January 20, 2006

Mr. Michael Kansler
President
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION - FINAL ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT RELATED TO PROPOSED EXTENDED POWER UPRATE (TAC NO. MC0761)

Dear Mr. Kansler:

Enclosed is a copy of the Final Environmental Assessment and Finding of No Significant Impact related to your application for an amendment dated September 10, 2003, as supplemented on October 1, and October 28 (2 letters), 2003; January 31 (2 letters), March 4, May 19, July 2, July 27, July 30, August 12, August 25, September 14, September 15, September 23, September 30 (2 letters), October 5, October 7 (2 letters), December 8, and December 9, 2004; February 24, March 10, March 24, March 31, April 5, April 22, June 2, August 1, August 4, September 10, September 14, September 18, September 28, October 17, October 21 (2 letters), October 26, October 29, November 2, November 22, and December 2, 2005; and January 10, 2006, for Vermont Yankee Nuclear Power Station (VYNPS).

The proposed amendment would change the VYNPS operating license to increase the maximum authorized power level from 1593 megawatts thermal (MWt) to 1912 MWt. This change represents an increase of approximately 20 percent above the current maximum authorized power level. The proposed amendment would also change the VYNPS technical specifications to provide for implementing uprated power operation.

The assessment is being forwarded to the Office of *Federal Register* for publication.

Sincerely,

***/RA/***

Richard B. Ennis, Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosure: As stated

cc w/encl: See next page

Mr. Michael Kansler
President
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION - FINAL ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT RELATED TO PROPOSED EXTENDED POWER UPRATE (TAC NO. MC0761)

Dear Mr. Kansler:

Enclosed is a copy of the Final Environmental Assessment and Finding of No Significant Impact related to your application for an amendment dated September 10, 2003, as supplemented on October 1, and October 28 (2 letters), 2003; January 31 (2 letters), March 4, May 19, July 2, July 27, July 30, August 12, August 25, September 14, September 15, September 23, September 30 (2 letters), October 5, October 7 (2 letters), December 8, and December 9, 2004; February 24, March 10, March 24, March 31, April 5, April 22, June 2, August 1, August 4, September 10, September 14, September 18, September 28, October 17, October 21 (2 letters), October 26, October 29, November 2, November 22, and December 2, 2005; and January 10, 2006, for Vermont Yankee Nuclear Power Station (VYNPS).

The proposed amendment would change the VYNPS operating license to increase the maximum authorized power level from 1593 megawatts thermal (MWt) to 1912 MWt. This change represents an increase of approximately 20 percent above the current maximum authorized power level. The proposed amendment would also change the VYNPS technical specifications to provide for implementing uprated power operation.

The assessment is being forwarded to the Office of *Federal Register* for publication.

Sincerely,
***/RA/***
Richard B. Ennis, Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-271
Enclosure: As stated
cc w/encl: See next page

DISTRIBUTION

| | | | |
|---|---|---|---|
| PUBLIC | CRaynor | OGC | CAnderson, RGN-I |
| LPL1-2 Reading | REnnis | ACRS | VBucci, OIG |
| CHolden | RFranovich | TAlexion | STurk, OGC |
| DRoberts | SImboden | QNguyen | |

ADAMS Accession Number: ML053530148

| OFFICE | LPL1-2/PM | LPL1-2/LA | REBB/BC | OGC | LPL1-2/BC |
|---|---|---|---|---|---|
| NAME | REnnis | CRaynor | RFranovich | STurk | DRoberts |
| DATE | 1/11/06 | 1/11/06 | 12/21/05 | 1/10/06 | 1/20/06 |

OFFICIAL RECORD COPY

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

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. 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

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

Vermont Yankee Nuclear Power Station

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. 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

7590-01-P

UNITED STATES NUCLEAR REGULATORY COMMISSION

ENTERGY NUCLEAR VERMONT YANKEE, LLC AND

ENTERGY NUCLEAR OPERATIONS, INC.

DOCKET NO. 50-271

VERMONT YANKEE NUCLEAR POWER STATION

FINAL ENVIRONMENTAL ASSESSMENT AND

FINDING OF NO SIGNIFICANT IMPACT

RELATED TO THE PROPOSED LICENSE AMENDMENT

TO INCREASE THE MAXIMUM REACTOR POWER LEVEL

AGENCY: U.S. Nuclear Regulatory Commission (NRC or the Commission)

SUMMARY: The NRC has prepared a final Environmental Assessment as its evaluation of a request by Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Entergy or the licensee) for a license amendment to increase the maximum thermal power at Vermont Yankee Nuclear Power Station (VYNPS) from 1593 megawatts-thermal (MWt) to 1912 MWt. This represents a power increase of approximately 20 percent for VYNPS. As stated in the NRC staff's position paper dated February 8, 1996, on the Boiling-Water Reactor Extended Power Uprate (EPU) Program, the NRC staff will prepare an environmental impact statement if it believes a power uprate will have a significant impact on the human environment. The NRC staff did not identify any significant impact from the information provided in the licensee's EPU application for VYNPS or the NRC staff's independent review; therefore, the NRC staff is documenting its environmental review in an environmental assessment. The final

environmental assessment and finding of no significant impact is being published in the *Federal Register*.

The NRC published a draft environmental assessment and finding of no significant impact on the proposed action for public comment in the *Federal Register* on November 9, 2005 (70 FR 68106). Two sets of comments were received as discussed below.

The licensee provided three comments in a letter dated December 8, 2005 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML053500122). The first comment clarified operation of the three modes of operation of the circulating water system. Based on this comment, the NRC revised the description of the system in the "Plant Site and Environs" and "Water Use Impacts" sections of the final environmental assessment. The second comment clarified that transmission lines are owned and operated by different transmission operators, rather than Entergy as was indicated in the draft environmental assessment. Based on this comment, the NRC revised the "Transmission Facility Impacts" section of the final environmental assessment. The third comment provided information regarding replacement of 21of the 22 cooling tower fan motors with higher horsepower motors. Since Entergy indicated that the conclusions in the draft environmental assessment regarding cooling tower operation (including noise) were correctly stated, no changes were made based on this comment.

Mr. David L. Deen of the Connecticut River Watershed Council (CRWC) provided three comments in an e-mail dated December 9, 2005 (ADAMS Accession No. ML053500124). The first comment raised concerns that the current National Pollutant Discharge Elimination System (NPDES) permit for VYNPS places no upper bound on the temperature of the river at which the licensee must stop adding waste heat through its cooling tower discharge and that a draft amendment to this permit fails to address this shortcoming. The CRWC proposed that Entergy should not raise the ambient water temperature beyond 85 EF at any point within the

Connecticut River. This comment exceeds the scope of the NRC's review of the proposed EPU amendment. The purpose of the NRC's environmental assessment is to evaluate the potential impact of the proposed action (i.e., the change due to the proposed EPU). As discussed in the NRC's draft environmental assessment, Entergy has requested that the State of Vermont issue an amendment to the current NPDES permit which would allow a one-degree increase in the thermal discharge limits, for certain river water temperature ranges. Entergy stated that the NPDES permit amendment is not necessary for the proposed EPU and the licensee will comply with the current NPDES permit thermal discharge limits if the permit amendment is not granted. The current NPDES permit represents the upper bound on the current impact on the river water temperatures in the vicinity of the discharge. The NRC's draft environmental assessment found that any discharge impacts for the proposed action will be the same as the current impacts from plant operation and, as such, the NRC concluded that there will be no significant impact on the Connecticut River from VYNPS discharge due to the EPU. The CRWC comment pertains to concerns regarding lack of an upper bound temperature limit in the NPDES permit. The "upper bound" referenced in the NRC's draft environmental assessment refers to an upper bound on the impact of the proposed EPU. Since the CRWC comment focuses on issues regarding the NPDES permit and does not provide any information regarding the impact of the proposed EPU, no changes were made to the final environmental assessment based on this comment.

The second comment from the CRWC stated that if the NPDES permit thermal discharge limits are increased, there would be harm to specific aquatic species (i.e., American shad, Atlantic salmon, spottail shiner, smallmouth bass, yellow perch, walleye, largemouth bass, fallfish, white sucker, and white perch). Similar to the first comment, since the CRWC comment focuses on issues regarding the proposed amendment to the NPDES permit and does not provide any information regarding the impact of the proposed EPU, no changes were made to the final environmental assessment based on this comment.

The third comment from the CRWC questioned the NRC's draft environmental assessment statement that there are no threatened and endangered aquatic species in the Connecticut River. The CRWC stated that the dwarf wedge mussel was listed as endangered under the Endangered Species Act in 1990, and that in 1993, the U.S. Fish and Wildlife Service approved a recovery plan to attempt to reestablish populations of the dwarf wedge mussel throughout its historical range including the Connecticut River. The CRWC stated that reestablishing the population in or near VYNPS would require the presence of one of its host species, the tessellated darter. The CRWC stated that although the nearest population of the wedge mussel is relatively far north of VYNPS, since the species is endangered and depends on the tessellated darter for its survival, the tessellated darter should be included in the threatened and endangered species review for the proposed EPU.

According to the U.S. Fish and Wildlife Service's 1993 recovery plan, the dwarf wedge mussel (*Alasmidonta heterodon*) is an endangered species located in the Connecticut River system. To assess the impact of the proposed action, the aquatic species evaluated in the draft environmental assessment were those in the vicinity of the VYNPS intake and discharge structures. The dwarf wedge mussel is not located in Windham County, Vermont and, therefore, was not included in the draft environmental assessment. The dwarf wedge mussel larvae attach to a host species for survival. One host species for the dwarf wedge mussel is the tessellated darter (*Etheostoma olmstedi*), which is also found in the Connecticut River system. The tessellated darter is not threatened or endangered and, therefore, was not included in the draft environmental assessment for the VYNPS EPU.

As noted above, the proposed EPU does not require an increase in discharge temperature limits. Further, following implementation of the EPU, the flow rate of water being withdrawn from the Connecticut River through the intake structure would not increase, and there would not be a configuration change to the intake structure to support the EPU.

Therefore, the EPU would not change existing impacts on the tessellated darter. In addition, according to Ecological Studies of the Connecticut River - Vernon, Vermont - Report 32, dated May 2003, the quantity of tessellated darters impinged on the VYNPS traveling screens is small compared to other impinged species. Impingement from the VYNPS intake does not significantly impact the tessellated darter population. The inter-governmental Environmental Advisory Committee (comprised of certain Vermont, New Hampshire, Massachusetts, and federal agencies) established limits for impingement of American shad (*Alosa sapidissima*) and Atlantic salmon (*Salmo salar*), and because VYNPS has not approached the impingement limits set for these species, the Vermont Agency of Natural Resources (ANR) concluded that the impingement of other species at VYNPS meets applicable laws. Entrainment of all aquatic species was monitored for over a decade beginning in 1972 and determined to be insignificant by the Environmental Advisory Committee. Entrainment was subsequently removed from the VYNPS NPDES permit. Therefore, the staff concludes that there would be no significant impact from impingement or entrainment to the tessellated darter or the dwarf wedge mussel associated with the proposed action.

ENVIRONMENTAL ASSESSMENT

Plant Site and Environs:

The EPU will apply to the facilities at the site of VYNPS located on the west shore of the Connecticut River in the town of Vernon, Vermont. Vernon is approximately four miles north of the Massachusetts state line. Vernon is located in Windham County.

The VYNPS site is located on Vernon Pond on the Connecticut River, about two-thirds of a mile upstream of the Vernon Hydroelectric Dam, at Connecticut River mile 138.3. Vernon Pond is the portion of the Connecticut River above Vernon Hydroelectric Dam. The site is surrounded by the Connecticut River on the east, by farm and pasture land mixed with wooded areas on the north and south, and by the town of Vernon on the west. The elevation of the VYNPS site is approximately 76 meters (250 feet) above mean sea level.

Northeast of the site, the Pisgah Mountain range rises to 457 meters (1500 feet). To the west and northwest of the site, mountains and hills rise to 549 meters (1800 feet). Approximately 13 kilometers (km) (8 miles (mi)) southeast of the site are Warwick State Forest and Northfield State Forest. Colrain State Forest is approximately 29 km (18 mi) southwest of Vernon. Green Mountain National Forest is located approximately 48 km (30 mi) west of Vernon.

VYNPS is a single-unit boiling-water reactor designed by General Electric, with a maximum reactor core power level output of 1593 MWt. Plant cooling is provided by either an open-cycle system, a closed-cycle cooling system, or a hybrid-cycle system. The mode of operation is selected to limit the heat discharged to the Connecticut River. The closed-cycle cooling system is equipped with a cooling tower that dissipates heat primarily to the atmosphere. After passing through the condenser, circulating water rejects waste heat to the atmosphere utilizing the cooling tower. Remaining waste heat is discharged in the form of blowdown from the circulating water system into the Connecticut River. In the open-cycle

mode, no water passes through the cooling towers. Water is removed from the Connecticut River for cooling and discharged back to the Connecticut River downstream of the intake structure. In the hybrid-cycle mode, all of the circulating water flow is cycled through the cooling towers, but only a portion is discharged to the river while the remainder is recycled.

Identification of the Proposed Action:

By letter dated September 10, 2003, Entergy proposed an amendment to the operating license for VYNPS to increase the maximum thermal power level by approximately 20 percent, from 1593 MWt to 1912 MWt. The change is considered an EPU because it would raise the reactor core power level more than 7 percent above the original licensed maximum power level. This amendment would allow the heat output of the reactor to increase, which would increase the flow of steam to the turbine. This would result in the increase in production of electricity and the amount of waste heat delivered to the condenser, and an increase in the temperature of the water being discharged into the Connecticut River. This is the first request by Entergy for a power uprate at VYNPS; no other power uprates have previously been requested or granted for this site.

The Need for the Proposed Action:

Entergy estimates that the EPU will result in an additional 100 to 110 megawatts-electric being generated. This additional electricity generation can power approximately 110,000 extra homes, reducing the need to obtain electricity from other sources. The EPU would not cause the environmental impacts that would occur if construction of a new power generation facility were sought to meet the region's electricity needs.

Environmental Impacts of the Proposed Action:

At the time of issuance of the operating license for VYNPS, the NRC staff noted that any activity authorized by the license would be encompassed by the overall action evaluated in the Final Environmental Statement (FES) for the operation of VYNPS, which was issued in July 1972. This environmental assessment summarizes the radiological and non-radiological impacts on the environment that may result from the currently proposed action.

NON-RADIOLOGICAL IMPACTS

Land Use Impacts:

The potential impacts associated with land use for the proposed action include impacts from construction and plant modifications. The impacts from construction due to the proposed EPU are minimal. No expansion of roads, parking lots, equipment storage or laydown areas, or transmission line rights-of-way is anticipated to support the proposed action. The only new construction required to support the EPU is the installation of temporary office space using modular units. This resulted in minor soil disturbance due to trenching, setting foundation columns, hook-up of water, sewer, telephone, and electricity.

In addition, a few modifications to plant equipment will take place to support the EPU. The most significant modifications include replacement of the high-pressure turbine steam path, rewinding the main generator, replacement of four high-pressure heaters, and replacement of the main transformer. The plant modifications will not result in any changes in land use and historic and archeological resources should not be affected by the proposed EPU. The proposed EPU would not modify land use at the site significantly over that described in the FES. Therefore, the staff concludes that the environmental land use impacts of the proposed EPU are bounded by the impacts previously evaluated in the FES.

Cooling Tower Impacts:

The potential impacts associated with increased cooling tower operation for the proposed action include aesthetic impacts due to the increased moisture content of the air. VYNPS has cooling towers that are currently used to reduce the heat output to the environment. The cooling towers are not currently used during the "winter period" of October 15 through May 15, but following the EPU, the cooling towers may be required for this period in order to meet the water discharge thermal limits set forth in the NPDES permit. The operation of the cooling towers during the "winter period" will result in a visible plume. However, heat rejection rates during this period are less than during the "summer period" of May 16 to October 14, so the visible plume size will not be larger than during the remainder of the year. The cooling tower plume dimensions during the "summer period" will increase following the EPU. The dimensions will increase by approximately 100 meters in length, 20 to 30 meters in width, and up to 50 meters in height. The increase in plume dimensions during the "summer period" and the presence of a plume during the "winter period" will not cause a significant aesthetic impact because similar plumes have been present in the area of VYNPS since 1972, and industrial plumes are a common feature to the Connecticut River Valley.

No significant fogging or icing due to cooling tower operation is predicted for the EPU. The Seasonal/Annual Cooling Tower Impact Program evaluation determined that there is no predicted ground-level fogging or icing during the year. The evaluation was performed for NPDES "summer period" and "winter period" thermal discharge limits.

No significant increase in noise is anticipated for cooling tower operation following the EPU. A study performed on the VYNPS cooling tower resulted in sound increases of less than one decibel for the increased cooling tower operation.

The aesthetic impacts associated with increased cooling tower operation for the proposed action will not change significantly over the aesthetic impacts associated with current

cooling tower operation. Plume dimensions will increase, but will remain consistent with the current aesthetic impacts in the VYNPS environment. No significant fogging or icing is predicted, and no significant increase in noise level is predicted for the increased cooling tower operation. Therefore, the staff concludes that there are no significant aesthetic or atmospheric impacts associated with increased cooling tower operation for the proposed action.

Transmission Facility Impacts:

The potential impacts associated with transmission facilities for the proposed action could include changes in transmission line corridor right-of-way maintenance and electric shock hazards due to increased current. The proposed EPU would not require any physical modifications to the transmission lines. Transmission line right-of-way maintenance practices, including the management of vegetation growth, would not change. There will be no change to operating voltage or transmission line rights-of-way. Transmission line clearances will remain unchanged. Modifications to onsite transmission equipment are necessary to support the EPU, including installation of capacitor banks to maintain system voltage requirements.

The National Electric Safety Code (NESC) provides design criteria that limit hazards from steady-state currents. The transmission lines currently meet the applicable shock prevention provisions of the NESC. There will be an increase in current passing through the transmission lines associated with the increased power level of the proposed EPU. The increased electrical current passing through the transmission lines will cause an increase in electromagnetic field strength in the transmission line corridors. The licensee provided an evaluation of the transmission line loadings based on the approximately 20-percent power uprate which concluded that there will be no significant increase in the risk of shock under the transmission lines. Based on this information, the staff concludes that adequate protection will be provided against hazards from electric shock even with the slight increase in current attributable to the EPU.

The impacts associated with transmission facilities for the proposed action will not change significantly over the impacts associated with current plant operation. There are no physical modifications to the transmission lines, transmission line right-of-way maintenance practices will not change, there are no changes to transmission line rights-of-way or vertical clearances, and electric current passing through the transmission lines will increase only slightly. Therefore, the staff concludes that there are no significant impacts associated with transmission facilities for the proposed action.

Water Use Impacts:

Potential water use impacts from the proposed action include hydrological alterations to the Connecticut River and changes to plant water supply. VYNPS uses cooling water from Vernon Pond on the Connecticut River, and discharges heated water back to the Connecticut River. Vernon Pond is the portion of the Connecticut River above Vernon Hydroelectric Dam. VYNPS can be operated in one of three modes: the open-cycle mode, the closed-cycle mode, or the hybrid-cycle mode. Each of the modes is discussed previously under “Plant Site and Environs.”

The NPDES permit limits the amount of heat discharged to the Connecticut River from the operation of VYNPS. The thermal limit set in the NPDES permit will not change with the EPU. In order to comply with the NPDES thermal limit following the EPU, Entergy plans to operate the cooling towers more often to dissipate heat to the atmosphere rather than the river.

Due to the large flow rate of the Connecticut River, heated water discharged to the Connecticut River will begin to mix immediately with the river water and cool. A hydrological-biological study of Vernon Pond conducted in 1974-1977 included a thermal study. This study concluded that during periods of low flow in the Connecticut River, the thermal plume from the VYNPS discharge extends outward into the river channel before being swept

downstream. During periods of high flow in the Connecticut River, the strong river currents shear the thermal plume and force the plume to flow along the Vermont shore. Due to these flow patterns in the Connecticut River and the thermal limits set in the NPDES permit, the EPU should not cause hydrological alterations to the Connecticut River.

The EPU would not involve any configuration change to the intake structure. The pump capacity will not change, so that there will not be an increase in the rate of withdrawal of water from the Connecticut River. There would be a slight increase in the amount of Connecticut River water consumed as a result of the EPU under all cooling modes of operation due to increased evaporative losses. During the NPDES summer period (May 16 to October 14), the increased water consumption will be less than 0.1% of the average monthly river flow. During the NPDES winter period (October 15 to May 15), the increased water consumption will be less than 0.2% of the average monthly river flow. Therefore, the increased loss is insignificant relative to the flow in the Connecticut River. On this basis, the staff concludes that there is no significant impact to the hydrological pattern on the Connecticut River, and there is no significant impact due to water consumption as a result of the proposed action.

Discharge Impacts:

Potential impacts to the Connecticut River from the VYNPS discharge could include increased turbidity, scouring, erosion, and sedimentation. These discharge-related impacts apply to open-cycle flow due to the large volume of water discharged to the river. However, since the EPU will not result in any significant change in the amount of water withdrawn from the Connecticut River during open-cycle operation there will be no significant change in the discharge volume or velocity; therefore, there will be no changes in turbidity, scouring, erosion, or sedimentation related to the EPU.

Surface water and wastewater discharges at VYNPS are regulated by the State of Vermont via a NPDES permit (NPDES No. VT0000264). The NPDES permit is periodically

reviewed and renewed by the Vermont ANR, Department of Environmental Conservation in Waterbury, Vermont. The EPU would cause an increase in the temperature of the water discharged to the Connecticut River, but the temperature of the water discharged will remain within thermal limits specified in the NPDES permit. The blowdown from the increased usage of the cooling towers would also be discharged to the Connecticut River. There is no significant additional impact to the Connecticut River expected from the increased operation of the cooling towers because cooling tower blowdown will increase only slightly due to minor increased usage of the cooling towers.

Entergy is requesting an amendment to the NPDES permit to allow a one-degree increase in the thermal discharge limit, for certain river water temperature ranges, for the "summer period" as shown in Table 1.

Table 1: Proposed Summer NPDES Permit Change

| Upstream River Temperature | Existing delta-temperature increase limit | Proposed delta-temperature increase limit |
|---|---|---|
| Above 78 EF | 2 EF | 2 EF |
| Greater than 63 EF, Less than or equal to 78 EF | 2 EF | 3 EF |
| Greater than 59 EF, Less than or equal to 63 EF | 3 EF | 4 EF |
| Greater than or equal to 55 EF, Less than or equal to 59 EF | 4 EF | 5 EF |
| Below 55 EF | 5 EF | 5 EF |

The NPDES permit amendment is not necessary for the EPU, and VYNPS will continue to operate under the current thermal discharge limits (under either the current NRC license or the EPU) if the NPDES permit amendment is not granted.

VYNPS has been operating within the current NPDES limits; therefore, these thermal limits represent an upper bound of the current impact on the river water temperatures in the vicinity of the discharge. The proposed one-degree increase in the current NPDES thermal discharge limit similarly represents the expected upper bound of the impact on the river water temperatures during the EPU. VYNPS will comply with the current thermal limits in the NPDES permit following the EPU if the NPDES permit amendment request is not granted, and any discharge impacts for the proposed action will be the same as the current impacts from plant operation. Therefore, the staff concludes that there will be no significant impact on the Connecticut River from VYNPS discharge for the proposed action.

Chemicals and concentrations released from VYNPS into the Connecticut River are regulated by the State of Vermont through the NPDES permit. VYNPS will continue to operate within the current NPDES permit limits following the power uprate.

Since there will be no significant increase in the VYNPS staffing levels during operations as a result of the power uprate, there will also be no increase in sanitary waste.

Impacts on Aquatic Biota:

The potential impacts to aquatic biota from the proposed action include impingement, entrainment, thermal discharge effects, and impacts due to transmission line right-of-way maintenance. The VYNPS has intake and discharge structures on the Connecticut River. The aquatic species evaluated in this environmental assessment are those in the vicinity of the intake and discharge structures.

VYNPS does entrain and impinge aquatic species. Entrainment and impingement of aquatic species are covered in the NPDES permit under Section 316(b) of the Clean Water Act. Entrainment was monitored for over a decade beginning in 1972, and determined to be insignificant by the inter-governmental Environmental Advisory Committee. The Environmental Advisory Committee is made up of Vermont Department of Environmental Conservation, Vermont Department of Fish and Wildlife, New Hampshire Fish and Game Department, New Hampshire Department of Environmental Services, Massachusetts Office of Watershed Management, Massachusetts Division of Fisheries and Wildlife, and the Coordinator of the Connecticut River Anadromous Fish restoration program of the U.S. Fish and Wildlife Service. The Vermont ANR concluded that no further entrainment sampling was required following historical studies conducted during the same time period, and dropped entrainment from the NPDES permit. Entrainment is no longer monitored at VYNPS. The ANR determined that entrainment sampling should be replaced with alternative biological monitoring of species in the Connecticut River. Therefore, since the 1980's, the licensee has conducted extensive monitoring as required by the ANR to determine if there are any potential impacts to aquatic species in the VYNPS intake and discharge areas. These procedures are not expected to change following the EPU.

Impingement is monitored annually and is considered low. Ecological studies of the Connecticut River - Vernon, Vermont - Report 32, dated May 2003, describes how Entergy

meets the requirements of the NPDES permit through impingement sampling. During 2002, 27 species of fish were collected, and all fish species collected were typical of the Connecticut River drainage. The Environmental Advisory Committee has established limits for impingement of American shad and Atlantic salmon, and VYNPS has never approached the impingement limits set for these species. Since VYNPS has never approached the impingement limits set for American shad and Atlantic salmon, the ANR has concluded that impingement of other species at VYNPS meets applicable laws. The flow rate of water being withdrawn from the Connecticut River through the intake structure will not increase following the EPU, and there will not be any configuration change to the intake structure to support the EPU. Therefore, no increase in the impingement of fish or shellfish, or in the entrainment of planktonic organisms would be expected following the EPU.

On July 9, 2004, the Environmental Protection Agency (EPA) published a final rule in the *Federal Register* (69 FR 41575) addressing cooling water intake structures at existing power plants whose flow levels exceed a minimum threshold value of 50 million gallons per day. The rule is Phase II in EPA's development of Section 316(b) regulations that establish national requirements applicable to the location, design, construction, and capacity of cooling water intake structures at existing facilities that exceed the threshold value for water withdrawals. The national requirements, which are implemented through NPDES permits, minimize the adverse environmental impacts associated with the continued use of the intake systems. Licensees are required to demonstrate compliance with the Phase II performance standards at the time of renewal of their NPDES permit. Licensees may be required, as part of the NPDES renewal, to alter the intake structure, redesign the cooling system, modify station operation, or take other mitigative measures as a result of this regulation. The new performance standards are designed to reduce significantly impingement and entrainment losses due to plant operation. Any site-specific mitigation would result in less impact due to continued plant operation.

The NPDES permit limits the amount of heat discharged to the Connecticut River from the operation of VYNPS. An analysis conducted in accordance with the NPDES permit on fish and aquatic species in 2002 concluded that there is no significant negative relationship between these species and the thermal discharge. Actually, a larger community of aquatic species was found to colonize near the VYNPS discharge. The thermal limits specified in the NPDES permit will not change with the EPU. Because Entergy will continue to meet the thermal discharge limit set by the NPDES permit following the EPU, there should be no additional thermal discharge effects on aquatic species for the proposed action.

As discussed in the transmission facility impacts section of this environmental assessment, transmission line right-of-way maintenance practices will not change for the proposed action. Therefore, the staff concludes that there are no significant impacts to aquatic biota associated with transmission line right-of-way maintenance for the proposed action.

In conclusion, there will be no increase in the impacts of entrainment or impingement because there will be no increase in the flow rate of water being withdrawn from the Connecticut River, and the amount of heat discharged to the Connecticut River will remain within the thermal limit specified by the NPDES permit following the EPU. There are no changes in transmission line right-of-way maintenance associated with the proposed action. Therefore, the staff concludes that there are no significant impacts to aquatic biota for the proposed action.

Impacts on Terrestrial Biota:

The potential impacts to terrestrial biota from the proposed action include impacts due to construction activities and transmission line right-of-way maintenance. As discussed in the transmission facility impacts section of this environmental assessment, transmission line right-of-way maintenance practices will not change for the proposed action. Similarly, as discussed above, apart from the construction of temporary office space using modular units,

construction activities due to the EPU will not disturb land on the VYNPS site. Therefore, the staff concludes that there are no significant impacts to terrestrial plant or animal species associated with construction activities or transmission line right-of-way maintenance for the proposed action.

Impacts on Threatened and Endangered Species:

Potential impacts to threatened and endangered species from the proposed action include the impacts assessed in the aquatic and terrestrial biota sections of this environmental assessment. These impacts include impingement, entrainment, thermal discharge effects, and impacts due to transmission line right-of-way maintenance for aquatic species, and impacts due to transmission line right-of-way maintenance for terrestrial species.

There are three species listed as threatened or endangered under the Federal Endangered Species Act within Windham County, Vermont. These are the Bald Eagle (*Haliaeetus leucocephalus*), Indiana Bat (*Myotis sodalis*), and Northeastern Bulrush (*Scirpus ancistrochaetus*). There are no records of any of these species on the VYNPS site. However, no formal surveys have been conducted by Entergy or the State of Vermont on the VYNPS site. Critical habitat has been designated for the Indiana Bat (*M. sodalis*), but not in the State of Vermont. Critical habitat has not been designated for the Bald Eagle (*H. leucocephalus*) or the Northeastern Bulrush (*S. ancistrochaetus*). There is a Bald Eagle (*H. leucocephalus*) nest downstream of the VYNPS site, on Stebbins Island in New Hampshire, and Bald Eagles (*H. leucocephalus*) have been observed flying over the VYNPS site. However, the Bald Eagle (*H. leucocephalus*) should not be impacted by the EPU because there are no Bald Eagles (*H. leucocephalus*) on the site and the NPDES permit includes provisions for protection of the Bald Eagle (*H. leucocephalus*) habitat.

Ecological Studies of the Connecticut River - Vernon, Vermont - Report 32, dated May 2003, describes how Entergy meets the requirements of the NPDES permit through

impingement sampling. An analysis of this report determined that no Federally-listed threatened or endangered species were collected.

The Vermont Nongame and Natural Heritage Program, associated with the Vermont ANR, reviewed the EPU project and found no undue adverse impact to nongame resources or natural areas from the proposed action. There are no Federally-listed threatened and endangered species recorded on the VYNPS site, and there is no critical habitat in the state of Vermont for the three listed species in Windham County. Therefore, the staff concludes that there is no effect to threatened and endangered species associated with the proposed action.

Social and Economic Impacts:

Potential social and economic impacts due to the proposed action include changes in tax revenue for Windham County and changes in the size of the workforce at VYNPS. The NRC staff has reviewed the information provided by the licensee regarding socioeconomic impacts. Entergy is a major employer in the community with approximately 670 full-time employees and contractors. Entergy is also a major contributor to the local tax base, but does not remit tax revenues directly to Windham County. Entergy personnel indirectly contribute to the tax base by paying sales and property taxes, state income taxes, and hotel and meal taxes which are paid by Entergy contractors while working at VYNPS. VYNPS pays a State Education Tax which is based on the level of generation of electrical power. The additional electrical power generated from the EPU will result in a proportional increase in taxes. The Tax Stabilization Contract, entered into by the Town of Vernon, Vermont and the owners of VYNPS, determines Entergy's contribution to the remaining local tax base. The contract specifies a Total Listed Value to be used for assessing Municipal Services property tax through 2010. The Total Listed Value applies to all real and personal property owned on April 1, 2000, and acquired thereafter, which is used in connection with the generation of electrical power through the nuclear fission process.

The proposed EPU would not significantly affect the size of the VYNPS labor force and would not have a material effect upon the labor force required for future outages after all stages of the modifications needed to support the EPU are complete. Entergy completed all major modifications in the Spring 2004 refueling outage, which required approximately 425 additional workers. Normally, less than 700 additional personnel are required for refueling outages; the Spring 2004 refueling outage required approximately 1125 additional personnel. Additional modifications needed to support the EPU were completed during the Fall 2005 refueling outage. The remaining modifications were less significant than those implemented during the Spring 2004 refueling outage and required less than 100 additional workers to supplement typical refueling outage staffing levels.

It is expected that the proposed EPU will increase the economic viability of VYNPS and lower the probability of early plant retirement. With the increased likelihood that VYNPS will remain operational at least through the end of the current license term, local employment opportunities will remain available. Early plant retirement would be expected to have a negative impact on the local economy and the community as a whole by reducing tax revenues and limiting local employment opportunities, although these effects could be mitigated by decommissioning activities in the short term.

The Vermont Public Service Board has determined that the EPU will not greatly interfere with the development of the region and will have a minimal impact outside the immediate area of VYNPS. Entergy has not identified any negative socioeconomic impacts associated with the EPU. Therefore, the staff concludes that there are no significant social or economic impacts associated with the proposed action.

Summary:

The proposed EPU would not result in a significant change in non-radiological impacts in the areas of land use, water use, waste discharges, cooling tower operation, terrestrial and aquatic biota, transmission facility operation, or social and economic factors. No other non-radiological impacts were identified or would be expected. Table 2 summarizes the non-radiological environmental impacts of the proposed EPU at VYNPS.

Table 2: Summary of Non-Radiological Environmental Impacts

| | |
|---|---|
| Land Use | No significant land use modifications; installed temporary office space to support EPU. |
| Cooling Tower | No significant aesthetic impact, slightly larger plume size; no significant increase in noise; no significant fogging or icing. |
| Transmission Facilities | No physical modifications to transmission lines; lines meet shock safety requirements; no changes to right-of-ways; small increase in electrical current would cause small increase in electromagnetic field around transmission lines. |
| Water Use | No configuration change to intake structure; no increased rate of withdrawal; slight increase in water consumption due to increased evaporation; no water use conflicts. |
| Discharge | Increase in water temperature discharged to Connecticut River; will meet thermal discharge limits in current NPDES permit following EPU; no change in chemical or sanitary waste discharges. |
| Aquatic Biota | No additional impact expected on aquatic biota. |
| Terrestrial Biota | Vermont Nongame and Natural Heritage Program found no adverse impact from EPU; no additional impact on terrestrial plant or animal species. |
| Threatened and Endangered Species | Three Federally-listed species in Windham County; EPU will have no effect on species. |
| Social and Economic | No significant change in size of VYNPS labor force required for plant operation or future refueling outages; increased production of tax revenues. |

RADIOLOGICAL IMPACTS

Radioactive Waste Stream Impacts:

VYNPS uses waste treatment systems designed to collect, process, and dispose of gaseous, liquid, and solid wastes that might contain radioactive material in a safe and controlled manner such that discharges are in accordance with the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20, "Standards for Protection Against Radiation", and 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities", Appendix I. These radioactive waste streams are discussed in the FES. The proposed EPU would not

result in changes in the operation or design of equipment in the gaseous, liquid, or solid waste systems.

Gaseous Radioactive Waste and Offsite Doses:

During normal operation, the gaseous effluent treatment systems process and control the release of gaseous radioactive effluents to the environment, including small quantities of noble gases, halogens, tritium, and particulate material. The gaseous waste management systems include the offgas system and various building ventilation systems. Entergy estimates that gaseous radioactive effluents will increase following the EPU but will remain within regulatory limits. In the past three years, the peak dose from gaseous effluents at VYNPS was less than 1 millirem (mrem) per year. The increase in gaseous effluents following the EPU is not expected to be more than 20 percent of the current gaseous effluent release, consistent with the EPU. If there were a 20 percent increase from the peak dose of less than 1 mrem per year, the projected dose would still remain well below the dose design objectives of Appendix I to 10 CFR Part 50. Therefore, the increase in offsite dose due to gaseous effluent release following the EPU would not be significant.

Liquid Radioactive Waste and Offsite Doses:

During normal operation, the liquid effluent treatment systems process and control the release of liquid radioactive effluents to the environment, such that the doses to individuals offsite are maintained within the limits of 10 CFR Part 20 and 10 CFR Part 50, Appendix I. The liquid radioactive waste systems are designed to process the waste and then recycle it within the plant as condensate, reprocess it through the radioactive waste system for further purification, or discharge it to the environment as liquid radioactive waste effluent in accordance with State and Federal regulations. Entergy estimates that the volume of liquid radioactive waste generated would increase by 1.2 percent of the current total, following the EPU. This is an increase in the volume of liquid radioactive waste that will require processing, and not an

increase in liquid radioactive effluent. The increased volume of liquid radioactive waste is due to the increased frequency of reactor water cleanup filter demineralizer and condensate demineralizer backwashes. The demineralizer backwashes will increase due to an increase in conductivity of the reactor water cleanup system and an increase in feedwater flow following the EPU. Entergy indicated that the percentage increase in liquid radioactive waste generated due to the EPU is within the designed system total volume capacity. There is a very small increase in the volume of liquid radioactive waste generated due to the EPU, but no liquid radioactive waste discharges are expected. Therefore, there would not be a significant environmental impact from the additional volume of liquid radioactive waste generated following the EPU.

Solid Radioactive Wastes:

The solid radioactive waste system collects, processes, packages, and temporarily stores radioactive dry and wet solid wastes prior to shipment offsite and permanent disposal. The largest volume of solid radioactive waste at VYNPS is low-level radioactive waste; sources of this include spent ion exchanger resins, filter sludges, air filters, and miscellaneous papers and rags. In 2001, which represents a year of peak solid waste generation, Entergy generated 37 cubic meters (1291 cubic feet) of solid waste. The proposed EPU is expected to increase the amount of reactor water cleanup and condensate demineralizer resins due to increased flow rates for the steam, feedwater, and condensate systems. This is the only expected waste increase. Entergy estimates that the volume of this solid waste could increase by as much as 17.8 percent over the volume of solid waste generated in 2001. Even with such an increase, the expected volume of low-level radioactive waste would be well below the value in the FES.

The proposed EPU would also result in a greater percentage of fuel assemblies being removed from the reactor core and replaced with new fuel assemblies during each refueling outage. Entergy expects the number of fuel assemblies consumed each cycle to increase by 28 percent following the EPU for the remaining term of the license. The additional amount of

fuel assemblies consumed will result in greater storage of spent fuel at VYNPS. Entergy estimates that VYNPS can operate to the Fall 2008 refueling outage before exhausting its full-core discharge capability and reaching the capacity of the spent fuel pool, if the plant does not implement the proposed EPU. Assuming the proposed EPU is implemented, Entergy estimates that VYNPS would exhaust its full core discharge capability one cycle earlier (i.e., by the Spring 2007 refueling outage). Regardless of the EPU, Entergy plans to utilize dry cask storage at VYNPS in the near future (pending Vermont Public Service Board approval), to permit continued operations for the full term of the current license. Dry cask storage at VYNPS will be necessary regardless of the EPU, subject to State approval separate from the EPU application, and would not involve a significant increase in the total number of spent fuel assemblies requiring storage over the term of the current license. Accordingly, the NRC staff concludes that there will be no significant environmental impact resulting from storage of the additional fuel assemblies.

In-Plant Radiation Doses:

The proposed EPU would result in the production of more radioactive material and higher radiation dose rates in some areas at VYNPS. For most areas, radiation doses are unchanged due to the ample margin in the radiation shielding design. Area dose rates inside shielded cubicles can increase as much as 20 percent. However, these areas are not normally occupied during plant operation. Entergy estimates that there will be higher radiation levels in and around the turbine, due to increased steam flow and velocity following the EPU, which will lead to shorter travel times to the turbine and less time for radioactive decay in transit. Therefore, Entergy estimates that the overall increase in radiation level could be as high as 26 percent in those areas with higher steam flow.

The VYNPS FES does not contain an estimate for annual collective occupational radiation dose. The collective occupational dose at VYNPS in 2001 and 2002 was 142

person-rem and 150 person-rem, respectively. The potentially higher dose rates due to the EPU are not expected to increase the annual collective occupational dose by more than 20 percent. Therefore, the annual average collective occupational dose after the EPU is implemented may increase by approximately 30 person-rem.

Individual worker exposure is maintained within acceptable limits by the VYNPS “as low as reasonably achievable” (ALARA) program which controls access to radiation areas. Procedural controls compensate for increased radiation levels to ensure that worker exposure remains ALARA and that the normal operation radiation zones are labeled and controlled for access in accordance with the requirements of 10 CFR Part 20 related to allowable worker exposure and access control. Accordingly, occupational doses after the EPU is implemented will remain within acceptable levels and will not result in a significant environmental or radiological dose impact.

Direct Radiation Doses Offsite:

Direct radiation emitted skyward from radionuclides (mainly nitrogen-16) in the main steam system components in the turbine building is scattered back to ground level by molecules in the air and provides another offsite public dose pathway (skyshine) from an operating boiling-water reactor. The licensee routinely monitors whole body dose rate offsite using high purity germanium detectors, pressurized ion chambers, and thermoluminescent dosimeters. Based on measurements of radiation, the highest direct radiation dose offsite was found at the west side boundary. Entergy estimates that approximately 90 percent of the direct radiation dose at the west side boundary is due to skyshine. The highest annual dose at the west side boundary is 13.4 mrem from skyshine. Following the EPU, skyshine is expected to increase by 26 percent due to the expected increase in the nitrogen-16 source in the turbine building. Assuming a 26-percent increase in direct radiation dose offsite due to skyshine following the EPU, the direct radiation dose offsite at the site boundary would be 16.9 mrem

from skyshine. The total maximum direct radiation dose offsite at the site boundary would be 18.6 mrem (16.9 mrem from nitrogen-16 skyshine plus 1.7 mrem from miscellaneous radwaste stored on site).

The annual whole body dose equivalent to a member of the public beyond the site boundary is limited to 25 mrem (0.25 mSv) by 40 CFR Part 190. The projected maximum direct radiation dose offsite at VYNPS is within this limit. The licensee will continue to perform surveys as the EPU is implemented to ensure continued compliance with 40 CFR Part 190. Therefore, the impact of the EPU on direct radiation dose offsite would not be significant.

Postulated Accident Doses:

As a result of implementation of the proposed EPU, there is an increase in the source term used in the evaluation of some of the postulated accidents in the FES. The inventory of radionuclides in the reactor core is dependent upon power level; therefore, the core inventory of radionuclides could increase by as much as 20 percent. The concentration of radionuclides in the reactor coolant may also increase by as much as 20 percent; however, this concentration is limited by the VYNPS Technical Specifications. This coolant concentration is part of the source term considered in some of the postulated accident analyses. Some of the radioactive waste streams and storage systems evaluated for postulated accidents may contain slightly higher quantities of radionuclides than is present under current operations. For those postulated accidents where the source term has increased, the calculated potential radiation dose to individuals at the site boundary (the exclusion area) and in the low population zone would be increased over values presented in the FES, but would be within the doses calculated by the licensee and approved by the NRC staff in a separate license amendment dated March 29, 2005, as discussed below.

In support of the EPU, the licensee submitted a separate license amendment request which proposed a full-scope implementation of an alternative source term (AST) methodology

pursuant to 10 CFR 50.67. The licensee performed the radiological analyses that support the AST amendment assuming a reactor power of 1950 MWt which is approximately 102 percent of the proposed EPU power level of 1912 MWt. The NRC approved the AST amendment request on March 29, 2005. As discussed in the safety evaluation for the AST amendment, the NRC staff concluded that the doses, for postulated design-basis accidents under EPU conditions, would meet the acceptance criteria of 10 CFR 50.67 and the guidance in Regulatory Guide 1.183. Therefore, the NRC staff concludes that any increased environmental impact under EPU conditions, in terms of potential increased radiological doses from postulated accidents, would not be significant.

Fuel Cycle and Transportation Impacts:

The environmental impacts of the fuel cycle and transportation of fuels and wastes are described in Tables S-3 and S-4 of 10 CFR 51.51 and 10 CFR 51.52, respectively. An additional NRC generic Environmental Assessment (53 FR 30355, dated August 11, 1988, as corrected by 53 FR 32322, dated August 24, 1988) evaluated the applicability of Tables S-3 and S-4 to higher burnup cycle and concluded that there is no significant change in environmental impact from the parameters evaluated in Tables S-3 and S-4 for fuel cycles with uranium enrichments up to 5 weight percent Uranium-235 and burnups less than 60,000 megawatt (thermal) days per metric ton of Uranium-235 (MWd/MTU). Entergy has concluded that the fuel enrichment at VYNPS will increase to approximately 4.6 weight percent Uranium-235 as a result of the EPU. Entergy states that the expected core average exposure for the EPU is 35,000 MWd/MTU and the maximum bundle exposure is 58,000 MWd/MTU. The fuel enrichment for the EPU will not exceed 5 weight percent Uranium-235, and the rod average discharge burnup will not exceed 60,000 MWd/MTU. Therefore, the environmental

impacts of the EPU will remain bounded by the impacts in Tables S-3 and S-4 and are not significant.

Summary:

The proposed EPU would not result in a significant increase in occupational or public radiation exposure, would not significantly increase the potential doses from postulated accidents, and would not result in significant additional fuel cycle environmental impacts. Accordingly, the Commission concludes that there are no significant radiological environmental impacts associated with the proposed action. Table 3 summarizes the radiological environmental impacts of the proposed EPU at VYNPS.

Table 3: Summary of Radiological Environmental Impacts

| | |
|---|---|
| Gaseous Effluents and Doses | Up to 20% increase in dose due to gaseous effluents; doses to individuals offsite will remain within NRC limits. |
| Liquid Effluents and Doses | Volume of liquid effluent generated expected to increase by 1.2%; slight increase in the amount of radioactive material in liquid effluent; no discharge of liquid effluent expected, no increase in dose to public. |
| Solid Radioactive Waste | Volume of solid waste expected to increase by 17.8% due to demineralizer resins; within FES estimate; increase in amount of spent fuel assemblies to be stored onsite. |
| In-plant Dose | Occupational dose could increase by 20% overall; will remain within acceptable limits under the VYNPS ALARA program. |
| Direct Radiation Dose | Up to 26% increase in dose rate offsite due to skyshine; expected annual dose continues to meet NRC/EPA limits. |
| Postulated Accidents | Licensee using Alternative Source Term; doses are within NRC limits. |
| Fuel Cycle and Transportation | Increase in bundle average enrichment and burnup; impacts stated in Tables S-3 and S-4 in 10 CFR Part 51 are bounding. |

Alternatives to Proposed Action:

As an alternative to the proposed action, the NRC staff considered denial of the proposed EPU (i.e., the "no-action" alternative). Denial of the application would result in no change in the current environmental impacts. However, if the EPU were not approved, other agencies and electric power organizations may be required to pursue other means of providing electric generation capacity to offset future demand. Such alternatives could include construction of fossil fuel or other generating capacity, or purchase of power from generating facilities outside the service area; such alternatives, however, would likely result in environmental impacts comparable to or greater than those involved in the EPU. For example, fossil fuel plants routinely emit atmospheric pollutants, causing impacts in air quality that are larger than if VYNPS were to provide the same amount of electric generation. Construction and operation of a fossil fuel plant also creates impacts in land use and waste management.

Alternative Use of Resources:

This action does not involve the use of any resources not previously considered in the 1972 FES for operation of the VYNPS.

Agencies and Persons Consulted:

In accordance with its stated policy, on September 2, 2005, the NRC staff consulted with the Vermont State official, William K. Sherman, of the Department of Public Service, regarding the environmental impact of the proposed action. The State official had no comments.

FINDING OF NO SIGNIFICANT IMPACT

On the basis of the environmental assessment, the Commission concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the Commission has determined not to prepare an environmental impact statement for the proposed action.

For further details with respect to the proposed action, see the licensee's application dated September 10, 2003, as supplemented on October 1, and October 28 (2 letters), 2003; January 31 (2 letters), March 4, May 19, July 2, July 27, July 30, August 12, August 25, September 14, September 15, September 23, September 30 (2 letters), October 5, October 7 (2 letters), December 8, and December 9, 2004; February 24, March 10, March 24, March 31, April 5, April 22, June 2, August 1, August 4, September 10, September 14, September 18, September 28, October 17, October 21 (2 letters), October 26, and October 29, November 2, November 22, and December 2, 2005; and January 10, 2006. Documents may be examined, and/or copied for a fee, at the NRC's Public Document Room (PDR), located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland. Publicly available records will be accessible electronically from the ADAMS Public Electronic Reading Room on the NRC Web site, http://www.nrc.gov/reading-rm/adams.html. Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS should contact the

NRC PDR Reference staff at 1-800-397-4209, or 301-415-4737, or send an e-mail to pdr@nrc.gov.

Dated at Rockville, Maryland, this 20th day of January 2006.

FOR THE NUCLEAR REGULATORY COMMISSION

***/RA/***

Richard B. Ennis, Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation