. David R. Lewis
Pillsbury Winthrop Shaw Pittman, LLP
2300 N Street, NW
Washington, DC 20037-1128

Mr. David O'Brien, Commissioner
Vermont Department of Public Service
112 State Street
Montpelier, VT 05620-2601

Mr. James Volz, Chairman
Public Service Board
State of Vermont
112 State Street
Montpelier, VT 05620-2701

Chairman, Board of Selectmen
Town of Vernon
P.O. Box 116
Vernon, VT 05354-0116

Operating Experience Coordinator
Vermont Yankee Nuclear Power Station
320 Governor Hunt Road
Vernon, VT 05354

G. Dana Bisbee, Esq.
Deputy Attorney General
33 Capitol Street
Concord, NH 03301-6937

Chief, Safety Unit
Office of the Attorney General
One Ashburton Place, 19th Floor
Boston, MA 02108

Ms. Carla A. White, RRPT, CHP
Radiological Health
Vermont Department of Health
P.O. Box 70, Drawer #43
108 Cherry Street
Burlington, VT 05402-0070

Mr. James M. DeVincentis
Manager, Licensing
Vermont Yankee Nuclear Power Station
P.O. Box 0500
185 Old Ferry Road
Brattleboro, VT 05302-0500

Resident Inspector
Vermont Yankee Nuclear Power Station
U. S. Nuclear Regulatory Commission
P.O. Box 176
Vernon, VT 05354

Director, Massachusetts Emergency
Management Agency
ATTN: James Muckerheide
400 Worcester Road
Framingham, MA 01702-5399

Jonathan M. Block, Esq.
Main Street
P.O. Box 566
Putney, VT 05346-0566

Mr. John F. McCann
Director, Licensing
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Gary J. Taylor
Chief Executive Officer
Entergy Operations
1340 Echelon Parkway
Jackson, MS 39213

cc:

Mr. John T. Herron
Sr. VP and Chief Operating Officer
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Oscar Limpias
Vice President, Engineering
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Christopher Schwartz
Vice President, Operations Support
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Michael J. Colomb
Director of Oversight
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Travis C. McCullough
Assistant General Counsel
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

Mr. Theodore Sullivan
Site Vice President
Entergy Nuclear Operations, Inc.
Vermont Yankee Nuclear Power Station
P.O. Box 0500
185 Old Ferry Road
Brattleboro, VT 05302-0500

Mr. James H. Sniezek
5486 Nithsdale Drive
Salisbury, MD 21801

Mr. Garrett D. Edwards
814 Waverly Road
Kennett Square, PA 19348

Ms. Stacey M. Lousteau
Treasury Department
Entergy Services, Inc.
639 Loyola Avenue
New Orleans, LA 70113

Mr. Norman L. Rademacher
Director, NSA
Vermont Yankee Nuclear Power Station
P.O. Box 0500
185 Old Ferry Road
Brattleboro, VT 05302-0500

Mr. Raymond Shadis
New England Coalition
Post Office Box 98
Edgecomb, ME 04556

Mr. James P. Matteau
Executive Director
Windham Regional Commission
139 Main Street, Suite 505
Brattleboro, VT 05301

Mr. William K. Sherman
Vermont Department of Public Service
112 State Street
Drawer 20
Montpelier, VT 05620-2601

Mr. Michael D. Lyster
5931 Barclay Lane
Naples, FL 34110-7306

Ms. Charlene D. Faison
Manager, Licensing
440 Hamilton Avenue
White Plains, NY 10601

Mr. James Ross
Nuclear Energy Institute
1776 I Street, NW, Suite 400
Washington, DC 20006-3708

cc:

Diane Curran, Esq.
Harmon, Curran, Spielberg &
Eisenberg, L.L.P
1726 M Street, NW, Suite 600
Washington, DC 20036

Ronald A. Shems, Esq.
Shems, Dunkiel, Kassel & Saunders, PLLC
91 College Street
Burlington, VT 05401

Karen Tyler, Esq.
Shems, Dunkiel, Kassel & Saunders, PLLC
91 College Street
Burlington, VT 05401

Sarah Hofmann, Esq.
Director of Public Advocacy
Department of Public Service
112 State Street - Drawer 20
Montpelier, VT 05620-2601

Jennifer J. Patterson, Esq.
Office of the New Hampshire Attorney
General
33 Capitol Street
Concord, NH 03301

Matias F. Travieso-Diaz, Esq.
Pillsbury Winthrop Shaw Pittman LLP
2300 N Street, NW
Washington, DC 20037-1128

Matthew Brock, Esq.
Assistant Attorney General
Office of the Massachusetts Attorney
General
Environmental Protection Division
One Ashburton Place, Room 1813
Boston, MA 02108-1598

Anthony Z. Roisman, Esq.
National Legal Scholars Law Firm
84 East Thetford Rd.
Lyme, NH 03768

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

JAN - 4 2007

Pao-Tsin Kuo, Acting Director
Division of License Renewal
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 2055-0001

Re: EFH Assessment for the Vermont Yankee Nuclear Power Station (TAC No. MC9670) License Renewal

Dear Mr. Kuo:

The National Marine Fisheries Service (NMFS) has received the Essential Fish Habitat (EFH) assessment contained within the Supplemental Environmental Impact Statement (SEIS) for the Vermont Yankee Nuclear Power Station (VYNPS) prepared by the U.S. Nuclear Regulatory Commission (NRC). According to the information provided to NMFS, the NRC proposes the license renewal of the VYNPS for a period of an additional 20 years. The NRC has determined that the license renewal of the VYNPS would result in minimal adverse effect on EFH for Atlantic salmon.

We appreciate the opportunity to provide comments regarding this project. However, at this time NMFS does not have sufficient staff resources to evaluate the effects of the proposed action on EFH and other NMFS trust resources. Therefore, NMFS will not be able to undertake an EFH consultation for the proposed license renewal of the VYNPS. Related correspondence should be addressed to the attention of Michael Johnson at the letterhead address above, or by phone at (978) 281-9130.

Sincerely,

Louis A. Chiarella

for Peter D. Colosi, Jr.
Assistant Regional Administrator
for Habitat Conservation

cc:
EPA: Mel Cote
USFWS: Marvin Moriarty
PRD: Mary Colligan

12/21/06
71FR76704

(7)

From: <Timmermann.Timothy@epamail.epa.gov>
To: <RLE@nrc.gov>, <VermontYankeeEIS@nrc.gov>
Date: Fri, Mar 2, 2007 12:46 PM
Subject: EPA comments on the Vermont Yankee DSEIS

Rich:

our comments on the Vermont Yankee DSEIS. Could you please send me confirmation that you received our comments?

Thanks,

Tim

Timothy L. Timmermann
Environmental Scientist
Office of Environmental Review

U.S. Environmental Protection Agency-New England
1 Congress Street, Suite 1100 Mail Code RAA
Boston, Massachusetts 02114-2023

Tel: 617-918-1025
Fax: 617-918-1029
email: timmermann.timothy@epa.gov

CC: <Timmermann.Timothy@epamail.epa.gov>, <Higgins.Elizabeth@epamail.epa.gov>

SUNSI Review Complete
Template=ADM-013

E-RIDS=ADM-03
Add=R. Elnitsky (RLE)

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.

3

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.

From: <Andrew_Raddant@ios.doi.gov>
To: <VermontYankeeEIS@nrc.gov>
Date: 03/06/2007 12:34:55 PM
Subject: Department of the Interior comments on the Vermont Yankee draft EIS/Supplement 30

Please find attached our comments on the Vermont Yankee Nuclear Power Station, EIS/Supplement 30.

Please call with questions.

Sincerely,

Andrew Raddant, Regional Environmental Officer
U.S. Department of the Interior
Office of the Secretary
Office of Environmental Policy and Compliance
408 Atlantic Avenue., Room 142
Boston, MA 02210-3334
Phone: 617-223-8565 Fax: 617-223-8569
email: andrew_raddant@ios.doi.gov

CC: <RLE@nrc.gov>

United States Department of the Interior
OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
408 Atlantic Avenue – Room 142
Boston, Massachusetts 02210-3334

TAKE PRIDE IN AMERICA

March 6, 2007

9043.1
ER 06/1220

12/21/04
71FR 76706
(14)

RECEIVED
2007 MAR -7 PM 3:29
RULES AND DIRECTIVES BRANCH

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

REF: NUREG-1437 Supplement 30, draft
Vermont Yankee Nuclear Power Station
COMMENTS

Dear Mr. Lesar:

This is in response to the Nuclear Regulatory Commission's (NRC) draft Generic Environmental Impact Statement for License Renewal of Nuclear Plants-Supplement 30 (dSEIS) for the Vermont Yankee Nuclear Power Station (Vermont Yankee), dated December, 2006. The Department of the Interior (Department) has reviewed the dSEIS and offers the following comments.

BACKGROUND

Entergy Nuclear Vermont Yankee, LLC (Entergy) owns and operates Vermont Yankee, located on the Connecticut River in Vernon, Vermont. The plant is licensed to operate through March, 2012. On January 25, 2006, Entergy filed an application with the NRC to renew the operating license for an additional 20 years.

Under the NRC's environmental protection regulations in Title 10, Part 51, renewal of a nuclear power plant operating license requires the preparation of an EIS. The NRC considered the environmental impacts of renewing an operating license in its Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS), NUREG-1437, Volumes 1 and 2. The GEIS identifies 92 environmental issues and reaches generic conclusions related to environmental impacts for 69 of these issues that apply to all plants or those with specific design or site characteristics. The dSEIS evaluates a subset of the remaining 23 issues that apply to Vermont Yankee.

E-RIDS=ADM-03
Add=R. Emch (RLE)

SUNSI Review Complete
Template=ADM-013

In the dSEIS, NRC staff concludes that for all issues evaluated, the significance of the potential environmental impacts of renewal of the operating license is SMALL,[1] and that no additional mitigation is warranted.

PROJECT DESCRIPTION

VY is located on the banks of the Connecticut River in Vernon, Vermont. The plant was originally licensed with an electrical capacity of 540 MW. In March 2006 the NRC authorized a 20 percent uprate to bring the plant's output to 650 MW. Approximately 0.75 mile downstream of VY is the Vernon Hydroelectric Project, which includes the Vernon Dam. All of VY's cooling water intake and discharge points are located within the lower portion of the Vernon Project's impoundment (Lower Vernon Pool, or LVP), which extends upstream 25 miles to the base of the Bellows Falls Hydroelectric Project Dam.

Throughout the year, VY is operated in open, closed, or hybrid cycle. Under closed cycle, cooling water is withdrawn from the river, pumped through an array of mechanical draft cooling towers, then returned to the intake area for reuse as cooling water until a portion is discharged to the river as cooling tower blowdown. Under open cycle, the plant is operated in a "once through" cooling mode, with all cooling water passing through the condenser cooling system and then discharged to the LVP. Under hybrid cycle, VY may modify the amount of cooling water that passes through the cooling towers and the amount that is recirculated, such that the discharge to the river may vary in both temperature and volume.[2]

VY's current National Pollution Discharge Elimination System (NPDES) permit sets limits on the amount of heated effluent allowed to be released to the Connecticut River. During the winter period (October 15 through May 15), the plant-induced temperature at downstream River Monitoring Station 3 shall not exceed 65°F, the rate of change of temperature at Station 3 shall not exceed 5°F per hour, and the increase in temperature above ambient at Station 3 shall not exceed 13.4°F. During the summer period (May 16 through October 14), the temperature increase at Station 3 is required to be less than 2°F above ambient for water that is above 63°F and less than 5°F above ambient for water that is below 55°F.

GENERAL COMMENTS

While the Department has many and varied interests in this proceeding, it is limiting the scope of its comments on the dSEIS to potential impacts that extending the operating license of VY may have on the aquatic resources of the Connecticut River.

The U.S. Fish and Wildlife Service (FWS) has been actively involved in VY through the Environmental Advisory Committee (EAC) established by the Vermont Agency of Natural Resources (VANR) via the NPDES permit it issues for the project. The NPDES permit requires Entergy to meet with the EAC at least annually to review and evaluate the aquatic environmental monitoring and studies program established in Part IV of the permit. The purpose of the EAC is to review environmental data and provide comments and recommendations to the VANR.

---

1 SMALL is defined as "Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource."

2 Normandeau Associates. April 2004. §316(a) Demonstration in Support of a Request for Increased Discharge Temperature Limits at Vermont Yankee Nuclear Power Station during May through October.

In addition to its role on the EAC, the FWS is a founding member of the Connecticut River Atlantic Salmon Commission (CRASC), and has actively participated in the licensing and post-licensing proceedings of the federally-regulated hydroelectric projects within the watershed.

Interjurisdictional Fisheries Management

The Connecticut River watershed is a resource of tremendous importance. The Department has been actively involved in interjurisdictional fisheries management on the Connecticut River since 1951, when the FWS began consultation on the first upstream passage facilities at the Holyoke Hydroelectric Project.

In 1967, a partnership between the FWS, the National Marine Fisheries Service (NMFS), and the states bordering on the Connecticut River was established to restore Atlantic salmon to the Connecticut River. The partnership was formally authorized by Congress in 1983 as the Connecticut River Atlantic Salmon Commission. The CRASC administers the inter-jurisdictional, cooperative effort to restore Atlantic salmon to the Connecticut River Basin (Public Law 98-138). CRASC's mission is to protect, conserve, restore and enhance the Atlantic salmon population in the Connecticut River Basin. Both the Departments of the Interior through the FWS and the Department of Commerce through the NMFS are members of the CRASC.

The CRASC released a revised *Strategic Plan for the Restoration of Atlantic Salmon to the Connecticut River* in 1998. The goals, objectives and strategies outlined in the plan, broad in scope and flexible, are designed to guide restoration activities by providing a framework that supports actions intended to increase the abundance of Atlantic salmon in the basin and define expectations and benchmarks for program evaluation. One specific goal (No. 2) defined in the plan is to "enhance and maintain the quantity, quality and accessibility of salmon habitat necessary to support re-established spawning populations." The third objective under this goal is relevant to the subject proceeding:

> Minimize passage obstructions, migratory delays and mortality of Atlantic salmon smolts and kelts downstream of areas stocked with fry, parr, smolts or adults.

In 1991, an updated plan for shad management in the Connecticut River was completed by the CRASC Shad Studies Subcommittee.[3] The goal of the management plan is to achieve the restoration and maintenance of a spawning population of American shad within its historical range in the Connecticut River Basin. Seven management objectives are listed in support of the restoration goal. In short summary, the CRASC calls for an adult return population of 1.5 to 2 million individuals, a maximum rate of exploitation of 40 percent of the population, annual passage of 40 to 60 percent of the spawning run at each successive upstream barrier on the mainstem river, and the maximization of outmigrant survival of juvenile and spent adult shad.

---

3 CRASC. February 4, 1992. A Management Plan for American Shad in the Connecticut River Basin.

SPECIFIC COMMENTS

2.1.3 Cooling and Auxiliary Water Systems

Page 2-8: In this section there is no mention of how the plant's operation has changed since it first went on-line. It is the Department's understanding that initially the plant operated in closed cycle year-round. Then, gradually the plant operated in open or hybrid cycle more often as variances to the state's thermal discharge limits were granted through the Environmental Protection Agency's (EPA) 316(a) process. We recommend that the FSEIS contain a chronology of how the plant has operated from the 1970s up through today.

Page 2-9: The dimensions of the discharge structure are provided, but not for the intake structure. The FSEIS should include intake dimensions so that approach velocities can be determined.

2.2.2 Water Use

Page 2-21: The dSEIS states that TransCanada (owner of the Vernon Project) regulates the river discharge to maintain a minimum sustained flow of 1,250 cfs. A more appropriate characterization is that TransCanada regulates river flow to maximize power production, while maintaining a minimum flow of 1,250 cfs (or inflow, if less) below the dam at all times.

Page 2-23: The dSEIS notes that "Vernon Pond" may fluctuate as much as 8 feet. However, according to the Order Amending License for the Vernon Project, dated June 22, 1992, "NEP responded that their ability to regulate a wider range of river flows could actually reduce pool level fluctuations. They further responded that their ability to fluctuate the pond would be small, on the order of one foot, and that any fluctuations would be gradual..."[4] The Department recommends that the FSEIS verify the licensed operating range and the actual operating range of the Vernon Project with TransCanada.

Page 2-23: The Cooling Water Use section discusses the recent power uprate at VY and its potential impact on consumptive water use. However, NRC staff bases its determination on the current NPDES permit limits, not the amended limits presently under appeal. Depending on how the appeal is decided, this evaluation may not be valid. Also, the determination in this section appears to be inconsistent with the evaluation on page 2-32, which considers an outcome resulting in an increased thermal limit.

The dSEIS does not adequately or clearly discuss the uprate, the 316(a) variance request, the license extension, or how these actions relate to each other, including operationally. The environmental implications may include effects of an increased thermal limit, and entrainment and impingement. This should be remedied in the FSEIS.

2.2.3 Water Quality

Page 2-27: The section discussing the NPDES permit should clarify that the EPA, or a delegated state, has the ability to include restrictions on cooling water intake structures. The current language suggests that conditions are limited to discharge standards and monitoring requirements for effluents from outfalls.

---

[4] Federal Energy Regulatory Commission. June 22, 1992. Order Amending License, Project No. 1904-008.

Page 2-28: The dSEIS states that the New England Coalition appealed the NPDES permit amendment that was issued on March 30, 2006. It is the Department's understanding that Entergy also appealed the permit (over the denial of a thermal increase for the period May 16 through June 15). Therefore, there may be a third outcome; if Entergy wins its appeal, the thermal limits would increase for the entire summer period. In fact, this scenario is the one explicitly contemplated and evaluated by NRC staff in the SEIS (page 2-32). The FSEIS should explain why all three possibilities were not considered in the evaluation of the environmental impact of the plant.

Page 2-32: The dSEIS refers to the equation developed decades ago to calculate the plant-induced temperature increase. While NRC staff provides a concise overview of how the model was developed, the Department recommends that the FSEIS explain why it is still appropriate to use a very old model when many conditions on the river are different than they were in the 1970s. From the Department's perspective, it would be a very useful exercise to revisit the concept and parameters that go into the equation and to validate it under present-day conditions. VY's compliance with its thermal limits is determined based on *calculated* temperature at Station 3, not by *measured* temperature. To date, any discrepancy between the two numbers has been attributed to atmospheric loading. While this may be true, Entergy has not provided any data to support that contention.

Page 2-34, Table 2-6: The NPDES permit does not contain a condition regarding a maximum temperature exceedance rate for the summer period; therefore, the Department is unclear why the last column is included.

Page 2-38: The FSEIS should clarify that the thermistor data were not collected with the intent to "characterize the circulation and distribution of heated water," but were used to develop and calibrate a hydrothermal model, which was then used to estimate how raising the thermal limits would affect water temperatures within the LVP and at Station 3. The hydrothermal model showed that under existing conditions, the thermal plume from VY extends across the river over to New Hampshire and downstream to Vernon Dam.

Another issue the Department recommends the FSEIS investigate is the geographic extent of VY's influence on water temperature. Presently, the thermal effluent is considered "fully mixed" at Station 3, for the purposes of the NPDES permit. However, at that point the water temperature is still up to 2°F higher than ambient. In order to fully understand the impact VY's thermal effluent has on the aquatic community of the Connecticut River, resource agencies need to know how far downstream the raised river temperature extends. This is especially pertinent to Atlantic salmon smolts, that could be adversely impacted by extended periods at elevated temperatures.

2.2.5 Aquatic Resources

Page 2-47, lines 3-4: The dSEIS states that fish are routinely sampled as part of the NPDES monitoring requirements, and that samples are collected by electroshocking in May, June, September and October. The FSEIS should note that in addition to the resident fish collections, American shad are sampled downstream of Vernon Dam by electroshocking and upstream of Vernon Dam by beach seine hauls, from July through October.

Page 2-47, lines 6-35: This section summarizes the species assemblage at VY for the pre-operational period and for the period 1991-2004. Based on this information, NRC staff concludes that "The fish community near the VYNPS has remained relatively stable...," yet the two communities compared are quite disparate:

Period	
Pre-Operational[a]	1991-2004[b]
smallmouth bass	yellow perch
white sucker	bluegill
yellow perch	pumpkinseed
rock bass	spottail shiner
walleye	largemouth bass
white perch	white sucker

[a] assumed decreasing abundance
[b] identified in decreasing abundance

As part of the 316(a) process, the FWS recommended that VY analyze the entire long-term fisheries data set; however, VY declined to use data prior to 1991 for its statistical analyses. While some indication of change to the fish communities upstream and downstream of Vernon Dam can be ascertained by comparing the percent composition of selected species over time (Figures 1 and 2, below), the full extent of VY's thermal effluent impact cannot be determined until a thorough evaluation of the entire data set is conducted, including pre-operational data and data collected under different permit limits.

Page 2-50, lines 22-23: The citation used for optimal temperature range of salmon smolts appears to be based on somewhat dated references, with the most recent being Shepherd 1991. The FSEIS should consider more recent research that shows a relationship between temperature and smolt physiology (McCormick *et al.* 1999) and temperature and smolt behavior (Barbin Zydlewski *et al.* 2005). These studies relate directly to potential impacts of VY's thermal effluent on smolt physiology. Higher water temperature increases the degree days experienced by smolts, which narrows the smolt window (the opportunity for smolts to successfully migrate to the estuary while they still retain their salinity tolerance). In addition, as the dSEIS points out, dams can delay migrating smolts. Given the extent of VY's thermal plume and its proximity to Vernon Dam and the downstream bypass facility, it is highly likely that the two projects, in combination, act to adversely affect smolt behavior and physiology (although the extent to which this impacts smolt survival has not been documented, to date).

Page 2-50, lines 33-35: Although adult Atlantic salmon returns had declined to less than 100 prior to 2005, the returns for 2005 and 2006 were 186 and 211, respectively.[5]

Page 2-51, lines 7-14: Given that downstream bypass facilities at hydroelectric projects on the river have only improved over time, presumably reducing turbine mortality, it does not appear that citing turbine mortality as a factor for declining American shad returns is accurate. Likewise, while the increase in the Connecticut River striped bass stock is a valid concern, no real habitat modifications to the impoundments have occurred in the past two decades. The FSEIS should either delete the reference to predation pressure in the impoundments or provide documentation to support the contention.

---

[5] http://www.fws.gov/r5crc/fish/daily.html.

7

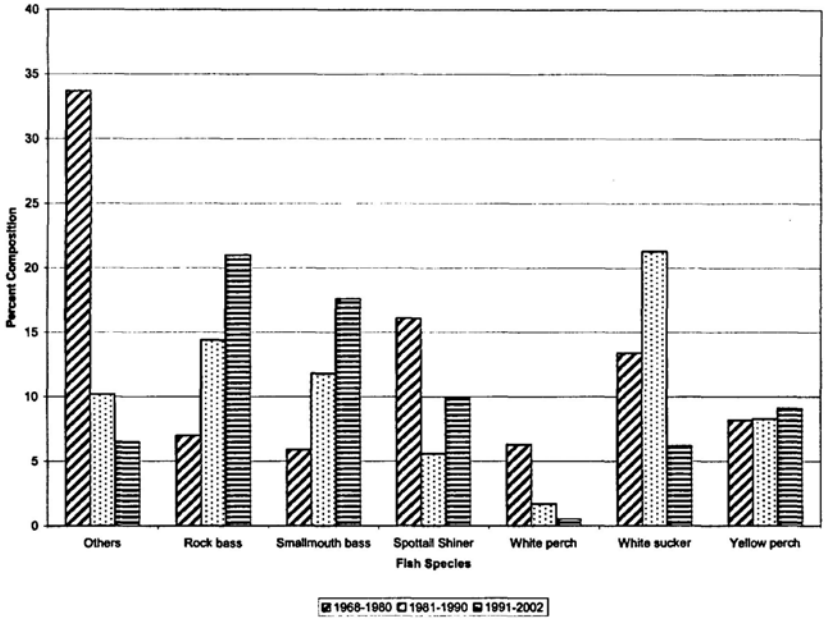

Figure 1. Percent composition of numerically important species collected downstream of Vernon Dam [from Table 5-14 of the 316(a) Demonstration, April, 2004].

Page 2-51, lines 20-25: In addition to the passage problems noted for the Cabot (Turners Falls) fish ladder, the FSEIS should identify that a second passage problem exists at the Gatehouse fishway (located at the upstream end of the hydropower canal). Efforts are underway to correct both issues. With respect to passage efficiency between hydro projects, from 2004-2006, 17 percent of the shad that passed Turners Falls Dam also passed Vernon Dam.[6]

Page 2-51, lines 25-29: The Department does not dispute the changes noted to the population structure of American shad on the Connecticut River. However, ascribing these changes solely to the implementation of fish passage facilities is not appropriate. The Department is aware of studies on other rivers without large dams or fish passage facilities that have shown similar changes in the structure of river herring stocks.[7]

---

6 2006 data are still preliminary.

7 Justin Davis, presentation at the Connecticut River Atlantic Salmon Commission Research Forum, February 16, 2007.

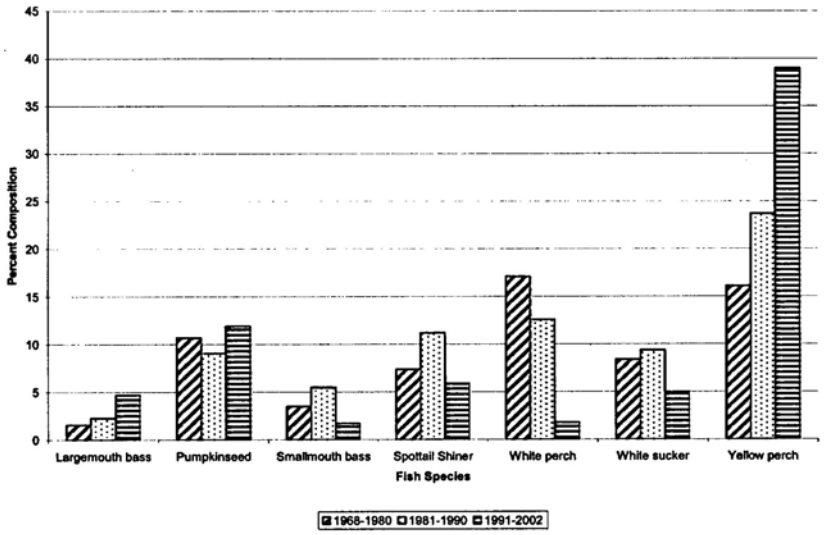

Figure 2. Percent composition of numerically important species collected upstream of Vernon Dam [from Table 5-14 of the 316(a) Demonstration, April, 2004].

Page 2-55, lines 9-11: This statement requires clarification. While American eel are common in many rivers and streams in Massachusetts and Connecticut, there are some notable exceptions; no eels have been collected recently upstream of the third dam (Shepaug) on the Housatonic River in Connecticut, and no eels have been collected recently in the Massachusetts portion of the Blackstone watershed.

2.2.5.2 Threatened and Endangered Aquatic Species

Page 2-57, lines 18-19: Although the shortnose sturgeon population downstream of Turners Falls Dam is 20 miles away from VY, the impact of the thermal effluent may still persist at that location.

4.1.1 Water Use Conflicts

Page 4-13, lines 17-19: The operation of downstream dams would have no effect on the water surface elevation of the Vernon impoundment.

4.1.2 Entrainment of Fish and Shellfish in Early Life Stages

Pages 4-14, 4-15: NRC staff provides a clear, concise summary of the 316(b) statutory requirements. However, since the dSEIS was issued, new developments have occurred (detailed below) that the FSEIS should address.

On January 26, 2007, the U.S. Second Circuit Court of Appeals ruled on a lawsuit Waterkeeper Alliance and other parties filed against the EPA over the Phase II 316(b) regulations issued in 2004. In its decision, the court remanded to EPA the provision establishing Best Technology Available and the site-specific cost-cost variance. The court remanded based on impermissible constructions of the statute, including those provisions that (1) set performance standards as ranges without requiring facilities to achieve the greatest reduction of adverse impacts they can; (2) allow compliance through restoration measures; and, (3) authorize a site-specific cost-benefit variance.[8]

VY has cooling towers but is only required to use them in order to meet the thermal limits specified in the NPDES permit. As part of the long-term biological monitoring that has been required at the plant, impingement and ichthyoplankton samples are collected annually during the summer period to document the extent of impingement and entrainment at the intake. Under the existing NPDES permit, there are no limits on impingement and entrainment rates of resident fish, but there are limits set for Atlantic salmon and American shad.

Given that VY has always had cooling towers, which is commonly accepted as the Best Technology Available (BTA), the Department recommends that the FSEIS give thorough consideration to an alternative that requires Entergy to operate VY in closed-cycle mode year-round. The Department's position is that this alternative would meet the statutory standard of "minimizing adverse environmental impact" pursuant to 316(b).

Page 4-16, Table 4-3: The Table presents percentages and numbers of fish eggs and larvae entrained at VY. 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, therefore 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. The FSEIS should provide total entrainment estimates for the species listed in Table 4-3.

Page 4-17, lines 11-13: Although Entergy believes no observable adverse impacts to any fish species or to the overall fish community of Vernon Pool due to entrainment by VY has been demonstrated, the fact remains that Figures 1 and 2 above show a decline in the percent composition of white sucker and white perch in the LVP, and both of these species do show up in entrainment collections. Whether this relationship is causal or coincident is unknown.

Page 4-15, 4-17: The dSEIS states, "When ichthyoplankton are at their peak in the Connecticut River (e.g., late spring through early summer), VYNPS is generally operating in an open-cycle or hybrid mode." However, NRC staff concludes on page 4-17 that potential impacts from entrainment of fish and shellfish by VY would be "SMALL," based in part by the utilization of the closed- or hybrid-cycle mode during much of the spawning season. These statements 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, the NRC should re-evaluate its basis for a conclusion of SMALL impact.

---

[8] Riverkeeper, Inc., *et al.* v. U.S. EPA, United States Court of Appeal for the Second Circuit. January 26, 2007.

The NRC's conclusion related to entrainment potential over the 20-year renewal period suggests that plant operations will continue as they have historically. However, within the last year, two significant changes to plant operations have occurred that change entrainment dynamics. First, if the power uprate results in a proportionate increase in waste heat, additional cooling water withdrawal may be needed, which, in turn, could increase entrainment. In addition, VY requested and received from the VANR a seasonal temperature increase[9] that would allow the plant to operate less frequently in the closed-cycle mode during periods when larval and juvenile fish are most vulnerable to entrainment and impingement. The FSEIS should fully evaluate the potential entrainment impacts of these new or planned modifications in plant operations.

4.1.2 Impingement of Fish and Shellfish

Page 4-17: The dSEIS provides no specific information on the cooling water intake structure (CWIS) to use in assessing its potential to impinge fish, or in assessing 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.

According to the dSEIS, the authorized discharge flow limit for both the open- and hybrid-cycle cooling modes is 543 mgd. The amount of water withdrawn when in hybrid-cycle mode varies depending in part on the water temperature of the Connecticut River. NRC staff concludes that potential impacts from entrainment of fish and shellfish by VY would be "SMALL," based in part on the utilization of the closed- or hybrid-cycle mode during much of the spawning season. However, since hybrid-cycle 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 ichthyoplankton presence in order provide a better assessment of entrainment potential as compared to closed-cycle (10,000 gpm) and open-cycle modes.

Page 4-18, lines 25-42: NRC staff provides impingement data from the 1970s and 1980s in numbers of fish impinged per day. For later data, the number reported is apparently total number collected. This method of reporting is confusing and makes it difficult to compare data sets. The FSEIS should standardize units and note any differences in sampling methodology between time periods.

Page 4-19, Table 4-4: This Table provides the percentages and numbers of fish impinged at VY during the summer period. It is unclear why data are combined for years 1988 and 1990-1997. It would be more helpful to include the information for each individual year. Under the current NPDES permit, no impingement monitoring is required during the winter period, which makes it impossible to determine annual impingement rates. Unlike ichthyoplankton entrainment, which is fairly discreet in its periodicity, impingement could occur year-round. In fact, impingement during the winter period may be higher than during the summer, if the heated effluent acts to attract resident species such as yellow perch.

Page 4-20, lines 5-15: The NPDES permit calls for weekly and 24-hour sampling. On the first day, the traveling screens are backwashed and the debris is examined for salmon and shad only.

---

[9] The amended permit has been stayed while the appeal is resolved.

This provides the quantity of shad and salmon impinged during the previous six days.[10] Then, 24 hours later, the process is repeated, except the debris is examined for all impinged fish.[11] In the most recent draft biological monitoring report,[12] during the summer period over 2,000 fish were impinged, with a total weight of over 65 kg. This number represents approximately 21 days of sampling (or less than 6 percent of a year). In comparison, only 376 fish were sampled via electrofishing during that same period (335 upstream of Vernon Dam). American shad had the highest impingement rate (577), yet no shad were collected in the general electrofishing sample upstream of Vernon Dam, and only 120 were caught in the beach seining conducted specifically for American shad.[13] The report contains a scatter plot of juvenile American shad abundance for the period 1991 through 2005, showing a statistically significant negative trend (i.e., decreasing shad stock). Impingement of shad could be a contributing factor in the stock decline.

NRC staff asserts that VY operates in closed- or hybrid-cycle modes during much of the year. The Department recommends that the FSEIS provide supporting information showing, on an annual basis, the percentage of time that VY operates in each mode. The NRC's conclusion related to impingement potential over the 20-year renewal period suggests that plant operations will continue as they have historically. However, the two significant changes to plant operations referred to above (i.e., the uprate and thermal increase) could change impingement dynamics. The FSEIS should fully evaluate the potential fish impingement impacts of these new or planned modifications in plant operations.

4.1.4 Heat Shock

Page 4-20: This section of the dSEIS provides a discussion of some potential environmental impacts associated with the discharge of heated effluent. 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. We recommend that the discussion in the 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 well above levels that are typical under ambient conditions.

4.7.2 Evaluation of Potential New and Significant Information Concerning Thermal Discharges to the Connecticut River

Page 4-50, lines 12-21: The dSEIS identifies an upper feeding limit for salmon of 72.5°F, an upper limit for survival of 82°F, and a smolt residency time of 12 hours. First, neither of the temperatures referenced relates to salmon smolts. The upper feeding limit mentioned is for parr, and the survival limit is for adults. Little, if any, information exists on temperature thresholds of smolts. However, as mentioned previously, recent research has shown a relationship between temperature and smolt physiology and temperature and smolt behavior. Second, the radiotelemetry studies done by Aquatec were conducted prior to the most recent thermal limits

---

[10] The inherent assumption is that all impinged fish stay on the traveling screens and are not passively or actively (e.g., predation) removed prior to sampling.

[11] Ecological Studies of the Connecticut River Vernon, Vermont, Report 35, January-December 2005, DRAFT. May 2006. Normandeau Associates.

[12] .Ecological Studies of the Connecticut River Vernon, Vermont, Report 35, January-December 2005, DRAFT. May 2006. Normandeau Associates.

[13] Vermont Yankee/Connecticut River System, Analytical Bulletin 83: Abundance of Juvenile American Shad in the Vernon Pool during 2005. May 2006. Normandeau Associates.

going into effect. The conclusions reached may or may not be valid under present-day conditions. Third, the 12-hour residency time is an average, and some smolts had residency times of up to 3½ days.[14]

The radiotelemetry studies conducted in the 1990s were intended to assess the efficiency of the downstream bypass facility at Vernon Dam, not to evaluate the thermal impact of VY on smolt behavior or physiology. Smolts are surface-oriented, and while they may indeed sound down to avoid the warmest water in the LVP, no data exist to support that presumption. Unfortunately, the configuration of the two projects (Vernon and VY) presents a worst-case scenario for smolts (and shad) because the fishways are located on the same side of the river as VY's discharge and the plume extends across the river. Whether migrants travel through the plume (the most direct route, but warmest water), or negotiate a path around the plume (cooler water, but longer residency time), ultimately they are exposed to elevated temperatures that could influence their survival.

Page 4-50, lines 26-30: NRC staff concludes that because impingement of shad and salmon has always been below annual limits stipulated in the NPDES permit, these species do not frequent the LVP; therefore, VY's thermal plume does not delay shad or salmon movements or function as an attraction to these species. First, as noted above, in 2005, the number of shad impinged greatly exceeded the number collected by seining and electroshocking. A conservative conclusion that could be drawn from this information is that shad production in the LVP is low to begin with, and many of those juveniles end up impinged on the traveling screens. Second, salmon and shad must frequent the LVP in order to migrate downstream. Third, no information provided in the dSEIS supports the contention that VY does not delay shad or salmon movements; those data simply do not exist for shad under the present thermal limits. Moreover, salmon smolt studies show a longer maximum residency time at Vernon than at Wilder or Bellows Falls Dams,[15] which could lead one to conclude that VY is a contributing factor to migration delay. In order to sort out whether, and to what extent, Vernon and VY each contribute to migration delay, a rigorous scientific study designed specifically to address the issue is needed.

While we know that shad are able to ascend the Vernon fish ladder, we do not know if they are delayed at the entrance due to any temperature differential, or in the LVP as they migrate upstream to spawn. We also do not know whether temperatures in the LVP affect spawning success. The trend analysis referred to above[16] showed declining juvenile shad abundance, which could be attributed to one or more factors, possibly including the thermal regime of the LVP. Directed studies like those done during Project SHARE have not been undertaken since the most recent thermal limits went into effect.

Page 4-51, lines 10-12: The dSEIS concludes that none of the observed changes in fish community composition or distribution in over 30 years of study in the LVP and upper Turners Falls Pool can be reasonably attributed to operations of VY. Based on the available information, the Department does not agree that the conclusion can be made that the changes to the fish

---

[14] Table 5-23 of the §316(a) Demonstration in Support of a Request for Increased Discharge Temperature Limits at Vermont Yankee Nuclear Power Station during May through October. 23 Normandeau Associates. April 2004.

[15] See Footnote #14.

[16] See Footnote #14.

community structure upstream and downstream of Vernon Dam since VY began operating,[17] or the recent declining trends in several fish species,[18] are not, at least in part, due to impacts caused by VY's impingement, entrainment, and/or thermal effluent. The FSEIS should provide documentation to support NRC staff's conclusion.

Page 4-51, lines 15-18: Regarding the discussion of solar radiation's contribution to the difference in river temperature between monitoring stations, please refer to our comments under the Water Quality section above.

Page 4-51, lines 23-28: The dSEIS focuses on potential thermal impacts to the Vernon Pool, in particular the LVP, but there is very little information about thermal impacts to habitat below the Vernon Dam. The FSEIS should include temperature data that graphically depict the spatial extent of the thermal plume below the Vernon Dam 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.

The dSEIS states that no observable adverse impacts to any fish species or to the overall fish community of Vernon Pool due to thermal discharges from VY have been demonstrated. Again, the most recent biological monitoring report, the first to include a long-term trend analysis, shows statistically-significant declining catch-per-unit-effort for three species, including American shad in the LVP, walleye in the Vernon tailrace, and white sucker both upstream and downstream of Vernon Dam. The Department is concerned by these results, and does not concur with the reasons put forth by Entergy that attribute the declines to factors other than VY.[19] At a minimum, these data highlight the need for a more detailed investigation of possible causes for the declines.

4.8.1 Cumulative Impacts on Aquatic Resources

Page 4-54, lines 16-19: The dSEIS states that VY impacts are localized and have a minimal contribution to the cumulative impact on aquatic resources in the Connecticut River. The Department respectfully disagrees, especially with regard to Atlantic salmon. Roughly 70 percent of all salmon-rearing habitat in the watershed is located upstream of VY, and that habitat produces nearly 60 percent of the system's smolts,[20] which must pass through VY. Research has shown that higher water temperature increases the degree days experienced by smolts, which narrows the smolt window (the opportunity for smolts to successfully migrate to the estuary while they still retain their salinity tolerance). VY's thermal effluent and the location of the discharge within the Vernon impoundment could contribute significantly to the cumulative impact on Atlantic salmon smolts migrating from upstream tributaries. If exposure to elevated temperatures at VY contributes to a reduction in at-sea survival of post-smolts, fewer adults may return to the river.

---

17 Table 5-14 of the §316(a) Demonstration in Support of a Request for Increased Discharge Temperature Limits at Vermont Yankee Nuclear Power Station during May through October. Normandeau Associates. April 2004.

18 See Footnote #11.

19 Entergy's consultant argues that CPUE of shad and white sucker upstream of VY's thermal influence also declined; therefore the trend cannot be attributed to VY. However, this rationale assumes that fish do not move between the two areas, which is not a reasonable assumption, given these species' mobility.

20 Jay McMenemy, personal communication. Smolt production based on a five-year average (range 55.6-67.4).

The dSEIS notes that "if a resource is regionally declining or imperiled, even a SMALL individual impact could be important if it contributes to or accelerates the overall resource decline." NRC staff goes on to conclude that the cumulative impact of continued operation of VY would be SMALL and no additional mitigation is warranted. The Department does not agree that the cumulative impact would be SMALL. However, even if the impact was SMALL, the fact that the resource (e.g., American shad, blueback herring) is declining argues strongly for mitigation measures. In this instance, the obvious mitigation would be to require VY to operate in closed-cycle mode year-round, which would greatly reduce impacts associated with impingement, entrainment and thermal effluent.

8.0 Environmental Impacts of Alternatives

The Department recommends that the FSEIS evaluate at least two more alternatives: (1) continued operation of VY under a year-round closed-cycle mode of operation; and (2) continued operation of VY under the present NPDES permit requirements, but with removal of the Vernon Dam.

9.2 Relative Significance of the Environmental Impacts of License Renewal and Alternatives

Page 9-7, line 19: The dSEIS states that closed-cycle cooling systems were assumed for all power-generation alternatives. The FSEIS should explain why closed-cycle operation was assumed for other power generation alternatives, but not for VY.

Thank you for the opportunity to comment on the dSEIS. Please do not hesitate to contact me at (617) 223-8565, or Melissa Grader of the U.S. Fish and Wildlife Service at (413) 548-8002, extension 124, if we can be of further assistance.

Sincerely,

Andrew L. Raddant
Regional Environmental Officer

Congress of the United States
Washington, DC 20515

March 5, 2007

Mr. Dale Klein
Chairman
United States Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Chairman Klein:

We appreciate the Nuclear Regulatory Commission's response to our request to hold a public meeting with Members of the Vermont Legislature and other interested parties in Montpelier, VT regarding the Environmental Impact Statement (EIS) for the Vermont Yankee nuclear facility. We understand that the February 27, 2007 meeting was well attended.

Based on the feedback we have received following this meeting, we request that you grant a 30-day extension of the deadline for public comment on the EIS. The current deadline is March 7, 2007. Such an extension will provide state Legislators a sufficient amount of time to review and comment on the EIS. We understand that an informal extension of the public comment deadline was agreed to by NRC staff during the meeting. Therefore, we are hopeful that you will act favorably on this request and we hank you in advance for your cooperation.

Sincerely,

Bernard Sanders
United States Senator

Patrick Leahy
United States Senator

Peter Welch
United States Representative

3/5...To EDO to Prepare Response for Signature of the EDO...Date due: March 19...
Copy to: Mike Lesar, OGC, RF, OCA to Ack...07-0151
(NOTE: The current deadline for public comment is March 7, 2007)

Background

[Federal Register: December 21, 2006 (Volume 71, Number 245)]
[Notices]
[Page 76706-76707]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr21de06-104]

NUCLEAR REGULATORY COMMISSION

[Docket No. 50-271]

Vermont Yankee Nuclear Power Station; Notice of Availability of the Draft Supplement 30 to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants, and Public Meeting for the License Renewal of **Vermont Yankee** Nuclear Power Station

Notice is hereby given that the U.S. Nuclear Regulatory Commission (NRC, Commission) has published a draft plant-specific supplement to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS), NUREG-1437, regarding the renewal of operating licenses DPR-28 for an additional 20 years of operation for the **Vermont Yankee** Nuclear Power Station (**Vermont Yankee**). **Vermont Yankee** is located in the town of Vernon, **Vermont**, in Windham County on the west shore of the Connecticut River. Possible alternatives to the proposed action (license renewal) include no action and reasonable alternative energy sources.

[[Page 76707]]

The draft Supplement 30 to the GEIS is publicly available at the NRC Public Document Room (PDR), located at One White Flint North, 11555 Rockville Pike, Rockville, Maryland, 20852, or from the NRC's Agencywide Documents Access and Management System (ADAMS). The ADAMS Public Electronic Reading Room is accessible at http://www.nrc.gov/reading-rm/adams/ The Accession Number for the draft

Supplement 30 to the GEIS is ML063390344. Persons who do not have access to ADAMS, or who encounter problems in accessing the documents located in ADAMS, should contact the NRC's PDR reference staff by telephone at 1-800-397-4209, or 301-415-4737, or via e-mail at pdr@nrc.gov. In addition, the following libraries have agreed to make

the draft supplement to the GEIS available for public inspection: Vernon Free Library, 567 Governor Hunt Road, Vernon, **Vermont**; Brooks Memorial Library, 224 Main Street, Brattleboro, **Vermont**; Hinsdale Public Library, 122 Brattleboro Road, Hinsdale, New Hampshire; and Dickinson Memorial Library, 115 Main Street, Northfield, Massachusetts.

Any interested party may submit comments on the draft supplement to the GEIS for consideration by the NRC staff. To be considered, comments on the draft supplement to the GEIS and the proposed action must be received by March 7, 2007; the NRC staff is able to assure consideration only for comments received on or before this date. Comments received after the due date will be considered only if it is practical to do so. Written comments on the draft supplement to the GEIS should be sent to: Chief, Rules and Directives Branch, Division of Administrative Services, Office of Administration, Mailstop T-6D59, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

Comments may be hand-delivered to the NRC at 11545 Rockville Pike, Room T-6D59, Rockville, Maryland, between 7:30 a.m. and 4:15 p.m. on Federal workdays. Electronic comments may be submitted to the NRC by e-mail at VermontYankeeEIS@nrc.gov. All comments received by the Commission, including those made by Federal, State, local agencies, Native American Tribes, or other interested persons, will be made

available electronically at the Commission's PDR in Rockville, Maryland, and through ADAMS.

The NRC staff will hold a public meeting to present an overview of the draft plant-specific supplement to the GEIS and to accept public comments on the document. The public meeting will be held on January 31, 2007, at the Latchis Theatre, 50 Main Street, Brattleboro, **Vermont**. There will be two sessions to accommodate interested parties. The first session will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second session will convene at 7 p.m. with a repeat of the overview portions of the meeting and will continue until 10 p.m., as necessary. Both meetings will be transcribed and will include:

(1) A presentation of the contents of the draft plant-specific supplement to the GEIS, and (2) the opportunity for interested government agencies, organizations, and individuals to provide comments on the draft report. Additionally, the NRC staff will host informal discussions one hour prior to the start of each session at the same location. No comments on the draft supplement to the GEIS will be accepted during the informal discussions. To be considered, comments must be provided either at the transcribed public meeting or in writing. Persons may pre-register to attend or present oral comments at the meeting by contacting Mr. Richard L. Emch, Jr., the Senior Project Manager, at 1-800-368-5642, extension 1590, or via e-mail at VermontYankeeEIS@nrc.gov no later than January 24, 2007. Members of the public may also register to provide oral comments within 15 minutes of the start of each session. Individual, oral comments may be limited by the time available, depending on the number of persons who register. If special equipment or accommodations are needed to attend or present information at the public meeting, the need should be brought to the attention of Mr. Emch's attention no later than January 24, 2007, to provide the NRC staff adequate notice to determine whether the request can be accommodated.

FOR FURTHER INFORMATION CONTACT: Mr. Richard L. Emch, Jr., Environmental Branch B, Division of License Renewal, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Mail Stop O-11F1, Washington, DC, 20555-0001. Mr. Emch may be contacted at the aforementioned telephone number or e-mail address.

Dated at Rockville, Maryland, this 13th day of December, 2006.

For the Nuclear Regulatory Commission,
Rani L. Franovich,
Branch Chief, Environmental Branch B, Division of License Renewal, Office of Nuclear Reactor Regulation.
[FR Doc. E6-21805 Filed 12-20-06; 8:45 am]
BILLING CODE 7590-01-P

ESSENTIAL FISH HABITAT ASSESSMENT FOR PROPOSED RENEWAL OF THE VERMONT YANKEE NUCLEAR POWER STATION OPERATING LICENSE

1.0 INTRODUCTION

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), which was reauthorized and amended by the Sustainable Fisheries Act of 1996, sets forth the essential fish habitat (EFH) provisions designed to protect important habitats of Federally managed marine and anadromous species. The Act requires the eight regional fishery management councils to describe and identify EFH, and to minimize the adverse effects of fishing on EFH. Pursuant to the Act, Congress has defined EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Federal agencies that fund, permit, or undertake activities that may adversely affect EFH are required to consult with the National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH, and respond in writing to NMFS's conservation recommendations. For the purpose of consultation, an adverse effect includes any impact that reduces the quality and/or quantity of EFH. The consultation document must include the following information:

- A description of the proposed action;
- An analysis of the potential adverse effects of the action on EFH and the managed species;
- The Federal agency's conclusions regarding the effects of the action on EFH; and
- Proposed mitigation, if applicable.

On January 25, 2006, Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Entergy), submitted an application for renewal of the operating license (OL) of the Vermont Yankee Nuclear Power Station (VYNPS) to the U.S. Nuclear Regulatory Commission (NRC) (Energy 2006a). The current OL expires at midnight on March 21, 2012. As part of the application, Entergy submitted an Environmental Report (ER) (Entergy 2006b) prepared in accordance with the requirements of Title 10, Part 51, of the *Code of Federal Regulations* (10 CFR Part 51).

On April 21, 2006, the NRC staff published a Notice of Intent (NRC 2006a) to prepare a plant-specific supplement to the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS) (NRC 1996,1999).[(a)] During the development of the Supplemental Environmental Impact Statement (SEIS), the NRC staff visited the site, visited the Conte Anadromous Fish Lab, met with members of Federal and State regulatory agencies, spoke to local citizens, interviewed individuals who had conducted environmental research in the

(a) The GEIS was originally issued in 1996. Addendum 1 to the GEIS was issued in 1999. Hereafter, all references to the "GEIS" include the GEIS and its Addendum 1.

Connecticut River, and reviewed a variety of technical reports, journal articles, and other relevant information to determine whether renewal would result in adverse environmental impacts. This information and other sources relevant to EFH issues were consulted during the development of this document. This EFH assessment has been developed to fulfill the NRC requirement under the MSFCMA for the VYNPS license renewal review.

2.0 PROPOSED FEDERAL ACTION

The proposed Federal action is renewal of the OL for VYNPS, a nuclear power plant that is located in southeastern Vermont in the town of Vernon, Windham County, on the western shore of the Connecticut River at River Mile (RM) 142. VYNPS is a single-unit plant with a boiling water reactor manufactured by General Electric. The unit was originally licensed for a reactor core power of 1593 megawatts-thermal (MW[t]), with a net electrical capacity of 540 megawatts-electric (MW[e]). VYNPS submitted, and the NRC approved, a power uprate to increase the maximum core power level to 1912 MW(t) on March 2, 2006. The gross electrical output at this core power level would be approximately 650 MW(e). The Connecticut River is the source for cooling water for the main condensers at the VYNPS. Cooling river water can be circulated through the system in one of three modes of operation: closed-cycle, open-cycle (also referred to as once-through cooling), or hybrid-cycle. Cooling towers are used when the plant operates in closed- or hybrid-cycle modes. The current OL for VYNPS expires on March 21, 2012. On January 25, 2006, Entergy submitted an application (Entergy 2006a) to the NRC to renew the OL for an additional 20 years of operation (i.e., until March 21, 2032).

3.0 ENVIRONMENTAL SETTING

VYNPS is located in southeastern Vermont, approximately 5 mi southeast of Brattleboro, Vermont and 28 mi north of Amherst, Massachusetts (Figure 1). The plant site is located on the western shore of the Connecticut River (Figure 2). VYNPS is located 0.75 mi upstream of the Vernon Dam, which is located at RM 142 (Figure 3). Two other dams, Turners Falls (RM 123) and Holyoke (RM 86) are also downstream of VYNPS on the main stem of the Connecticut River. The area upstream of Vernon Dam is known as Vernon Pool. Vernon Pool covers 2250 acres (at full-pond elevation of 220.13 ft behind the Vernon Dam) and extends upstream to Bellows Falls Dam at RM 174. Maximum water depth at Vernon Dam is 40 ft (Entergy 2006b). The Connecticut River near Vernon Dam is about 0.5 mi wide (AEC 1972). The minimum sustained flow from the Vernon Dam is 1250 cfs, or the inflow, if river flow is less than this. Average daily flow is about 10,500 cfs with an average annual flow of 3.3×10^{11} ft^3 (Entergy 2006b). During 2004, the lowest daily river discharge at Vernon Dam was 1757 cfs and the highest was 50,618 cfs. Monthly flow rate averages from 6347 cfs in August to 23,570 cfs in April (Normandeau 2005).

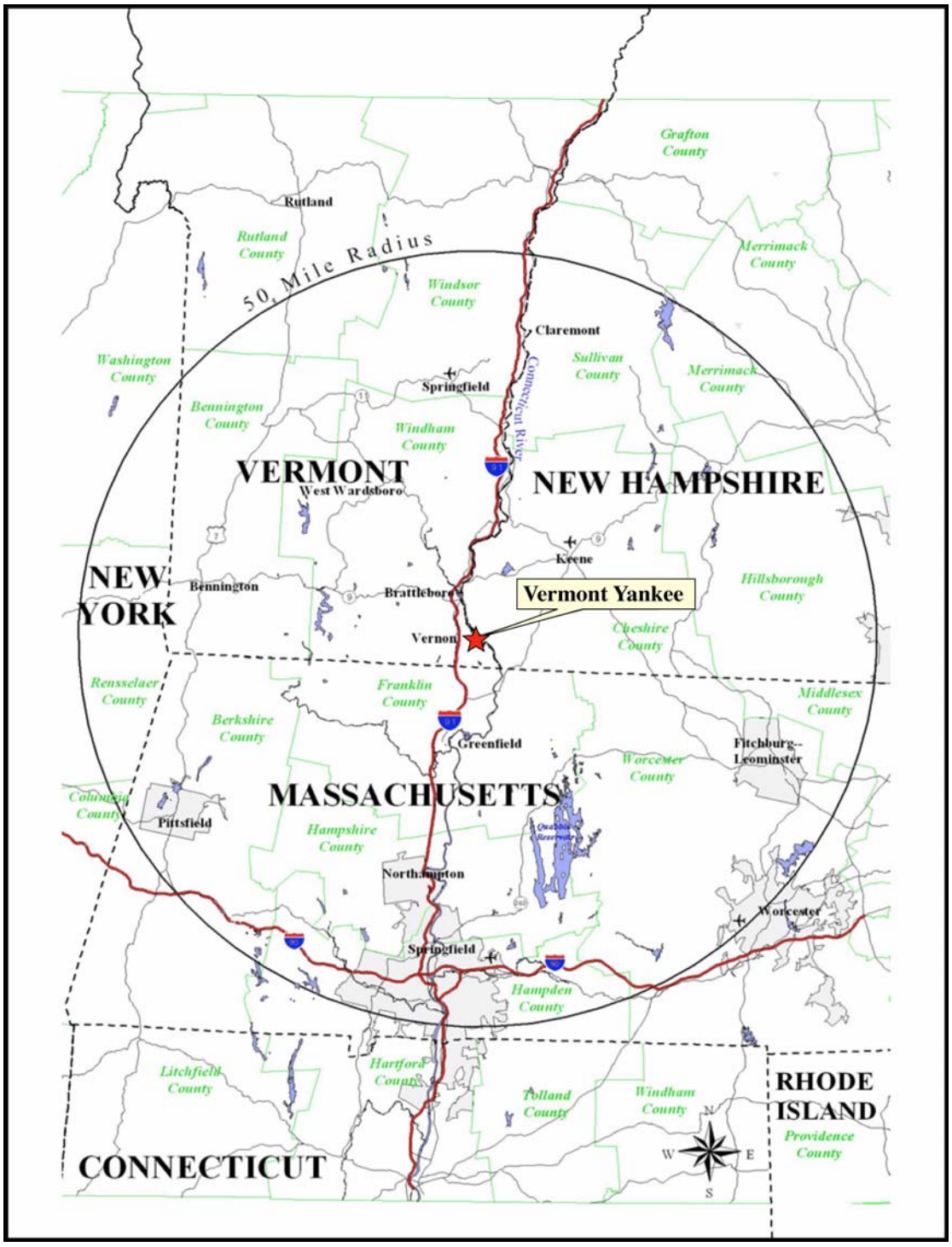

Figure 1. Location of Vermont Yankee Nuclear Power Station, 50-mi Region (Source: Entergy 2006b)

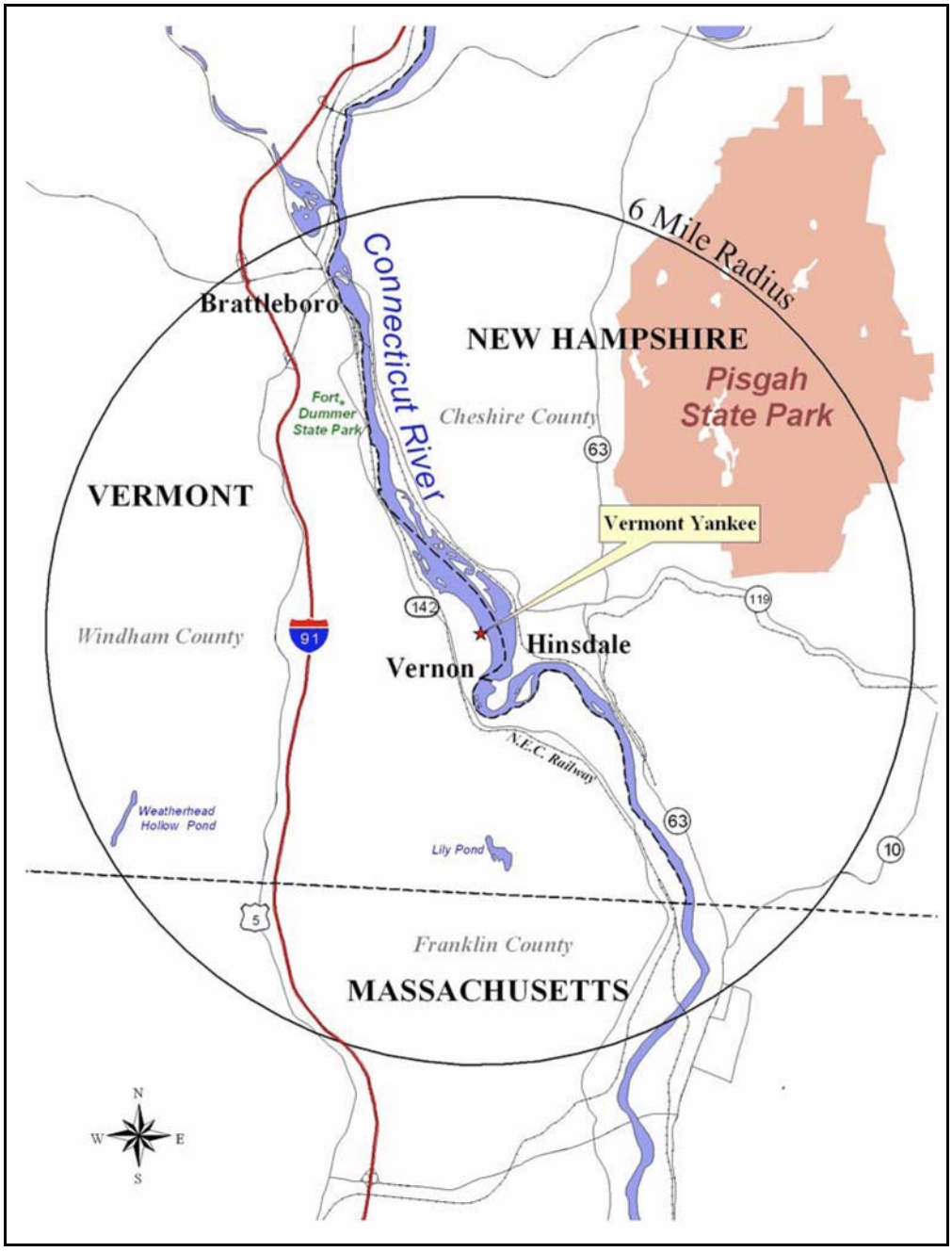

Figure 2. Location of Vermont Yankee Nuclear Power Station, 6-mi Region (Source: Entergy 2006b)

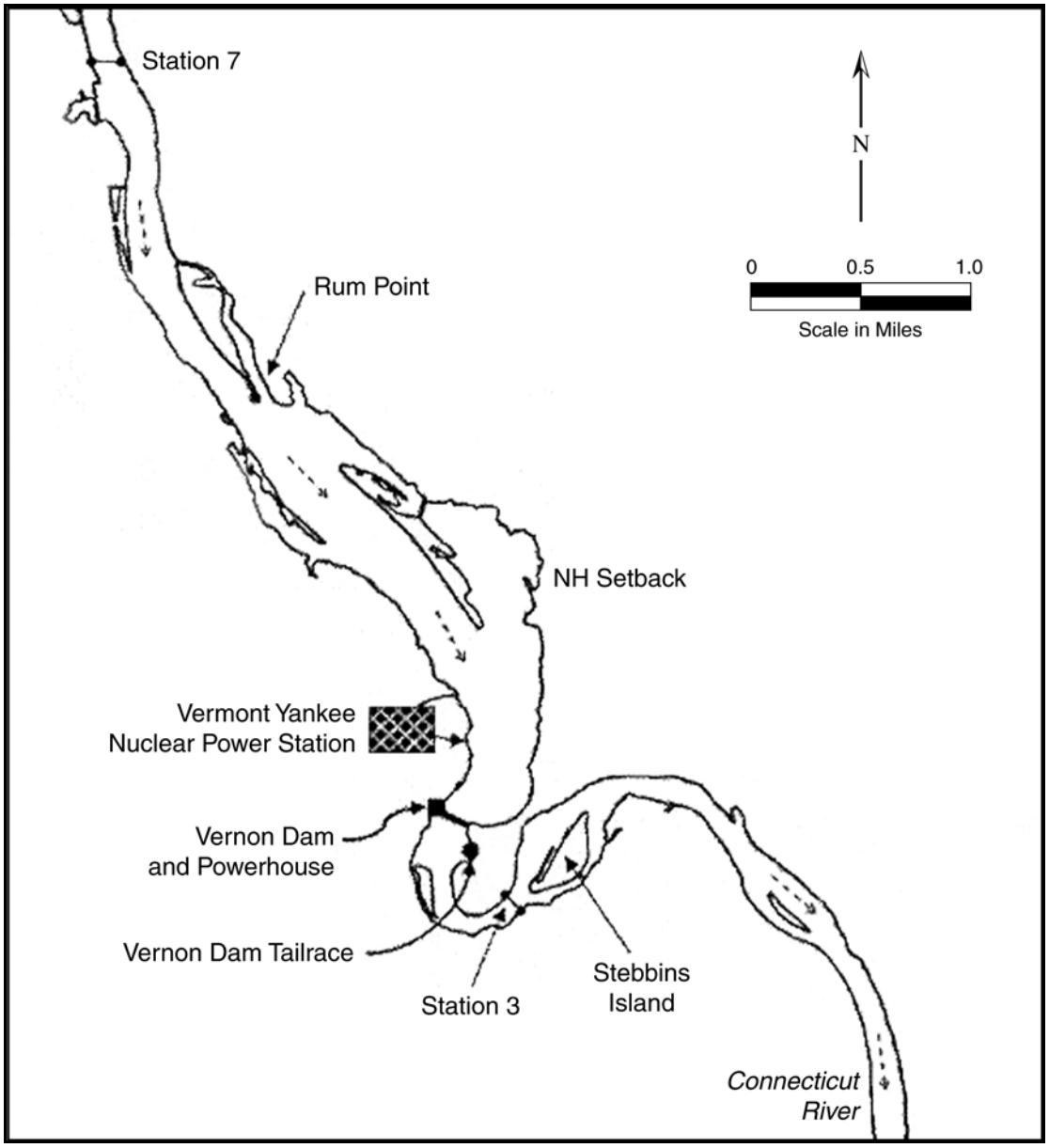

Figure 3. Location of Vernon Dam and River Monitoring Stations 3 and 7 Relevant to VYNPS (Source: Entergy 2006b)

Yearly ambient water temperatures in the vicinity of VYNPS vary from 32 to 84°F with daily variations rarely exceeding 2°F (Entergy 2006b). During 2004, the monthly average daily river temperature upstream of VYNPS ranged from a low of 32.5°F in February to 72.7°F in July. The lowest daily river temperature was 32.4°F on February 22, 2004 while the highest daily river temperature was 76.4°F on August 5, 2004 (Normandeau 2005).

A number of physical and chemical stresses have caused major changes and modifications to the aquatic resources within the Connecticut River. The major industrial use of the river is the 12 hydroelectric dams (9 are upstream of VYNPS) and 4 storage dams (3 are upstream of VYNPS) located on the mainstream of the river. Vernon Dam creates a lentic (lake-like) condition above the dam and a lotic (flowing) condition below the dam. A fishway was constructed at Vernon Dam in 1981. Prior to that time, the dam was a barrier to fish movement. The fishway is a concrete structure that consists of a vertical slot ladder from the tailrace to a fish trap and viewing gallery. An Ice Harbor-style ladder provides passage from there to Vernon Pool. The fishway is supplied with a flow of 65 cfs while it operates. An attraction flow of 40 cfs is also discharged near the foot of the ladder (Normandeau 2004a). A downstream fish conduit was first operated in 1991 (Normandeau 2004a). The primary downstream conduit, located in the center of the powerhouse, has a 350-cfs bypass flow through a 9-ft by 6-ft gate and tube that narrows to a 4-ft by 5-ft opening at its discharge end. An alternative or supplemental pipe that supplies the 40 cfs attraction flow at the foot of the fishway was converted to a “fish pipe” in 1994 for additional downstream passage of fish (Normandeau 2004a). Both warmwater and coolwater fish exist upstream and downstream of Vernon Dam. Fish are routinely sampled upstream and downstream of Vernon Dam as part of the National Pollutant Discharge Elimination System (NPDES) permit monitoring requirements (VANR 2006).

4.0 PLANT COOLING WATER SYSTEM DESCRIPTION

The Connecticut River is the source for cooling water for the main condensers at the VYNPS. Cooling river water can be circulated through the system in one of three modes of operation: closed-cycle, open-cycle (also referred to as once-through cooling), or hybrid-cycle. Cooling towers are used when the plant operates in closed- or hybrid-cycle modes. Unless otherwise noted, the discussion of the circulating-water system was obtained from the Final Environmental Statement for VYNPS operations (AEC 1972) and the applicant’s ER (Entergy 2006b,c).

In all three modes, the circulating water exits the condenser and flows into the discharge structure. In the open-cycle mode, after entering the discharge structure the water returns to the river through an aerating structure. The cooling towers are not used in the open-cycle mode of operation. In both the closed-cycle and hybrid cycle, after entering the discharge structure, the circulating water is pumped up to the cooling towers. After being cooled, the water returns to a weir collection chamber in the discharge structure. A gate inside this chamber allows all or a portion of the water to return to the intake structure. In the closed-cycle mode all of the tower cooled water is returned to the intake structure for re-use in the condenser. In the hybrid cycle

mode of operation a portion of the water returns to the intake structure while the remainder is returned to the river through the aerating structure. The exact amount of water returned to both the intake structure and the river in hybrid mode depends on seasonal variation in environmental parameters, particularly the temperature in the Connecticut River. Blowdown from the circulating water system is discharged to the river through piping near the discharge structure. Make-up water lost from blowdown and evaporation from the cooling towers is withdrawn from the river. VYNPS has two mechanical draft cooling towers, one of which has a deep basin holding 1.4 million gal of water for emergency cooling (VDEC 2003, VDEC 2006a, Entergy 2004).

The concrete intake structure has three pump bays for three circulating pumps and two service water bays for four service water pumps and two fire water pumps. All bays are provided with trash racks and traveling water screens to remove debris in the intake water. Water treatment equipment at the intake structure delivers biocides to both the circulating water and service water pump bays to minimize biofouling of the system. Corrosive control agents and chemicals to adjust pH are also added (Entergy 2004).

Cooling water for the main condensers is drawn from the Connecticut River using three vertical circulating water pumps, which provide a total maximum flow capacity of 360,000 gpm (802 cfs) (during once-through operation) and a minimum of 10,000 gpm (22 cfs) (during closed-cycle operation). Approach velocities at the intake trash racks are about 1.2 ft/s at a low water level of 215 ft mean sea level (MSL) and 1.0 ft/s for the normal water level of 220 ft MSL, while intake velocities at the traveling screens are 1.96 ft/s for an extreme low water level of 212 ft MSL, 1.73 ft/s for a low water level of 215 ft MSL, and 1.57 ft/s for a normal water level of 220 ft MSL.

Water is also drawn from the river for the plant's service water system, which provides water for turbine and reactor auxiliary equipment cooling, reactor shutdown cooling, and miscellaneous services. Four vertical, two-stage, turbine-like pumps, located at the north end of the intake structure, supply water to the service water system, providing a total flow capacity of 13,400 gpm. Additionally, two pumps with a total flow capacity of 5000 gpm, which are operated infrequently, are located at the north end of the intake structure to withdraw water from the river for fire protection (Entergy 2006b).

Cooling water discharge to the Connecticut River flows through an aerating discharge structure located near the riverbank. The structure is about 199 ft long by 108 ft wide by 46 ft deep. An aerating spillway, consisting of three rows of dissipating concrete blocks with approximately nine blocks per row, is adjacent to and downstream of the discharge structure. It provides air entrainment, energy dissipation, and warm water dispersion of the discharged cooling water. Sheet piling is used to prevent scouring of the aerating apron (Entergy 2004). NPDES-permit established limitations for circulating water discharges are 543 million gpd for open- and hybrid-cycle modes and 12.1 million gpd for the closed-cycle mode (NRC 2006c).

5.0 POTENTIAL IMPACTS OF PLANT OPERATION ON BIOTA AND HABITAT

The cooling water system associated with VYNPS utilizes water from the Connecticut River and may potentially affect EFH in the following ways:

- Impingement of juvenile and adults life stages and/or their larger prey items;
- Entrainment of eggs and larvae and/or planktonic prey items;
- Withdrawal of water from the water column; and
- Discharge of heated cooling water.

These impacts are discussed in this section.

5.1 IMPINGEMENT

As part of its NPDES permit requirements, Entergy is required to monitor fish impingement at VYNPS. Routine impingement sampling is conducted from April 1 through June 15 and from August 1 through October 31. Limits are established for the number of Atlantic salmon (*Salmo salar*) and American shad (*Alosa sapidissima*) that can be impinged. The impingement limit for Atlantic salmon is set at 0.1 percent of the estimated smolt-equivalents (estimated number of smolts from a population that successfully emigrate from a specified area) migrating past VYNPS. If the limit is exceeded, the plant must run in a closed-cycle mode until June 15. American shad impingement limit is set at one impinged shad for each adult shad that passes the Vernon Dam fishway and/or is transported by State or Federal fisheries personnel upstream of Vernon Dam (Aquatec 1990). Impingement numbers below those established for the two anadromous fish species are considered by the Environmental Advisory Committee[(a)] (comprised of representatives from the Vermont Department of Environmental Conservation, Vermont Department of Fish and Wildlife, New Hampshire Department of Environmental Services, New Hampshire Department of Fish and Game, Massachusetts Department of Environmental Protection, Massachusetts Division of Fish and Wildlife, and the U.S. Fish and Wildlife Service (FWS) Coordinator of the Connecticut River Anadromous Fish Program) to be impingement losses that are not adverse to the populations of these species (Entergy 2006a). To date, the NPDES permit limits established for these species have not been exceeded.

(a) The Environmental Advisory Committee has an advisory function that reviews and evaluates the aquatic environmental monitoring and studies program at VYNPS. It also defines specific objective investigations for Entergy to complete.

During the initial FWPCA Section 316 Demonstration (Aquatec 1978), an average of 23 fish per day was impinged during 685 days of once-through operation. The Turners Falls and Vernon Dam fishways were not in place until the early 1980s therefore, no Atlantic salmon or American shad were impinged prior to this period (Aquatec 1990). During the impingement sampling periods of the 1980s, an average of 26 fish were impinged per day (Aquatec 1990). Over 80 percent were small sunfish, rock bass (*Ambloplites rupestris*), minnows, and yellow perch (*Perca flavescens*). During the 1980s, 59 juvenile Atlantic salmon and one American shad were impinged (Aquatec 1990).

Table 1 presents some results of impingement collections that have been made at VYNPS since 1988. Impingement collections at VYNPS are generally made from April 1 through June 15 and August 1 through October 31 each year, as dictated by NPDES permit stipulations. In general, the common warmwater residents within Vernon Pool were predominant in impingement collections. These included sunfish, rock bass, and yellow perch. The numbers of American shad and Atlantic salmon impinged at VYNPS were lower than the yearly NPDES permit limits set for these species. For example, the permit limits were set at 1666 American shad and 231 Atlantic salmon, but only 25 American shad and 9 Atlantic salmon were impinged in 2001 (VYNPS and Normandeau 2002). In 2003, 13 American shad and 28 Atlantic salmon were impinged, while the permit limits for that year were set at 1140 and 364, respectively (Entergy and Normandeau 2004). In 2004, 73 American shad and no Atlantic salmon were impinged; the NPDES permit impingement limits for 2004 were set at 1005 American shad and 252 Atlantic salmon (Normandeau 2005).

Based on riverine and impingement collections of resident and anadromous fish that have been ongoing since VYNPS began withdrawing water from Vernon Pool, no observable adverse impacts to any fish species or to the overall fish community due to the operation of VYNPS has been demonstrated (Aquatec 1978, 1990; Normandeau 2004a, 2005; Entergy 2006b).

5.2 ENTRAINMENT

Entrained fish eggs and larvae experience thermal stress and mechanical and hydraulic forces during transport through a plant's cooling system. In a study of the Haddam Neck Plant, a nuclear plant with once-through cooling that formerly operated on the lower Connecticut River, Marcy (2004c (1976c) and references cited therein) found mechanical damage to be the main cause of entrainment mortality, while thermal shock was responsible for only about 20 percent

Table 1. Percentages (and Numbers) of Fish Species Impinged at VYNPS[(a)]

	Collection Period			
Species	1988 and 1990-1997	2001	2003	2004

Sea lamprey (*Petromyzon marinus*)	0.9 (130)[(b)]	34.4 (241)	0.2 (2)	0.0 (0)
American shad (*Alosa sapidissima*)	2.6 (387)	3.6 (25)	1.1 (13)	30.8 (73)
Atlantic salmon (*Salmo salar*)	1.4 (202)	1.3 (9)	2.5 (28)	0.0 (0)
Chain pickerel (*Esox niger*)	0.2 (31)	0.4 (3)	1.0 (11)	0.8 (2)
Golden shiner (*Notemigonus crysoleucas*)	1.1 (161)	2.1 (15)	0.6 (7)	0.4 (1)
Spottail shiner (*Notropis hudsonius*)	7.7 (1139)	0.3 (2)	0.8 (9)	2.1 (5)
Yellow bullhead (*Ameiurus natalis*)	1.5 (227)	0.0 (0)	3.4 (39)	0.4 (1)
Rock bass (*Ambloplites rupestris*)	10.8 (1599)	4.7 (33)	9.5 (108)	9.7 (23)
Pumpkinseed (*Lepomis gibbosus*)	5.8 (853)	1.7 (12)	14.2 (162)	2.5 (6)
Bluegill (*Lepomis macrochirus*)	19.9 (2937)	28.7 (201)	32.6 (372)	28.3 (67)
Unidentified sunfish (*Lepomis* spp.)	20.1 (2967)	0.0 (0)	0.0 (0)	0.0 (0)
Smallmouth bass (*Micropterus dolomieu*)	1.9 (279)	1.0 (7)	2.4 (27)	3.8 (9)
Largemouth bass (*Micropterus salmoides*)	0.9 (134)	0.6 (4)	5.1 (58)	1.3 (3)
Black crappie (*Pomoxis nigromaculatus*)	0.01 (1)	1.7 (12)	11.0 (126)	4.2 (10)
Yellow perch (*Perca flavescens*)	15.2 (2247)	18.3 (128)	15.0 (171)	8.4 (20)
Other species (including unidentifiable fishes)	28.3 (4184)	1.1 (8)	0.8 (9)	7.2 (17)
Totals	100 (14,778)	100 (700)	100 (1142)	100 (237)

(a) Data presented represent a portion of the impingement data collected at this facility.
(b) The percent of the total number of fish followed by the total number of fish impinged in parantheses for each species during the collection period.
Sources: Normandeau 1999; VYNPS and Normandeau 2002; Entergy and Normandeau 2004; Normandeau 2005.

of the mortality. While some entrainment survival occurs, 100 percent mortality is normally assumed as a conservative estimate of entrainment losses for all operational modes. When ichthyoplankton are at their peak in the Connecticut River (e.g., late spring through early summer), VYNPS is generally operating in an open-cycle or hybrid mode. The NPDES permit requires larval fish sampling to be done weekly during this period (Normandeau 2005).

The portion of Vernon Pool near VYNPS was found not to be a good fish spawning area due to daily water level fluctuations, a steep shoreline, and a silty sand substrate. Therefore, the amount of ichthyoplankton entrained in the area would be expected to be limited. Overall, densities of ichthyoplankton near the VYNPS intake were <1 fish/m^3, which were much lower than densities in littoral areas estimated by Aquatec (1990). For example, minnow densities near the VYNPS intake were <0.6 larvae/m^3, whereas densities in shallow, slow-moving nearshore areas were as high as 3000/m^3 (Aquatec 1990). Monitoring results indicate that larval fish densities are low in the VYNPS area and the impact of entrainment has been minimal (Entergy 2006a).

Table 2 presents some of the results of entrainment collections that have been made in the Connecticut River in the vicinity of the VYNPS intake since 1988. Entrainment collections at VYNPS are generally made from early May through early to mid July each year, as dictated by the NPDES permit. In general, the common warmwater species that are resident within Vernon Pool were predominant in entrainment collections. These included the spottail shiner (*Notropis hudsonius*), white perch (*Morone americana*), and centrarchids. No Atlantic salmon has been collected in entrainment samples, and one American shad has been collected in entrainment samples.

5.3 THERMAL RELEASES

The discharge of heated water from VYNPS creates elevated temperatures in the Connecticut River and produces a thermal plume that varies in extent and magnitude based on operational characteristics of the plant, ambient air and water temperatures, and hydrodynamic characteristics of the river. The maximum discharge flow temperature for VYNPS is 100°F, although this seldom occurs (Normadeau 2004a). Thermal discharges have the potential to affect food web dynamics, alter fish behavior, or produce acute or chronic impacts on temperature-sensitive species.

5.3.1 Temperature Requirements under the Current NPDES Permit

The current NPDES permit (VDEC 2003) defines two seasonal periods (winter, from October 15 through May 15; and summer, from May 16 through October 14) and sets limits for the increase in temperatures at River Monitoring Station 3, less than a mile downstream of Vernon Dam (Figure 3). These are presented in detail in Table 3.

Table 2. Percentages (and Numbers) of Fish Eggs and Larvae by Species Entrained at VYNPS

Appendix E

Species	Collection Period			
	1988 and 1990-1997	2001	2003	2004
Common carp (*Cyprinus carpio*)	0.3[(a)] (18)	0.2 (3)	2.2 (27)	0.5 (5)
Spottail shiner (*Notropis hudsonius*)	0.03 (2)	57.9 (978)	71.6 (875)	25.4 (269)
Notropis spp.	49.6[(b)] (2850)	0.0 (0)	0.0 (0)	0.0 (0)
Cyprinidae	13.7[(b)] (788)	0.0 (0)	0.0 (0)	0.0 (0)
White sucker (*Catostomus commersoni*)	0.02 (1)	37.9 (640)	0.2 (2)	1.0 (11)
White perch (*Morone americana*)	20.7 (1191)	1.8 (31)	14.6 (178)	3.4 (36)
Sunfish (*Lepomis* spp.)	10.9 (628)	1.8[(c)] (31)	8.2[(c)] (100)	68.7 (726)
Largemouth bass (*Micropterus salmoides*)	0.07 (4)	0.0[(d)] (0)	0.0[(d)] (0)	0.0 (0)
Yellow perch (*Perca flavescens*)	4.2 (244)	0.1 (2)	3.2 (39)	0.5 (5)
Walleye (*Sander vitreus*)	0.14 (8)	0.1 (2)	0.1 (1)	0.2 (2)
Other species (including unidentifiable fishes)		0.1[(e)] (2)	0.0 (0)	0.3[(e)] (3)
Total	100 (5747)	100 (1690)	100 (1222)	100 (1057)

(a) The percent of the total number collected followed by the total number of entrained in parentheses for each species during the collection period.
(b) Based on entrainment sample identifications done in the subsequent years and fish species known from lower Vernon Pool, most individuals identified as only *Notropis* spp. or Cyprinidae were probably spottail shiners.
(c) Listed as Centrarchidae and therefore may also include some largemouth bass.
(d) See footnote (c) - likely that some largemouth bass eggs and larvae were entrained.
(e) The Other species category is almost entirely the tessellated darter (*Etheostoma olmstedi*).

Sources: Normandeau 1999; VYNPS and Normandeau 2002; Entergy and Normandeau 2004; Normandeau 2005

Table 3. Discharge Temperature Requirements under the Current and Amended NPDES Permits for VYNPS

Currently Enforced NPDES Permit (June 9, 2003)	March 30, 2006 Amendment Request to NPDES Permit
Winter (October 15 through May 15) at downstream Station 3[(a)]: • Temperature shall not exceed 65°F; • The rate of change of temperature (i.e., the mean difference between consecutive hourly average temperatures) shall not exceed 5°F per hour; • The plant-induced increase in temperature above ambient water temperature as measured at Station 7 shall not exceed 13.4°F.	Winter (October 15 through May 15) at downstream Station 3[(a)]: • Temperature shall not exceed 65°F; • The rate of change of temperature (i.e., the mean difference between consecutive hourly average temperatures) shall not exceed 5°F per hour; • The plant-induced increase in temperature above ambient shall not exceed 13.4°F.
Summer (May 16 through October 14): • The increase in river water temperature at Station 3 above ambient water temperature as measured at Station 7 shall not exceed the following:	Early Summer (May 16 through June 15): • The increase in river water temperature at Station 3 above ambient water temperature as measured at Station 7 shall not exceed the following:
Upstream Station 7 temperatures / Temperature increase above Station 7 measured at Station 3 shall not exceed Above 63°F — 2°F >59°F, ≤63°F — 3°F ≥55°F, ≤59°F — 4°F Below 55°F — 5°F	Upstream Station 7 temperatures / Temperature increase above Station 7 measured at Station 3 shall not exceed Above 63°F — 2°F >59°F, ≤63°F — 3°F ≥55°F, ≤59°F — 4°F Below 55°F — 5°F
	Summer (June 16 through October 14): • The increase in river water temperature at Station 3 above ambient water temperature as measured at Station 7 shall not exceed the following:
	Station 7 temperatures / Temperature increase above Station 7 measured at Station 3 Above 78°F — 2°F >63°F, ≤78°F — 3°F >59°F, ≤63°F — 4°F ≤59°F — 5°F
	• When the average hourly temperature at Station 3 equals or exceeds 85°F, the thermal output of the discharge must be reduced to the extent that the average hourly temperature at Station 3 does not exceed 85°F.

(a) Station 3 is located 1.4 mi downstream of VYNPS.

(b) Station 7 is located 3.7 mi upstream of VYNPS.

NPDES permits are issued for five years at a time. On July 11, 2001, VDEC issued a renewed permit for VYNPS with an expiration date of March 31, 2006, and the permit was amended on June 9, 2003 (VDEC 2003). On February 20, 2003, Entergy applied to the VDEC to amend the permit for VYNPS to increase the temperature of the Connecticut River by 1°F as determined at River Monitoring Station 3 (downstream monitoring station) during the NPDES summer period (May 16 through October 14). On March 30, 2006, VDEC issued an amendment to the permit for VYNPS; however, the amended permit only authorized the requested temperature increase for the period from June 16 through October 14 (VDEC 2006a). VDEC concluded that additional information was needed to evaluate the impacts of the temperature increase on migrating salmon smolt during the May 16 through June 15 portion of the NPDES summer period, since it marks the end of the smolt outmigration period. The permit would have expired on March 31, 2006; however, Entergy submitted an application for a renewed permit on September 29, 2005 (Entergy 2005e). By letter dated September 30, 2005, VDEC informed Entergy that the renewal application was timely and that the permit would remain valid under an administrative extension until VDEC completes the review of the permit renewal application (VDEC 2005a).

In May 2006, the New England Coalition (NEC) appealed the NPDES permit amendment that was issued on March 30, 2006. The amendment was stayed by the State of Vermont Environmental Court on August 28, 2006. At the time this SEIS was published, VYNPS was operating under the NPDES permit as issued on June 9, 2003 (VDEC 2003). The future status of the permit depends on the outcome of the NEC appeal. If the appeal is upheld, an increase in thermal discharge will not be granted and the discharge requirements in the current permit (issued June 9, 2003) will continue until a new permit is issued. If the appeal is denied, the NPDES permit as amended March 30, 2006, will be reinstated and remain in effect until a new permit is issued by VDEC (NRC 2006d). The temperature requirements of the current and amended NPDES permits are presented in Table 3.

The NRC staff's evaluation of the environmental impact in the SEIS and this assessment of essential fish habitat considered the 1°F increase for the time period May 16 through October 14. This evaluation would be bounding if the VDEC grants Entergy the 1°F increase in the May 16 through June 14 time period or the NEC appeal is denied or the NEC appeal is upheld.

5.3.2 Methods of Demonstrating Compliance

The NPDES permit requirements, as of the date of this SEIS, are described below. The permit requires that during the winter period (October 15 through May 15), the plant-induced temperature at downstream River Monitoring Station 3 shall not exceed 65°F (Table 3). The plant-induced temperature increase is calculated using the equation published in the executive summary of the 1978 demonstration report (Aquatec 1978). The equation is based on the principle of energy conservation and takes into account the heat content of the plant's

circulating water system and cooling towers, the heat content of the plant's cooling water discharge to the river, and the average discharge (flow) of the Connecticut River as measured at Vernon Dam.[a] Measurement and cooling system data are linked to a process computer that allows plant personnel to adjust operations on the basis of continual real-time data to meet the thermal requirements of the permit (Normandeau 2005).

The Vernon Dam regulates the river discharge to maintain a minimum sustained flow of 1250 cfs. At 1250 cfs, the permitted theoretical maximum increase in temperature at River Monitoring Station 3 due to the plant's thermal discharge is 12.9°F. In effect, the plant can operate in an open-cycle cooling mode (without cooling tower operation) when ambient river temperatures as measured at the upstream River Monitoring Station 7 are less than 52.1°F (i.e., 65°F minus 12.9°F) during the winter period. At ambient temperatures equal to or greater than 52.1°F, the plant's heat discharge can be reduced by using the cooling towers to dissipate heat to the atmosphere (especially during periods of low river flow) (Normandeau 2005). The NPDES permit requires that the plant-induced increase in temperature never exceeds 13.4°F and that the rate of increase never exceeds 5°F per hour.

Table 4 summarizes the maximum simulated river temperature increases at River Monitoring Station 3 and the flows at which they occurred during the winter period (October 15 through May 15) for the years 2000 through August 2006.

Table 5 summarizes the maximum simulated river temperature increases at the station and the flows at which they occurred during the summer period for the years 2000 through 2006.

Exceedences occurred in each of the years between 2000 and 2004, but in each case were less than 1 hr in duration:

- On July 16 and 21, 2000, two 59-minute exceedences occurred (2.74°F and 0.03°F, respectively) when Vernon Dam went to minimum flow as a result of a loss of offsite power caused by a lightning strike (Normandeau 2001).

- On July 5, 2001, a 59-minute exceedence of 0.12°F occurred because plant operators did not shift to closed-cycle mode quickly enough to respond to changing river conditions.

(a) The heat content of the circulating water system and cooling towers is calculated on the basis of the change in condenser inlet temperatures over a specified time interval. The heat content of the cooling water discharge is calculated on the basis of the number and pumping capacity of circulating water intake pumps, the difference between condenser inlet and outlet temperatures, the number of circulating intake and cooling tower booster pumps, and the cooling tower outlet temperatures all over a specified time interval (Normandeau 2005).

Table 4. Maximum Simulated River Temperature Increase at River Monitoring Station 3 during the NPDES Winter Period (October 15 through May 15)

Year	Day	Maximum Temperature Increase	Permit Limit	River Flow (cfs)	Exceeded 5°F/hour?
2006[a]	March 12	6.03°F	13.4°F	2958	No
2005	February 10	12.91°F	13.4°F	1285	No
2004	February 2	12.90°F	13.4°F	1331	No
2003	January 25	13.16°F	13.4°F	1308	No
2002	January 23	12.70°F	13.4°F	1367	No
2001	December 21	12.67°F	13.4°F	1250	No
2000	November 26	12.60°F	13.4°F	1275	No

(a) Data through August 2006.
Source: Normandeau 2001, 2002, 2003, 2004b, 2005; DeWald 2005a, 2006b

Table 5. Maximum Simulated River Temperature Increase at River Monitoring Station 3 during the NPDES Summer Period (May 16 through October 14)

Year	Day	Maximum Temperature Increase (Permit Limit)	Permit limit	River Flow (cfs)	Exceeded 5°F/hour?
2006[a]	August 15	2.94°F	3.0°F	3168	No
2005	July 1	1.97°F	2.0°F	6760	No
2004	July 6	2.06°F	2.0°F	3483	No
2003	September 19	2.16°F	2.0°F	2802	No
2002	October 5	2.05°F	2.0°F	1697	No
2001	July 5	2.12°F	2.0°F	3923	No
2000	July 16	2.74°F	2.0°F	6571	No

(a) Data through August 2006.
(b) There was an exceedence on July 21, 2000, but it was not the maximum for the year 2000.
Source: Normandeau 2001, 2002, 2003, 2004b, 2005; DeWald 2005b, 2006c

- On October 5, 2002, a 60-minute exceedence of 0.05°F occurred because of unreliable automated input associated with new equipment (Normandeau 2003).

- On September 19, 2003, an 11-minute exceedence of 0.16°F occurred because plant operators shifted operating parameters in anticipation of an increase in river flow (reported by the Wilder Hydroelectric Dam). The increase in river flow occurred, but not to the degree anticipated (Normandeau 2004b).

- On July 6, 2004, a 45-minute exceedence of 0.06°F occurred when the plant was brought back on-line after an outage caused by a transformer fire (Normandeau 2005).

There were no exceedences in 2005 or 2006 through August.

5.3.3 Temperatures in the Connecticut River

The monthly variation in river temperatures as measured at River Monitoring Stations 3 (downstream) and 7 (upstream) over a 5-year period (2000 to 2004) are shown in Figures 4 and 5, respectively. Over this period, monthly averages ranged from 34.5°F in January to 75.5°F in July at River Monitoring Station 3 and from 33.4°F in February to 73.3°F in August at River Monitoring Station 7.

Figure 6 is a plot of the difference in average monthly temperatures between River Monitoring Stations 3 and 7 (i.e., Station 3 temperature minus Station 7 temperature) in 2000 through 2004. There is an increasing trend throughout the spring, peaking in May, with Station 3 having an average temperature that was 5.9°F higher than that at Station 7, with a decreasing trend throughout the summer. In most months during this summer period, the average monthly temperatures at the downstream station were greater than those at the upstream station. However, in September and December, the average monthly temperatures at River Monitoring Station 7 were higher than River Monitoring Station 3 (1.4°F and 0.4°F, respectively). The average temperature difference between the stations was less than 1°F in January and March (Normandeau 2001, 2002, 2003, 2004b, 2005).

In June, July, and August of 2002, temperature measurements were taken from thermistor stations along three bank-to-bank transects across Vernon Pool perpendicular to the river flow, as part of a study to characterize the circulation and distribution of heated water in the area between the VYNPS discharge structure and Vernon Dam (Figure 7; ASA 2004). Temperatures were measured at three depths at each of the three stations along each transect (Figure 7; Table 6). The June-July sampling period was chosen to represent expected conditions; August was chosen to represent low-flow, high-temperature conditions, usually considered the worst-case for potential impacts to aquatic biota.

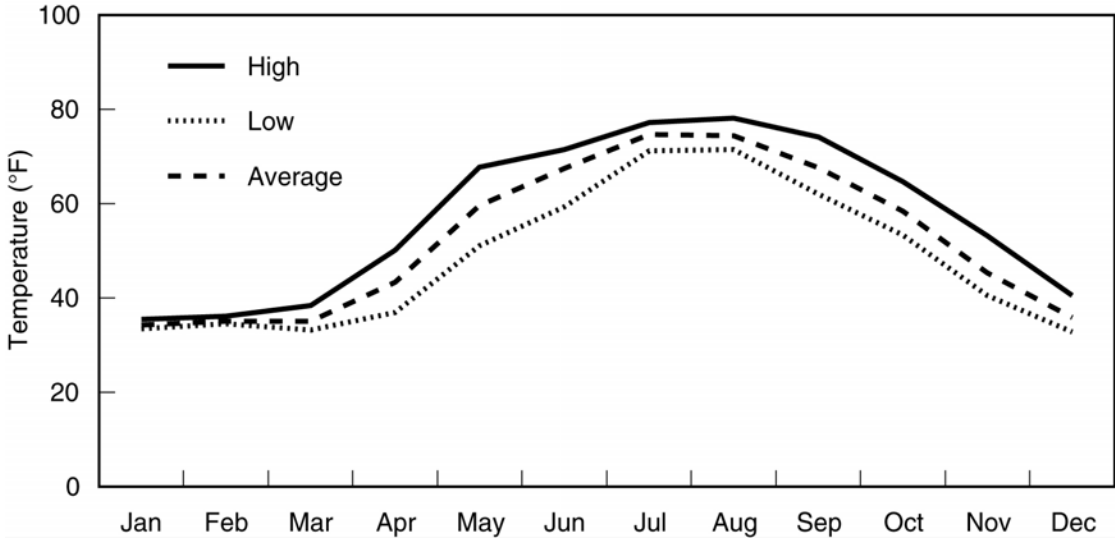

Figure 4. Seasonal Variation in Temperature at River Monitoring Station 3, Located about 0.65 miles Downstream of Vernon Dam (2000-2004) (Source: Normandeau 2001, 2002, 2003, 2004b, 2005)

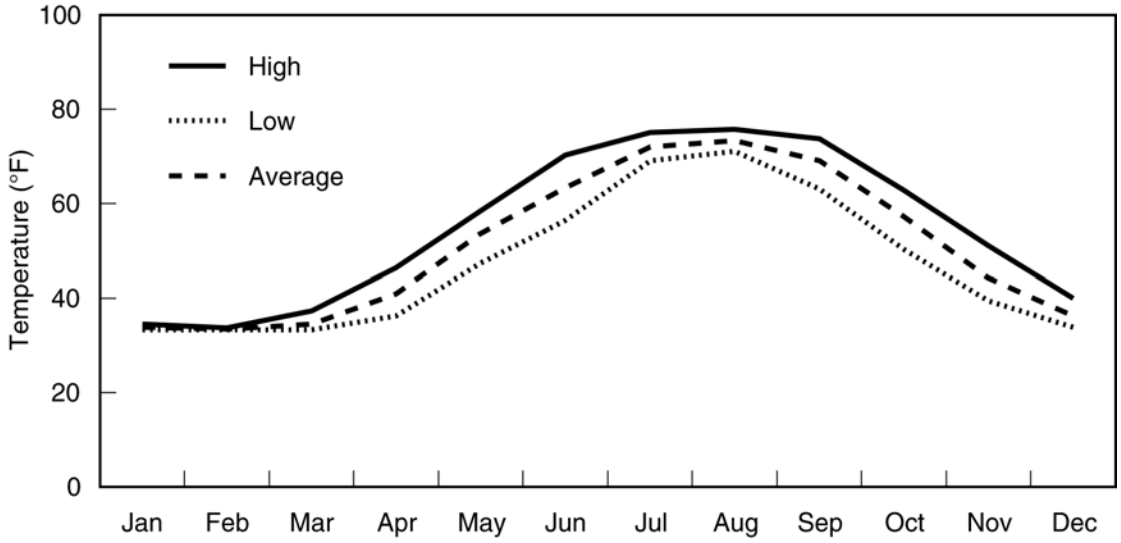

Figure 5. Seasonal Variation in Temperature at River Monitoring Station 7, Located 4 Miles Upstream of VYNPS (2000-2004) (Source: Normandeau 2001, 2002, 2003, 2004b, 2005)

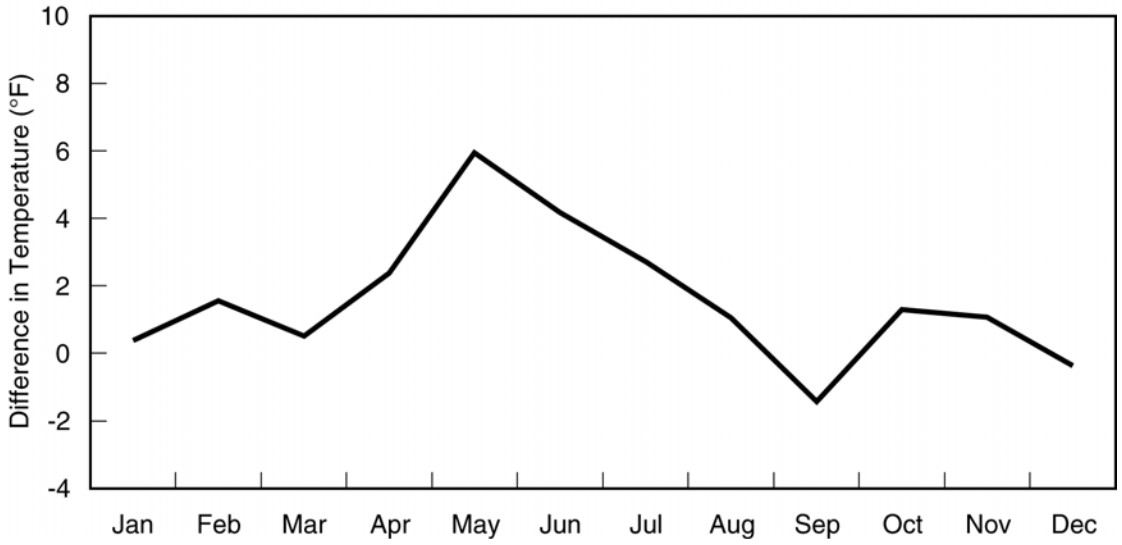

Figure 6. Difference in Average Monthly Temperatures between River Monitoring Stations 3 (downstream) and 7 (upstream) (Source: Normandeau 2001, 2002, 2003, 2004b, 2005)

Table 6. Total Water Depth and Temperature Sampling Depths in Vernon Pool

Station Total	Water Depth (ft)	Surface Depth (ft)	Middle Depth (ft)	Bottom Depth (ft)
C1/C2	17	1	8.5	16
C3/C4	17	1	8.5	16
C5/C6	14	1	7	13
D1/D2	20	1	10	19
D3/D4	14.1	1	7	13
D5/D6	23	1	11.5	22
E1/E2	39	1	19.5	38
E3/E4	13	1	6.5	12
E5/E6	5	1	2.5	4
F1/F2	13	1	6.5	12
F3/F4	21	1	10.5	20

Source: ASA 2004

Figure 7. Locations of Thermistor Stations at Vernon Pool (Source: ASA 2004)

The June-July measurements showed that temperature ranges were fairly similar along each transect between the VYNPS discharge structure and Vernon Dam: 67.1°F to 81.5°F at C stations, 67.3°F to 82.9°F at D stations, and 66.7°F to 81.9°F at E stations (Figure 7). Temperatures were generally lower at the F stations (67.1°F to 77.0°F), located upgradient of the VYNPS intake structure, during the same sampling period (Figure 7).

In the June-July sampling period, thermal stratification of the water column was greatest (up to a 6.3°F difference across the thermocline) near the VYNPS intake structure and had a decreasing trend toward the dam. Measurements at the E stations near Vernon Dam showed little stratification of the water column; however, the diurnal variation in surface temperature, due to fluctuations in river flow and the effects of solar heating, was as high as 1.8°F.

Significant spatial gradients in the surface water temperature of Vernon Pool were also detected in the June-July sampling period. Temperatures across the transects varied as much as 5.4°F to 7.2°F, with the higher temperatures recorded near the west bank. Temperature variations were least pronounced during periods of high river flow. The average temperature difference between the upstream River Monitoring Station 7 and the downstream River Monitoring Station 3 during the June-July sampling period was 4.3°F.

The August temperature measurements also showed similarities along each transect between the VYNPS discharge structure and Vernon Dam: 75.2°F to 85.1°F at C stations, 75.2°F to 84.7°F at D stations, and 75.9°F to 86.6°F at E stations. Temperatures were generally lower at the F station (74.8°F to 83.8°F), located upgradient of the VYNPS intake structure, during the same sampling period.

The August diurnal variation in temperature due to fluctuations in river flow and the effects of solar heating was most pronounced at the surface (upper 1 ft) in Vernon Pool, with the highest variation (3.6°F) occurring near the VYNPS discharge structure (Station C1/C2); diurnal variation was less pronounced at the upstream location (Transect F), with a variation of about 1.5°F at the surface.

There was little spatial variation in temperature across the bank-to-bank transects in Vernon Pool during the August sampling period. Although temperatures were slightly higher near the VYNPS discharge structure, thermistor temperatures were within about 1.8°F of each other across a single transect at any given time. The average temperature difference between the upstream River Monitoring Station 7 and the downstream River Monitoring Station 3 during the August sampling period was 2.9°F (ASA 2004).

No fish mortalities or delays in fish migration have been observed due to the VYNPS thermal discharge. VYNPS operations have not been observed to have caused fish mortality or been a barrier to fish migration due to thermal releases or delays in the movement of migratory fish species due to the thermal plume (Aquatec 1990; Normandeau 2004b).

6.0 POTENTIAL EFFECTS OF THE PROPOSED ACTION ON DESIGNATED ESSENTIAL FISH HABITAT

6.1 EVALUATION OF SPECIES REQUIRING EFH CONSULTATION

During the development of this EFH assessment, NMFS websites (NMFS 2006a,b) were consulted to develop an initial list of candidate fish species that would be considered for EFH consultation. On May 5, 2006, the NRC contacted the NMFS and requested information on EFH under the MSFCMA (NRC 2006d). In NMFS's response on September 15, 2006, NMFS stated that the Connecticut River and tributaries are designated EFH for Atlantic salmon and that the potential impacts from VYNPS operation on Atlantic salmon and their habitat should be fully evaluated in the SEIS (NMFS 2006c). This EFH Assessment is in support of the NRC's initiation of an EFH consultation with NMFS regarding the potential license renewal of VYNPS.

6.2 ATLANTIC SALMON

6.2.1 Life History of Atlantic Salmon

Atlantic salmon are anadromous and have a complex life history that includes spawning in freshwater rivers and feeding migrations in the Atlantic Ocean. Most Atlantic salmon of United States origin spend two years (ranging from one to three or more years) in the ocean before returning to their natal rivers to spawn. Spawning of Atlantic salmon in New England typically occurs in late October and November. Eggs are deposited by the females in nests constructed out of river rocks; the nests are referred to as redds. A typical female lays about 7000 eggs, which are then fertilized by the males. Although some adults survive to spawn in subsequent years, most die following spawning. Those that do return to sea, do so either immediately after spawning or during the following spring (FWS 2002). Few Atlantic salmon live to be more than eight or nine years old (Bigelow and Schroeder 2002). The eggs overwinter in the gravel and hatch the following spring, usually in March and April. Newly hatched sac fry (alevins, the beginning of larval stage) remain in the gravel and use the energy reserves in their yolk sacs to continue development. Once the yolk sacs become depleted the fry emerge from the gravel and begin feeding on plankton and small invertebrates. Fry emergence generally occurs from March through June (FWS 2002). They inhabit shallow riffles with moderate currents (McCormick et al. 1998)

About early December, the fry disperse into riffles with faster currents and coarse substrates (McCormick et al. 1998). The fry develop markings along their sides; at this point, the young Atlantic salmon are called parr (beginning of juvenile stage). Parr inhabit cool, swift-flowing streams with riffles and gravel-cobble substrates. As they mature, they will also inhabit slower-moving waters with pools and vegetation (Kart et al. 2004; NHFGD 2005). They may also move into small tributaries during their first summer as parr and remain there until they leave as smolts (McCormick et al. 1998). Parr are opportunistic feeders, feeding mostly on aquatic

insects; they in turn fall prey to fish and bird species (FWS 2002). The parr stage lasts for one to three years. During this period, they reach a length of about 4 in. (10 cm). After reaching this size, most parr undergo a developmental change during the spring (smoltification) to become smolts; however, some parr will become sexually mature before smoltification and are capable of fertilizing the eggs of returning females (Henry and Cragg-Hine 2003). Some of these mature parr can undergo smoltification in the following spring (McCormick et al. 1998). As smolts, the juvenile Atlantic salmon begin migrating toward the ocean. During their migration, they begin schooling and develop a tolerance to salt water necessary before they enter the ocean.

Once in the ocean, they eventually migrate toward their major feeding grounds in the North Atlantic near Greenland and Iceland. While in the ocean, Atlantic salmon prey upon various fish species and large zooplankton and are preyed upon by seals, sharks, tuna, striped bass (*Morone saxatilis*), bluefish (*Pomatomus saltatrix*), and other predators (FWS 2002). After spending one to three or more years at sea, adult salmon migrate back to their natal streams to spawn. In New England, the migration generally occurs from May through October with May through July being the primary time period. Spawning normally occurs from late October through November in New England (FWS 2002). Once they enter freshwater, adult Atlantic salmon cease feeding and will not feed again until they re-enter the ocean some six months to a year later (FWS 2002). Adults that do not die after spawning will overwinter in the river before migrating back to sea.

6.2.2 EFH for Atlantic Salmon

EFH for Atlantic salmon is described as all waters currently or historically accessible to Atlantic salmon within Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut (NMFS 1998). The Connecticut River and its tributaries are considered EFH for all life stages of the Atlantic salmon (eggs, larvae, juveniles, adults [those that are in-migrating to spawning sites, overwintering, or out-migrating to the sea], and spawning adults). The following EFH requirements are applicable for the specific life stages of the Atlantic salmon (NMFS 1998):

- *Eggs.* Substrates within a gravel or cobble riffle above or below a pool in rivers and streams. Generally, the water temperature in the excavations that Atlantic salmon construct for egg-laying (i.e., redds) is below 50°F and consists of clean, well-oxygenated freshwater. Atlantic salmon eggs are most frequently present in redds between October and April.

- *Larvae.* Substrates within a gravel or cobble riffle above or below a pool in rivers and streams. Generally, Atlantic salmon larvae (i.e., alevins and fry) occur in locations with clean, well-oxygenated freshwater and water temperatures below 50°F. Atlantic salmon alevins and fry occur most frequently observed between March and June.

- *Juveniles.* Shallow gravel or cobble riffles interspersed with deeper riffles and pools of rivers and estuaries. Generally, Atlantic salmon juveniles (e.g., parr) are found in areas with clean, well-oxygenated freshwater; water temperatures below 77°F, water depths of 4 to 24 in.; and water flows of 12 to 36 in./s. As they grow, parr transform into smolts. Atlantic salmon smolts require downstream access to make their way to the ocean. Upon entering the sea, "post-smolts" become pelagic and range from Long Island Sound north to the Labrador Sea.

- *Adults.* For adult Atlantic salmon returning to spawn, EFH includes habitats with resting and holding pools in rivers and estuaries. Returning Atlantic salmon require access to their natal streams and access to the spawning grounds. Generally, conditions where returning Atlantic salmon adults are found migrating to the spawning grounds include water temperatures below 73°F and dissolved oxygen levels above 5 parts per million (ppm). Oceanic adult Atlantic salmon are primarily pelagic and range from the waters of the continental shelf off southern New England north throughout the Gulf of Maine.

- *Spawning adults.* EFH for spawning adults includes gravel or cobble substrates of riffles above or below a pool of specific rivers and streams that currently support or historically supported Atlantic salmon spawning. Generally, conditions where spawning Atlantic salmon are found include water temperatures below 50°F; water depths of 12 to 24 in.; water flows around 24 in./s; and clean, well-oxygenated freshwater. Spawning Atlantic salmon adults are most frequently observed during October and November.

EFH regulations also direct the fishery management councils to consider a second, more limited habitat designation for each species in addition to EFH. Habitat areas of particular concern (HAPCs) are described in the regulations as subsets of EFH that are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. Designated HAPCs are not afforded any additional regulatory protection under the MSFCMA. However, Federal projects with potential adverse impacts on HAPCs are more carefully scrutinized. In addition to identifying general EFH for Atlantic salmon, the New England Fishery Management Council also identified HAPC for adult Atlantic salmon in 11 coastal watersheds in Maine that support unique and important populations of Atlantic salmon. Thus, those HAPCs would not be affected by VYNPS operations.

6.2.3 Atlantic Salmon in the Connecticut River

Prior to damming of the Connecticut River watershed, Atlantic salmon spawning runs occurred as far upstream as Beecher Falls (near the Vermont-Canadian border, about RM 370) (NHFGD 2005). Spawning runs mostly occurred in the spring, but a small number of Atlantic salmon also migrate upriver in the early fall. Those that return in the spring spend the summer in deep, cold pools of their natural streams before spawning in fall (Connecticut River Atlantic Salmon Commission 1998). The optimal temperature range for migratory adults is 57.2 to 68°F

(Krisweb.com undated). Since the installation of fishways on the Connecticut River, Atlantic salmon have reached as far upstream as the Ammonoosuc River, downstream of the Ryegate Dam (RM 273) (FWS undated). Historically, little of the mainstem of the Connecticut River downstream of the present-day site of the Ryegate Dam supported Atlantic salmon rearing habitat (Gephard and McMenemy 2004). Spawning habitat primarily occurs in the Connecticut River tributaries (Gephard and McMenemy 2004). Artificial barriers (e.g., dams and faulty culverts) and natural barriers (e.g., waterfalls > 10 ft high) pose problems for adults migrating to their spawning areas (Kart et al. 2004). Most returning Atlantic salmon are captured for broodstock, although about 10 percent are released upstream of Holyoke Dam to spawn naturally (Connecticut River Atlantic Salmon Commission 1998). In 2004, nearly 7.8 million fry, parr, and smolts were stocked in the Connecticut River watershed (U.S. Atlantic Salmon Assessment Committee 2005).

In 2004, it was estimated that 183,000 smolts were produced above Holyoke Dam (RM 87) (U.S. Atlantic Salmon Assessment Committee 2005). Smolt passage efficiency at Bellows Falls, Vernon, Turners Falls, and Holyoke Dams has been estimated at 80 percent at each dam (Boubee and Haro 2003).

Optimal spawning temperature is 41 to 46.4°F (Krisweb.com undated). Spawning habitat consists of coarse, clean gravel stretches that are at least 3 to 10 ft long and 3 ft wide with water depths 1 to 2 ft. Self-sustaining populations of Atlantic salmon do not currently occur within the Connecticut River watershed are therefore, dependent on a multi-state stocking effort (Kart et al. 2004). Juvenile Atlantic salmon have been stocked in streams as far north as the Nulhegan River, Vermont, about 350 mi upstream on the Connecticut River (FWS undated).

Annual spawning runs in the Connecticut River have numbered in the hundreds but more recently have declined to less than one hundred. For example, in 2004 there were only 69 documented Atlantic salmon returns to the river, and only 1635 to all rivers in the United States (U.S. Atlantic Salmon Assessment Committee 2005). Spawning run declines have been occurring throughout the range during the last 30 years (Gephard and McMenemy 2004). There is a no-take policy for Atlantic salmon in the Connecticut River (NHFGD 2005). The Connecticut River Atlantic Salmon Commission establishes annual schedules for the passage of migratory fish species for a number of dams on the Connecticut River (FWS 2006). The 2006 schedule for upstream passage operations at Vernon Dam was May 15 through July 15 and September 15 through November 15 for Atlantic salmon; the 2006 schedule for downstream Atlantic salmon passage was April 1 through June 15 for smolts and October 15 through December 31 for adults (FWS 2006). The number of Atlantic salmon that have annually passed upstream of Vernon Dam from 1981 to 2006 has ranged from 0 to 13. Four passed the dam in 2006 (FWS 2006).

A variety of factors, including stream hydrology, water temperatures, pH, dissolved oxygen, streambed characteristics, availability of food, competition, predation, pollution, and recreational and commercial fishing, interact to affect the survival of the various life stages of Atlantic salmon

in rivers and streams (Maine Atlantic Salmon Task Force 1997). In addition to turbine mortality and other passage issues at dams, dams and their impoundments can delay migration of Atlantic salmon smolts and increase water temperature, which can lead to a loss of smolt characteristics. This can have a negative impact on the capacity of smolts to survive in seawater and return as adults (McCormick et al. 1999). Extended residency in impoundments can also increase predatory pressure to smolts. Low pH due to acid deposition appears to be detrimental to outmigrating smolts. Water temperature fluctuations in the Atlantic Ocean over the past ten years may be contributing to reduced adult salmon returns throughout much of their range (Kart et al. 2004). Atlantic salmon recovery is also hindered by degraded water quality parameters, siltation in tributary streams, and predation of early life history stages by a variety of species including the striped bass.

The results of studies conducted at VYNPS suggest that no eggs and larvae or any life stage of Atlantic salmon are entrained. There are no records of adults being impinged. Each year low numbers of smolts are impinged at VYNPS. These losses are inconsequential when compared to the total number of smolts in the river. The number of smolts impinged has been a small portion of the applicant's NPDES permit limit for Atlantic salmon (Aquatec 1978, 1990; Entergy 2006a; Entergy and Normandeau 2004; Normandeau 1999, 2004a, 2005; VYNPS and Normandeau 2002).

The only life stages of the Atlantic salmon exposed to the VYNPS thermal plume are smolts (during spring) and migrating adults (during spring and fall). The schedule for upstream fish passage operations at Vernon Dam is from mid May to mid July and from mid September to mid November for adult salmon. The downstream fish passage operations are from about April 1 through mid June for smolts and mid October to the end of December for adults (FWS 2006).

Few adults pass by VYNPS as adult spawning runs in the Connecticut River are small and 90 percent of the adults that reach Holyoke Dam are captured for broodstock. Adult Atlantic salmon passage at Vernon Dam occurs during mid June (VFWD 2006).

The optimum temperature range for adult Atlantic salmon migration is 57.2 to 68°F with the highest temperature for normal upstream migration being about 80.6°F, depending upon acclimation and duration of exposure (Fay et al. 2006). The optimum temperature range for smolt migration is 44.6 to 57.7°F with the highest temperature being about 66.2°F (Fay et al. 2006).

In 2004, river temperatures of VYNPS averaged about 42.9°F in April, 57.3°F in May, and 65.7°F in June, while at the downstream monitoring Station 3 they averaged about 43.3°F in April, 59.5°F in May, and 67.5°F in June. Average daily temperatures at the Vernon Dam fishway from mid May through the end of June ranged from 55.5°F(May 27) to 70.6°F (June 15) (Normandeau 2005). Thus, river temperatures near the VYNPS are within the tolerance limits of migrating adult Atlantic salmon and, most often, for migrating smolts. June appears to be the only month during which water temperatures exceed tolerance limits for outmigrating smolts;

therefore smolt migration could potentially be affected during June. No blockages of adult Atlantic salmon past Vernon Dam due to VYNPS operations were observed during Project SAVE (Save Available Vermont Energy) (Aquatec 1990). Seventy-five percent of the adult Atlantic salmon that passed Turners Falls Dam passed the Vernon Dam fishway, while radiotelemetry studies of smolts revealed that downstream movement into and through the VYNPS thermal plume occurred without any observed delays (Aquatec 1990). Most Atlantic salmon smolt migrate past VYNPS before the upper limit for survival of 82°F is exceeded (Normandeau 2004a). Atlantic salmon smolts migrating past VYNPS would not be subjected to elevated temperatures for more than 12 hr, and could avoid the warmest waters by swimming around or under the plume (Normandeau 2004a). Therefore, there may be a slight habitat squeeze in the migration corridor in the vicinity of VYNPS, but studies indicate that most smolts successfully complete their downstream migration.

Although prey items for Atlantic salmon are entrained or impinged in the VYNPS cooling system, there is no indication that prey populations have been measurably affected and that prey populations near VYNPS are not limited by station operation. The NRC staff concludes VYNPS operations would likely have a minimal adverse effect on Atlantic salmon EFH (See Table 7 for a summary of potential adverse effects).

7.0 MITIGATION MEASURES

Four categories of impacts related to VYNPS operations that could influence EFH for the Atlantic salmon are: (1) entrainment of Atlantic salmon early life stages; (2) impingement of juvenile or adult Atlantic salmon; (3) discharge of heated cooling water; and (4) mortality of Atlantic salmon prey species due to impingement, entrainment, or thermal effects. The applicant's NPDES permit contains operational and temperature limits to protect water quality and minimize impacts to aquatic biota. The State of Vermont has established limits on the increase in water temperature above ambient in the Connecticut River due to station operations. These limits were established, in part, to minimize impacts to Atlantic salmon during the spawning migration and outmigration of smolts. Additionally, the VYNPS intake is located in an area devoid of unique spawning habitat for Atlantic salmon so entrainment of eggs and larvae are not a concern. Should impingement of smolts prove to be a problem in the future, particularly if the Connecticut River salmon population increases substantially, the licensee could install a fish return system or operate the station in the closed-cycle cooling mode during the period of time the smolts are outmigrating.

Table 7. Impacts of VYNPS Operations on EFH of the Atlantic Salmon

Life Stage	EFH Description	Expected Effect of VYNPS Operations on EFH
Eggs	Bottom habitats with gravel or cobble riffles above or below a pool in rivers; clean, well-oxygenated water with water temperatures <50°F and water depths of 30 to 61 cm (1 to 2 ft); occur most frequently between October and April.	**No Adverse Effect.** No spawning habitat near plant. Additionally, eggs incubate in gravel and are, therefore, not subject to entrainment. Spawning areas not affected by thermal discharges.
Larvae	Bottom habitats with gravel or cobble riffles above or below a pool in rivers; clean, well-oxygenated water with water temperatures <50°F; occur most frequently between March and June for alevins/fry.	**No Adverse Effect.** No spawning habitat near the plant so no thermal effects. Additionally, alevins remain buried in gravel and once fry emerge from the redd they tend to remain in their natal stream. Therefore, larvae are not subject to entrainment.
Juveniles	Shallow gravel/cobble habitats interspersed with deeper riffles and pools in rivers and estuaries; clean, well-oxygenated water with water temperatures 77°F; prefers water depths of 10 to 61 cm (0.3 to 2 ft) and water velocities of 30 to 92 cm/s (1 to 3 ft/s).	**Minimal Adverse Effect.** Parr habitat no present in immediate area of VYNPS therefore no thermal effects. Smolts not commonly impinged; impingement numbers well below yearly NPDES permit limits. Prey items are entrained or impinged at VYNPS, but prey population size not affected. Smolts move into and through the VYNPS thermal plume without observed delays.
Adults	Areas with resting and holding pools in rivers and estuaries for adults returning to spawn; water temperatures <73°F and with dissolved oxygen levels >5 ppm; oceanic adults are mainly pelagic and range from the continental shelf off southern New England north throughout the Gulf of Maine.	**Minimal Adverse Effect.** Very few returning Atlantic salmon allowed to continue upstream spawning migrations past Holyoke Dam. Generally, those that pass Turners Falls Dam also pass Vernon Dam, and most of those subsequently pass Bellows Falls Dam. Few post-spawning adults expected to pass the VYNPS area. Generally, impingement of adults would be unlikely. Adults do not feed while in freshwater; thus, other fish species impinged at VYNPS do not comprise a loss of prey items for adult Atlantic salmon. Thermal effects on adults not observed and unlikely.
Spawning Adults	Bottom habitats with gravel or cobble riffles above or below a pool in rivers; clean, well-oxygenated water with temperatures <50°F, depths of 30 to 61 cm (1 to 2 ft), and velocities about 61 cm/s (2 ft/s); spawning most frequently occurs in October and November.	**No Adverse Effect.** No spawning habitat near the plant so no adverse effect due to thermal discharges or impingement.

Sources: Maine Atlantic Salmon Task Force 1997; NMFS 1998, 2006a; Scott and Crossman 1973

8.0 CONCLUSION

For each life stage, VYNPS operations were evaluated to determine whether they resulted in (1) no adverse impact, (2) minimal adverse impacts, or (3) substantial adverse impact on Atlantic salmon EFH. These impact categories follow the standards used by the Northeast Regional Office of the NMFS. The expected impacts of VYNPS operations on EFH for the Atlantic salmon are summarized in Table 7. Because VYNPS operates for a portion of the year in a once-through mode, it has the potential to have an adverse impact on EFH for the Atlantic salmon due to withdrawal from the Connecticut River. However, the low level of interactions between the Atlantic salmon and the facility, as well as current mitigation measures in place at VYNPS, reduce the potential adverse effect on the various life stages of the Atlantic salmon and their respective EFHs. The 316(a) and (b) Demonstration that has been conducted at VYNPS, coupled with results of annual impingement, entrainment, and riverine sampling of fish required by NPDES permit stipulations, have demonstrated that VYNPS operations do not have an adverse effect on the aquatic biota in the Connecticut River, including the movement of migrating Atlantic salmon smolts and adults (Aquatec 1978, 1990; Entergy 2006a; Entergy and Normandeau 2004; Normandeau 1999, 2004a, 2005; VYNPS and Normandeau 2002). The affected area from VYNPS operations would not affect any habitats in or near bays, estuaries, or offshore areas. Accordingly, there would be no adverse effects on EFH or Federally managed species in such areas. The NRC staff concludes that license renewal of VYNPS for an additional 20 years of operation would result in a minimal adverse effect on EFH of the Atlantic salmon.

9.0 REFERENCES

10 CFR Part 51. *Code of Federal Regulations*, Title 10, *Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

Applied Science Associates, Inc. (ASA). 2004. *Hydrothermal Modeling of the Cooling water Discharge from the Vermont Yankee Power Plant to the Connecticut River*. ASA Report 02-088. (April 2004).

Aquatec Inc. (Aquatec). 1978. *Executive Summary 316 Demonstration Vermont Yankee Nuclear Power Station - Biological, Hydrological & Engineering Information*. Aquatec Inc., South Burlington, Vermont. (March 1978).

Aquatec Inc. (Aquatec). 1990. *316 Demonstration Vermont Yankee Nuclear Power Station Connecticut River, Vernon, Vermont - Biological, Hydrological & Engineering Information*. Aquatec Inc., South Burlington, Vermont. (June 1990).

Bigelow, H.B., and W.C. Schroeder. 2002. *Fishes of the Gulf of Maine*. Fishery Bulletin 74, Revision 1.1. Fishery Bulletin of the Fish and Wildlife Service. Available URL: http://www.gma.org/fogm/Default.htm (Accessed September 22, 2006).

Boubee, J., and A. Haro. 2003. "Downstream Migration and Passage Technologies for Diadromous Fishes in the United States and New Zealand: Tales from Two Hemispheres." Downstream Movement of Fish in the Murray-Darling Basin - Canberra Workshop. June. Available URL: http://www.mdbc.gov.au/data/pages/509/Jacques_Boubee_&_Alex_Haro.pdf (Accessed July 26, 2006).

Connecticut River Atlantic Salmon Commission. 1998. "Strategic Plan for the Restoration of Atlantic Salmon to the Connecticut River." Connecticut River Atlantic Salmon Commission, Sunderland, Massachusetts. July 1998. Available URL: http://www.fws.gov/r5crc/documents.strplan.pdf (Accessed April 6, 2006).

Dewald, L. 2005a. Letter from L. DeWald, Entergy, to Theresa Tanner, VDEC. Subject: "Monthly NPDES Discharge Monitoring Report for February 2005." (March 7, 2005).

Dewald, L. 2005b. Letter from L. DeWald, Entergy, to Theresa Tanner, VDEC. Subject: "Monthly NPDES Discharge Monitoring Report for July 2005." (August 12, 2005).

Dewald, L. 2006a. Letter from L. DeWald, Entergy, to Theresa Tanner, VDEC. Subject: "Monthly NPDES Discharge Monitoring Report for March 2006." (April 11, 2006).

Dewald, L. 2006b. Letter from L. DeWald, Entergy, to Theresa Tanner, VDEC. Subject: "Monthly NPDES Discharge Monitoring Report for August 2006." (September 11, 2006).

Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Entergy). 2004. *Vermont Yankee Nuclear Power Station, Updated Final Safety Analysis Report, Revision 19.* Docket No. 50-271. Brattleboro, Vermont. (November 1, 2004).

Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Entergy). 2006a. *License Renewal Application, Vermont Yankee Nuclear Power Station, Operating License No. DPR-28.* Docket No. 50-271. Brattleboro, Vermont. (January 25, 2006).

Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.(Entergy). 2006b. *Applicant's Environmental Report - Operating License Renewal Stage, Vermont Yankee Nuclear Power Station*. Docket No. 50-271. Brattleboro, Vermont. (January 25, 2006).

Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Entergy). 2006c. *Vermont Yankee Nuclear Power Station License No. DPR-28 (Docket No. 50-271) License Renewal Application, Amendment 6*. Brattleboro, Vermont. (July 2006).

Entergy Nuclear Vermont Yankee, LLC, and Normandeau Associates, Inc. (Entergy and Normandeau). 2004. *Ecological Studies of the Connecticut River, Vernon, Vermont*. Report 33. Prepared for Entergy Nuclear Vermont Yankee, LLC, Vernon, Vermont by Entergy Nuclear Vermont Yankee, LLC and Normandeau Associates, Inc., Bedford, New Hampshire. (May 2004).

Fay, C. et al. 2006. *Status Review of Anadromous Atlantic Salmon (Salmo salar) in the United States, Report to the National Marine Fisheries Service and U.S. Fish and Wildlife Service*. Available at http://www.nmfs.noaa.gov/pr/species/statusreview.htmr. (Accessed November 13, 2006).

Gephard. S. and J. McMenemy. 2004. "An Overview of the Program to Restore Atlantic Salmon and Other Diadromous Fishes to the Connecticut River with Notes on the Current Status of These Species in the River." Pages 287-317 in Jacobson, P.M., D.A. Dixon, W.C. Leggett, B.C. Marcy, Jr., and R.R. Massengill (eds.). *The Connecticut River Ecological Study (1965-1973) Revisited: Ecology of the Lower Connecticut River 1973-2003*. American Fisheries Society, Monograph 9. Bethesda, Maryland.

Henry, K. and D. Cragg-Hine. 2003. "Ecology of the Atlantic Salmon." Conserving Natura 2000 Rivers Ecology Series No. 7. English Nature, Peterborough. Available URL: http://www.english-nature.org.uk/LIFEinUKRivers/publications/Salmon.pdf (Accessed August 23, 2006).

Kart, J., R. Regan, S.R. Darling, C. Alexander, K. Cox, M. Ferguson, S. Parren, K. Royar, and B. Popp (eds.). 2004. "Vermont's Wildlife Action Plan." Vermont Fish & Wildlife Department, Waterbury, Vermont. Available URL: http://www.vtfishandwildlife.com/swg_cwcs_report.cfm (Accessed August 22, 2006).

Krisweb.com. Undated. "Water Temperature and Gulf of Maine Atlantic Salmon." Klamath Resource Information System. Available URL: http;//www.krisweb.com/krissheepscot/krisdb/html/krisweb/stream/temperature_sheepscot.htm (Accessed July 31, 2006).

Maine Atlantic Salmon Task Force. 1997. "Atlantic Salmon Conservation Plan for Seven Maine Rivers." Maine Atlantic Salmon Task Force, Augusta, Maine. Available URL: http://mainegov-images.informe.org/asc/archive/Atlantic%20Salmon%20Conservation%20Plan1.pdf (Accessed June 2, 2005).

McCormick, S.D., L.P. Hansen, T.P. Quinn, and R.L. Saunders. 1998. "Movement, Migration, and Smolting of Atlantic Salmon (*Salmo salar*)." *Canadian Journal of Fisheries and Aquatic Sciences,* Vol. 55 (Suppl. 1): 77-92.

McCormick, S.D., R.A. Cunjak, B. Dempson, M.F. O'Dea, and J.B. Carey. 1999. "Temperature-Related Loss of Smolt Characteristics in Atlantic Salmon (*Salmo salar*) in the Wild." *Canadian Journal of Fisheries and Aquatic Sciences,* Vol. 56, pp. 1649-1658.

National Marine Fisheries Service (NMFS). 1998. "Essential Fish Habitat Description Atlantic Salmon (Salmo salar)." Available URL: http://www.nero.noaa.gov/hcd/salmon.pdf (Accessed September 19, 2006).

National Marine Fisheries Service (NMFS). 2006a. "Summary of Essential Fish Habitat (EFH) and General Habitat Parameters for Federally Managed Species." Available URL: http://www.nero.noaa.gov/hcd/efhtables.pdf (Accessed September 21, 2006).

National Marine Fisheries Service (NMFS). 2006b. "Guide to EFH Consultations." Available URL: http://www.nero.noaa.gov/hcd/appguide1.html (Accessed September 21, 2006).

National Marine Fisheries Service (NMFS). 2006c. Letter from L.A. Chiarella, National Marine Fisheries Service, Gloucester, Massachusetts, to R. Franovich, U.S. Nuclear Regulatory Commission, Washington, D.C. (September 15, 2006).

New Hampshire Fish and Game Department (NHFGD). 2005. "New Hampshire Wildlife Action Plan," New Hampshire Fish and Game Department, Concord, New Hampshire. Available URL: http://www.wildlife.state.nh.us/Wildlife/wildlife_plan.htm (Accessed August 22, 2006).

Normandeau Associates, Inc. (Normandeau). 1999. *Summary Report on the 1986-1997 Ecological Studies of the Connecticut River, Vernon, Vermont*. Prepared for Vermont Yankee Nuclear Power Corporation, Vernon, Vermont by Normandeau Associates, Inc., Drumore, Pennsylvania. (April 22, 1999).

Normandeau Associates, Inc. (Normandeau). 2001. "Ecological Studies of the Connecticut River, Vernon, Vermont." Report 30 (January-December 2000). (April 2001).

Normandeau Associates, Inc. (Normandeau). 2002. "Ecological Studies of the Connecticut River, Vernon, Vermont." Report 31 (January-December 2001). (April 2002).

Normandeau Associates, Inc. (Normandeau). 2003. "Ecological Studies of the Connecticut River, Vernon, Vermont." Report 32 (January-December 2002). (May 2003).

Normandeau Associates, Inc. (Normandeau). 2004a. *§316(a) Demonstration in Support of a Request for Increased Discharge Temperature Limits at Vermont Yankee Nuclear Power Station during May through October*. Prepared for Entergy Nuclear Vermont Yankee, Vernon, Vermont, by Normandeau Associates, Inc., Bedford, New Hampshire. (April 2004).

Normandeau Associates, Inc. (Normandeau). 2004b. "Ecological Studies of the Connecticut River, Vernon, Vermont." Report 33 (January-December 2003). (May 2004).

Normandeau Associates, Inc. (Normandeau). 2005. "Ecological Studies of the Connecticut River, Vernon, Vermont." Report 34 (January-December 2004). (May 2005).

Scott, W.B. and E.J. Crossman. 1973. "Freshwater Fishes of Canada." Bulletin 184. Fisheries Research Board of Canada. Ottawa, Canada.

U.S. Atlantic Salmon Assessment Committee. 2005. "Annual report of the U.S. Atlantic Salmon Assessment Committee." Report No. 17 - 2004 Activities. Annual Report 2005/17. U.S. Atlantic Salmon Assessment Committee, Woods Hole, Massachusetts. Available URL: http://www.nefsc.noaa.gov/USASAC/2005%20USASAC%20Report/USASAC%2017%20report%20final.pdf (Accessed April 12, 2006).

U.S. Atomic Energy Commission (AEC). 1972. *Final Environmental Statement Related to the Operation of the Vermont Yankee Nuclear Power Station, Vermont Yankee Nuclear Power Corporation*. Docket No. 50-271. Directorate of Licensing. Washington, D.C. (July 1972).

U.S. Fish and Wildlife Service (FWS). 2002. "The Natural History of Atlantic Salmon (*Salmo salar*)." U.S. Fish and Wildlife Service, Central New England Fishery Resources Office, Nashua, New Hampshire. Available URL: http://www.fws.gov/r5cneafp/salmon.htm (Accessed April 7, 2006).

U.S. Fish and Wildlife Service (FWS). 2006. "Fish Passage Schedule." U.S. Fish and Wildlife Service, Connecticut River Coordinator's Office, Sunderland, Massachusetts. Available URL: http://www.fws.gov/r5crc/Habitat/fish_passage_schedule.htm (Accessed April 6, 2006).

U.S. Fish and Wildlife Service (FWS). Undated. "Fish Facts." U.S. Fish and Wildlife Service, Connecticut River Coordinator's Office, Sunderland, Massachusetts. Available URL: http://www.fws.gov/r5crc/Fish/facts.html (Accessed April 6, 2006).

U.S. Nuclear Regulatory Commission (NRC). 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*. NUREG-1437, Vols. 1 and 2, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1999. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants Main Report*, "Section 6.3 - Transportation, Table 9.1. Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants, Final Report." NUREG-1437, Vol. 1, Addendum. Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 2006a. *Vermont Yankee Nuclear Power Station - License Renewal Application*. Available URL: http://www.nrc.gov/reactors/operating/licensing/renewal/applications/vermont-yankee.html (Accessed September 22, 2006).

U.S. Nuclear Regulatory Commission (NRC). 2006b. "Entergy Nuclear Operations, Inc., Vermont Yankee Nuclear Power Station; Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process." *Federal Register*, Vol. 71, No. 77, pp. 20733-20735. Washington, D.C. (April 21, 2006).

U.S. Nuclear Regulatory Commission (NRC). 2006c. *Vermont Yankee Nuclear Power Station - Final Environmental Assessment and Finding of No Significant Impact Related to the Proposed License Amendment to Increase the Maximum Power Level*. Docket No. 50-271. Washington, D.C. (January 20, 2006).

U.S. Nuclear Regulatory Commission (NRC). 2006d. Letter from R. Franovich, U.S. Nuclear Regulatory Commission, Washington, D.C., to P. Kurkul, National Marine Fisheries Service, Gloucester, Massachusetts. (May 5, 2006).

Vermont Agency of Natural Resources (VANR). 2006. *Final Amended Discharge Permit #3-1199*. Vermont Agency of Natural Resources, Department of Environmental Conservation, Wastewater Management Division, Waterbury, Vermont. (March 2006).

Vermont Department of Environmental Conservation (VDEC). 2003. *National Pollutant Discharge Elimination System Permit Number VT0000264* (VDEC Permit No. 3-1199). Wastewater Management Division. (June 9, 2003).

Vermont Department of Environmental Conservation (VDEC). 2005. *Renewal of Permit No. 3-1199*. Permit renewal with letter from C. Fowler, VDEC, to L. DeWald, Entergy. (September 30, 2005).

Vermont Department of Environmental Conservation (VDEC). 2006a. *Final Amended Discharge Permit No. 3-1199.* Amended permit with letter from B.D. Kooiker, VDEC, to L. DeWald, Entergy. (March 30, 2006).

Vermont Yankee Nuclear Power Station and Normandeau Associates, Inc. (VYNPS and Normandeau). 2002. *Ecological Studies of the Connecticut River, Vernon, Vermont*. Report 31, January-December 2001. Prepared for Vermont Yankee Nuclear Power Corporation, Brattleboro, Vermont, by Vermont Yankee Nuclear Power Station, Brattleboro, Vermont, and Normandeau Associates, Inc., Bedford, New Hampshire. (April 2002).