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Docket No. 50-271
BVY 06-077
TAC No. MC 9670

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Reference: 1. Letter, Entergy to USNRC, "Vermont Yankee Nuclear Power Station, License No. DPR-28, License Renewal Application," BVY 06-009, dated January 25, 2006.

**Subject: Vermont Yankee Nuclear Power Station
License No. DPR-28 (Docket No. 50-271)
License Renewal Application, Amendment 9**


On January 25, 2006, Entergy Nuclear Operations, Inc. and Entergy Nuclear Vermont Yankee, LLC (Entergy) submitted the License Renewal Application (LRA) for the Vermont Yankee Nuclear Power Station (VYNPS) as indicated by Reference 1. The LRA Environmental Report (Appendix E) is being revised in response to NRC questions raised during the Environmental Scoping Audit. Changes to the LRA are recorded as Revision 2 to Appendix E, with the following affected sections listed below:

- Attachment 1: Section 3.6, References
- Attachment 2: Section 4.23, References
- Attachment 3: Section 2.5, Threatened or Endangered Species
- Attachment 4: Section 3.2.7, Power Transmission Systems
- Attachment 5: Section 4.0, Environmental Consequences of the Proposed Action
- Attachment 6: Section 4.13, Electromagnetic Fields – Acute Effects
- Attachment 7: Section 6.0, Summary of License Renewal Impacts and Mitigating Actions

Should you have any questions concerning this letter, please contact Mr. James DeVincentis at (802) 258-4236.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 10, 2006.

Sincerely,


Ted A. Sullivan
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Attachments 7
cc: See next page

A117

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Attachment 1

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Section 3.6, Page 3-22

3.6 References

- 3-1 Entergy VY (Entergy Nuclear Vermont Yankee, LLC). 2002. Vermont Yankee Nuclear Power Station, Off-Site Dose Calculation Manual, Revision 30.
- 3-2 Entergy VY (Entergy Nuclear Vermont Yankee). 2003. Correspondence (BVY 03-80) from Entergy Nuclear Vermont Yankee, LLC, to the U. S. Nuclear Regulatory Commission, Vermont Yankee Nuclear Power Station License No. DPR-28 (Docket No. 50-271) Technical Specification Proposed Change No. 263 Extended Power Uprate, September 10, 2003.
- 3-3 Entergy VY (Entergy Nuclear Vermont Yankee). 2004. Vermont Yankee Nuclear Power Station, Updated Final Safety Analysis Report, Revision 19.
- 3-4 NRC (U.S. Nuclear Regulatory Commission) 2005. United States Nuclear Regulatory Commission, Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc., Docket No. 50-271, Vermont Yankee Nuclear Power Station Draft Environmental Assessment and Finding of No Significant Impact Related to the Proposed License Amendment to Increase the Maximum Reactor Power Level, November 3, 2005.
- 3-5 FTN Associates, Email communication between B. West (FTN Associates) and R. Buckley (Entergy), July 31, 2006.
- 3-6 FTN Associates, Email communication between B. West (FTN Associates) and R. Buckley (Entergy), July 31, 2006.

Attachment 2

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- 4- 13 NRC (U. S. Nuclear Regulatory Commission). 2001. Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Arkansas Nuclear One, Unit 1. NUREG-1437, Supplement 3. Office of Nuclear Reactor Regulation, Washington, D.C. April 2001.
- 4- 14 NRC (U. S. Nuclear Regulatory Commission). 2004a. Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Arkansas Nuclear One, Unit 2, NUREG-1437, Supplement 19, Washington, DC.
- 4- 15 NRC (U.S. Nuclear Regulatory Commission). 2004b. Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues. NRR Office Instruction No. LIC-203, Revision 1, May 24, 2004.
- 4- 16 SVPSB (State of Vermont Public Service Board). 2003. Petition of Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. Pursuant to 30 V.S.A. §248, for a Certificate of Public Good to Modify Certain Generation Facilities, Prefiled Testimony of Sonja A. Schuyler on Behalf of Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc., February 21, 2003.
- 4- 17 USCDC (U.S. Center for Disease Control). 2004. Division of Parasitic Diseases. *Naegleria* Infection Fact Sheet. Accessed on the Internet on November 30, 2004 at http://www.cdc.gov/ncidod/dpd/parasites/naegleria/2004_PDF_Naegleria.pdf.
- 4- 18 VAT (Vermont Agency of Transportation). 2004. Automatic Traffic Recorder History 1988 – 2003. Program Development Division, Traffic Research Unit, May 2004.
- 4- 19 VYNPC (Vermont Yankee Nuclear Power Corporation). 1969. Vermont Yankee Nuclear Power Station Drawings B-191394 (115 kV Transmission System, S/C Type "D", 90× Angle & DE Tower, Load & Clearance Diagram), B-191402 (Sag and Tension Data, Location of Spans) and B-191404 (Sag and Tension Data for Spans 3, 4, 5 7 8), 1969.
- 4- 20 VYNPC (Vermont Yankee Nuclear Power Corporation). 2002. Letter Agreement dated July 16, 2002, from Bruce Wiggett (Vermont Nuclear Power Corporation) to Bruce Davin (USGEN New England, Inc. c/o PG&E National Energy Group).
- 4-21 FTN Associates, Email communication between B. West (FTN Associates) and R. Buckley (Entergy), July 31, 2006.
- 4-22 FTN Associates, Email communication between B. West (FTN Associates) and R. Buckley (Entergy), July 31, 2006.

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Section 2.5, Pages 2-10, 2-11

Counties, Vermont. Suitable habitats for the dwarf wedgemussel are well-oxygenated streams and rivers with sandy or gravelly bottoms and slow to moderate current [Reference 2-11]. Negative impacts to the species in relation to the facility are unlikely since (1) recent surveys between the Bellows Falls Dam and Vernon did not discover any wedgemussels, and (2) the southernmost finding was in muddy habitat near Rockingham, Vermont, just north of Bellows Falls Dam, which is upstream of VYNPS by about 30 miles. [Reference 2-40]

Jesup's milk-vetch is only known to occur within the Connecticut River valley of both Vermont and New Hampshire, specifically Sullivan County, New Hampshire, and Windsor County, Vermont [Reference 2-29]. Only four individual populations of this plant are known and the total population is estimated to be less than 1,000 individuals. The entire population is known from a 15-mile stretch of the Connecticut River, of which the plants occupy a specific ecotome best described as a disturbed area, which is both ice covered and flooded during portions of the year [Reference 2-12]. Since these populations lie approximately 40 miles north of the VYNPS facility, the possibility of occurrence near the site is unlikely.

Northeastern Bulrush is known to occur in the following counties and states near VYNPS: Sullivan County, New Hampshire; Franklin County, Massachusetts; and Windham County, Vermont. Habitat for this species is described as open herb-dominated wetland areas [Reference 2-12]. Although this species is documented as occurring in Windham County, Vermont, there are only limited areas near the VYNPS facility that could contain suitable habitat for the species.

Small whorled pogonia is listed as occurring within Merrimack County, New Hampshire, and Hampshire, Hampden, and Middlesex Counties, Massachusetts [Reference 2-29]. This species is associated with rich, acidic soils and is often encountered in areas that also contain witch hazel (*Hamamelis virginiana*), beech (*Fagus grandifolia*), and red maple (*Acer rubrum*) [Reference 2-12]. Since there are no known records of this species within 20 miles of the VYNPS facility, the possibility of occurrence near the site is unlikely.

As discussed in Section 2.4, critical habitat has not been designated for any federally listed threatened and endangered species within the vicinity of VYNPS.

There are a total of 12 federally listed threatened or endangered species in the State of Vermont. On the transmission line there is a remote possibility of two animal species and one plant species being found there. These species are the Indiana bat, the bald eagle, and the small whorled pogonia. The small whorled pogonia, which is federally listed as threatened, has historically been found in the State of Vermont, but is now believed to be extirpated throughout the State of Vermont. Bald eagles, which are federally listed as threatened, have been found in Windsor County, but the nearest location to the transmission lines appears to be to the East on the Connecticut River. Bald eagles may have transitory visits to the transmission lines. The Indiana Bat, which is federally listed as endangered has not been found in Windsor or Windham counties, but may pass through the transmission line corridor in a transitory nature.

2.6 Regional Demography

2.6.1 Regional Population

The *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* presents a population characterization method that is based on two factors: "sparseness" and "proximity" [Reference 2-17, Section C.1.4]. "Sparseness" measures population density and city size within 20 miles of a site and categorizes the demographic information as follows.

Demographic Categories Based on Sparseness

Category		
Most sparse	1.	Less than 40 persons per square mile and no community with 25,000 or more persons within 20 miles
	2.	40 to 60 persons per square mile and no community with 25,000 or more persons within 20 miles
	3.	60 to 120 persons per square mile or less than 60 persons per square mile with at least one community with 25,000 or more persons within 20 miles
Least sparse	4.	Greater than or equal to 120 persons per square mile within 20 miles

Source: Reference 2-17

"Proximity" measures population density and city size within 50 miles and categorizes the demographic information as follows.

Demographic Categories Based on Proximity

Category		
Not in close proximity	1.	No city with 100,000 or more persons and less than 50 persons per square mile within 50 miles
	2.	No city with 100,000 or more persons and between 50 and 190 persons per square mile within 50 miles
	3.	One or more cities with 100,000 or more persons and less than 190 persons per square mile within 50 miles
In close proximity	4.	Greater than or equal to 190 persons per square mile within 50 miles

Source: Reference 2-17

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Section 3.2.7, Pages 3-12 to 3-13

3.2.6 Maintenance, Inspection and Refueling Activities

Various programs and activities currently exist at VYNPS to maintain, inspect, test, and monitor the performance of plant equipment. These programs and activities include, but are not limited to those implemented to

- meet the requirements of 10 CFR 50, Appendix B (Quality Assurance), Appendix R (Fire Protection), Appendices G and H, Reactor Vessel Materials;
- meet the requirements of 10 CFR 50.55a, American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, Section XI, In-service Inspection and Testing Requirements;
- meet the requirements of 10 CFR 50.65, the maintenance rule, including the structures monitoring program; and
- maintain water chemistry in accordance with EPRI guidelines.

Additional programs include those implemented to meet Technical Specification surveillance requirements, those implemented in response to NRC generic communications, and various periodic maintenance, testing, and inspection procedures. Certain program activities are performed during the operation of the unit, while others are performed during scheduled refueling outages.

3.2.7 Power Transmission Systems

Two 115-kV transmission lines were constructed to transmit electric power from VYNPS to the Vermont – New Hampshire interconnected 115-kV grid and to provide a source of off-site power for the plant. The Chestnut Hill 115-kV transmission line, which spans the Connecticut River, is approximately 2 miles in length and extends east from the VYNPS 115-kV switchyard to the Chestnut Hill Substation located near Hinsdale, New Hampshire (Figure 3-2). The line spans the Connecticut River on galvanized steel towers and then extends to the Chestnut Hill substation on wooden H-pole structures. The right-of-way for the line (and two parallel 345-kV transmission lines) is 300 feet in width. From the VYNPS 115-kV substation to the state boundary, the line is owned by Vermont Electric Power Company, Inc. (VELCO) of Rutland, VT. From the state boundary to the Chestnut Hill substation, the line is owned and operated by Public Service Company of New Hampshire (a subsidiary of the Northeast Utilities System) located in Manchester, NH. The Chestnut Hill substation and several other 115-kV lines in the area were in existence prior to the development of VYNPS project.

The Coolidge transmission line is approximately 50 miles in length and extends from VYNPS north to the Coolidge Substation located near Ludlow, Vermont (Figure 3-3). The line extends north from VYNPS on steel, single-pole structures for approximately 2 miles and then on wooden H-pole structures to the substation near Ludlow. The right-of-way, which is 200 feet wide, and transmission tower structures were designed to eventually support a double-circuit 345-kV transmission line, if needed.

The Coolidge line is owned and operated by the Vermont Electric Power Company, Inc. of Rutland, VT. This transmission line was completed in 1971 and operated until 1974 at a voltage of 115-kV, although it was built to the design specifications of a single-circuit 345-kV system. The line voltage was increased as part of the regional 345-kV transmission system expansion in the mid-1970's to provide improved power delivery in the region of central Vermont, southern New Hampshire, and western Massachusetts. Although the Coolidge line was constructed, in part, to connect VYNPS to the grid, the line would have likely been constructed in its present location for the expanding regional 345-kV grid even if VYNPS did not exist.

The Amherst and Northfield 345-kV transmission lines that connect at the VYNPS 345-kV substation (Figure 3-2) were also constructed in the 1970's as part of the New England 345-kV transmission expansion. These lines were not constructed for the purpose of connecting VYNPS to the transmission grid. Due to the convenient location of VYNPS, these lines span the river and meet at the VYNPS substation where they intertie with the 345-kV system of central Vermont. The Amherst line (also referred to as the Scobie line) is owned and operated by Public Service Company of New Hampshire and the Northfield line segment in Massachusetts is owned and operated by Western Massachusetts Electric of Northfield, MA. The Public Service Company of New Hampshire and the Western Massachusetts Electric Company are subsidiaries of Northeast Utilities.

In addition to the 115-kV and 345-kV transmission lines, an underground 13.2-kV line was constructed from the Vernon Hydro Station to VYNPS to provide another source of off-site power for the plant.

Transmission lines that connect to VYNPS are not owned, operated, or maintained by Entergy. The transmission line owners are responsible for compliance with applicable state and federal regulations that affect the operation and maintenance of the systems. The owners of the lines have no records of any significant impacts or regulatory compliance issues since the lines were constructed and placed into service approximately 30 years ago (References 3-5 and 3-6).

Based on conversations with VELCO, right-of-way vegetation maintenance practices include the use of mechanical clearing and hand-applied herbicide methods. Impacts to regulated wetlands are avoided and widespread application of herbicides is not used (Reference 3-5). Maintenance of the Coolidge line ROW is managed with consideration of wetlands, wildlife, aesthetics, erosion, and rare and uncommon natural areas and sites with rare plants or invasive nuisance plants. To date, no issues of concern have been identified with this ROW.

Based on conversations with the staff of Northeast Utilities personnel (Reference 3-6), vegetation control in the common ROW for the Chestnut Hill 115-KV and the two 345-kV transmission lines is maintained using only mechanical methods and alternative vegetation planting practices. No herbicides are used for ROW maintenance in New Hampshire. Limited use of hand-applied herbicides is used on portions of the Northfield-345 kV line segment located in Massachusetts. To date, no regulatory compliance issues have been identified for the common ROW for the 115-kV Chestnut Hill line and the two 345-kV lines.

The conditions of the transmission line equipment and rights-of-way are routinely monitored by

aerial surveys conducted by the system owners. No changes in the design and operation of these transmission lines are anticipated to occur during the VYNPS license renewal period.

3.3 Refurbishment Activities

10 CFR 51.53(c)(2) requires the following of a license renewal applicant's environmental report.

The report must contain a description of the proposed action, including the applicant's plans to modify the facility or its administrative control procedures as described in accordance with Section 54.21 of this chapter. This report must describe in detail the modifications directly affecting the environment or affecting plant effluents that affect the environment.

The objective of the review required by 10 CFR 54.21 is to determine whether the detrimental effects of plant aging could preclude certain VYNPS systems, structures, and components from performing in accordance with the current licensing basis, during the additional 20 years of operation requested in the license renewal application. There are no plans associated with license renewal to modify the facility or its administrative control procedures other than those procedures necessary to implement the aging management programs described in the Integrated Plant Assessment. The proposed action does not include any modifications directly affecting plant effluents or the environment.

The evaluation of structures and components as required by 10 CFR 54.21 has been completed and is described in the body of the VYNPS license renewal application. This evaluation did not identify the need for refurbishment of structures or components related to license renewal.

Routine replacement of certain components during the period of extended operation is expected to occur within the bounds of normal plant maintenance. Modifications to improve operation of plant systems, structures, or components are reviewed for environmental impact by station personnel during the planning stage for the modification. These reviews are controlled by site procedures.

3.4 Programs and Activities for Managing the Effects of Aging

The programs for managing aging of systems and equipment at VYNPS are described in the body of the VYNPS license renewal application. The evaluation of structures and components required by 10 CFR 54.21, identified some new inspection activities necessary to continue operation of VYNPS during the additional 20 years beyond the initial license term. These activities are described in the body of the VYNPS license renewal application. The additional inspection activities are consistent with normal plant component inspections and therefore are not expected to cause significant environmental impact. The majority of the aging management programs are existing programs or modest modifications of existing programs.

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Section 4.0, Pages 4-1 to 4-5

4.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

Discussion of GEIS Categories for Environmental Issues

The NRC has identified and analyzed 92 environmental issues that it considers to be associated with nuclear power plant license renewal and has designated the issues as Category 1, Category 2, or NA (not applicable). NRC designated an issue as Category 1 if the following criteria were met:

- the environmental impacts associated with the issue have been determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristic;
- a single significance level (i.e., small, moderate, or large) has been assigned to the impacts that would occur at any plant, regardless of which plant is being evaluated (except for collective offsite radiological impacts from the fuel cycle and from high-level waste and spent-fuel disposal); and
- mitigation of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant-specific mitigation measures are likely to be not sufficiently beneficial to warrant implementation.

If the NRC concluded that one or more of the Category 1 criteria could not be met, NRC designated the issue Category 2. NRC requires plant-specific analysis for Category 2 issues. NRC designated two issues as NA, signifying that the categorization and impact definitions do not apply to these issues. NRC rules do not require analyses of Category 1 issues that NRC resolved using generic findings (10 CFR 51, Appendix B, Table B-1) as described in the GEIS [Reference 4-11]. An applicant may reference the generic findings or GEIS analyses for Category 1 issues.

Category 1 License Renewal Issues

Entergy has determined that, of the 69 Category 1 issues, 7 are not applicable to VYNPS because they apply to design or operational features that do not exist at the facility. In addition, because Entergy does not plan to conduct refurbishment activities, the NRC findings for the 7 Category 1 issues applicable to refurbishment do not apply. Table 4-1 lists these 14 issues and provides a brief explanation of why they are not applicable to VYNPS. Table 4-2 lists the 55 Category 1 issues applicable to VYNPS. Entergy reviewed the NRC findings on these 55 issues and identified no new and significant information that would invalidate the findings for VYNPS. Entergy has not identified any new and significant information concerning the impacts addressed by these findings.

Table 4-1
Category 1 Issues Not Applicable to VYNPS

Surface Water Quality, Hydrology, and Use (for All Plants)	
Impacts of refurbishment on surface water quality	No refurbishment activities planned.
Impacts of refurbishment on surface water use	No refurbishment activities planned.
Altered salinity gradients	VYNPS located on freshwater body.
Altered thermal stratification of lakes	VYNPS not located on a lake.
Aquatic Ecology (for All Plants)	
Refurbishment	No refurbishment activities planned.
Groundwater Use and Quality	
Impacts of refurbishment on groundwater use and quality	No refurbishment activities planned.
Groundwater quality degradation (Ranney Wells)	VYNPS does not use Ranney wells.
Groundwater quality degradation (saltwater intrusion)	VYNPS located on freshwater body.
Groundwater quality degradation (cooling ponds in salt marshes)	VYNPS located on freshwater body.
Human Health	
Radiation exposures to the public during refurbishment	No refurbishment activities planned.
Occupational radiation exposures during refurbishment	No refurbishment activities planned.
Terrestrial Resources	
Cooling pond impacts on terrestrial resources	VYNPS does not use cooling ponds.
Bird collisions with cooling towers	VYNPS does not use natural draft towers.
Socioeconomics	
Aesthetic impacts (refurbishment)	No refurbishment activities planned.

Table 4- 2
Category 1 Issues Applicable to VYNPS

Surface Water Quality, Hydrology, and Use (for All Plants)
Water use conflicts (plants with once-through cooling systems)
Altered current patterns at intake and discharge structures
Temperature effects on sediment transport capacity
Scouring caused by discharged cooling water
Eutrophication
Discharge of chlorine or other biocides
Discharge of sanitary wastes and minor chemical spills
Discharge of other metals in waste water
Aquatic Ecology (for All Plants)
Accumulation of contaminants in sediments or biota
Entrainment of phytoplankton and zooplankton
Cold shock
Thermal plume barrier to migrating fish
Distribution of aquatic organisms
Premature emergence of aquatic insects
Gas supersaturation (gas bubble disease)
Low dissolved oxygen in the discharge
Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses
Stimulation of nuisance organisms (e.g., shipworms)
Aquatic Ecology (for Plants with Cooling Tower Based Heat Dissipation Systems)
Entrainment of fish and shellfish in early life stages
Impingement of fish and shellfish
Heat shock
Ground-water Use and Quality
Groundwater use conflicts (potable and service water; plants that use <100 gpm)
Terrestrial Resources
Cooling tower impacts on crops and ornamental vegetation
Cooling tower impacts on native plants
Bird collision with power lines
Power line right-of-way management (cutting and herbicide application)
Floodplains and wetland on power line right of way

Table 4- 2
Category 1 Issues Applicable to VYNPS
(Continued)

Terrestrial Resources (continued)
Impacts of electromagnetic fields on flora and fauna (plants, agricultural crops, honeybees, wildlife, livestock)
Air Quality
Air quality effects of transmission lines
Land Use
Land use (license renewal period)
Power line right-of-way
Human Health
Microbiological organisms (occupational health)
Noise
Radiation exposures to public (license renewal term)
Occupational radiation exposures (license renewal term)
Socioeconomics
Public services: public safety, social services, and tourism and recreation
Public services, education (license renewal term)
Aesthetic impacts (license renewal term)
Aesthetic impacts of transmission lines (license renewal term)
Postulated Accidents
Design basis accidents
Uranium Fuel Cycle and Waste Management
Offsite radiological impacts (individual effects from other than the disposal of spent fuel and high level waste)
Offsite radiological impacts (collective effects)
Offsite radiological impacts (spent fuel and high level waste disposal)
Non-radiological impacts of the uranium fuel cycle
Low-level waste storage and disposal
Mixed waste storage and disposal
On-site spent fuel
Nonradiological waste
Transportation

Table 4- 2
Category 1 Issues Applicable to VYNPS
(Continued)

Decommissioning
Radiation doses
Waste management
Air quality
Water quality
Ecological resources
Socioeconomic impacts

Category 2 License Renewal Issues

NRC designated 21 issues as Category 2. Sections 4.1 through 4.21 address the Category 2 issues, beginning with a statement of the issue. As is the case with Category 1 issues, some Category 2 issues (2) apply to operational features that VYNPS does not have. In addition, some Category 2 issues (4) apply only to refurbishment activities. If the issue does not apply to VYNPS, the section explains the basis.

For the 15 Category 2 issues applicable to VYNPS, the corresponding sections contain the required analyses. These analyses include conclusions regarding the significance of the impacts relative to renewal of the operating license for VYNPS and, when applicable, discuss potential mitigative alternatives to the extent required. Entergy has identified the significance of the impacts associated with each issue as SMALL, MODERATE or LARGE consistent with the criteria that NRC established in 10 CFR 51, Appendix B, Table B-1, Footnote 3 as follows.

- **SMALL** - Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. For the purposes of assessing radiological impacts, the Commission has concluded that those impacts that do not exceed permissible levels in the Commission's regulations are considered small.
- **MODERATE** - Environmental effects are sufficient to alter noticeably, but not to destabilize, any important attributes of the resource.
- **LARGE** - Environmental effects are clearly noticeable and are sufficient to destabilize any important attributes of the resource.

In accordance with NEPA practice, Entergy considered ongoing and potential additional mitigation in proportion to the significance of the impact to be addressed (i.e., impacts that are small receive less mitigative consideration than impacts that are large).

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Section 4.13, Pages 4-29, 4-30

4.13 Electromagnetic Fields –Acute Effects

4.13.1 Description of Issue

Electromagnetic fields, acute effects (electric shock)

4.13.2 Findings from Table B-1, Subpart A, Appendix A

SMALL, MODERATE, or LARGE. Electric shock resulting from direct access to energized conductors or from induced charges in metallic structures has not been a problem at most operating plants and generally is not expected to be a problem during the license renewal term. However, site-specific review is required to determine the significance of the electrical shock potential at the site. See 10 CFR 51.53(c)(3)(ii)(H).

4.13.3 Requirements [10 CFR 51.53(c)(3)(ii)(H)]

If the applicant's transmission lines that were constructed for the specific purpose of connecting the plant to the transmission system do not meet the recommendations of the National Electric Safety Code for preventing electric shock from induced currents, an assessment of the impact of the proposed action on the potential shock hazard from the transmission lines must be provided.

4.13.4 Background

The transmission line of concern is that between the plant switchyard and the intertie to the transmission system. With respect to shock safety issues and license renewal, three points must be made. First, in the licensing process for the earlier licensed nuclear plants, the issue of electrical shock safety was not addressed. Second, some plants that received operating licenses with a stated transmission line voltage may have chosen to upgrade the line voltage for reasons of efficiency, possibly without reanalysis of induction effects. Third, since the initial NEPA review for those utilities that evaluated potential shock situations under the provision of the NESC, land use may have changed, resulting in the need for reevaluation of this issue.

The electrical shock issue, which is generic to all types of electrical generating stations, including nuclear power plants, is of small significance for transmission lines that are operated in adherence with NESC. Without review of each nuclear plant's transmission line conformance with NESC criteria, it is not possible to determine the significance of the electrical shock potential [Reference 4-11, Sections 4.5.4 and 4.5.4.1].

4.13.5 Analysis of Environmental Impact

As discussed in Section 3.2.7 of this ER, two 115-kV transmission lines were originally constructed to connect VYNPS to the Vermont-New Hampshire regional transmission grid. The 50-mile long Coolidge line, owned and operated by VELCO, was actually designed and constructed in 1971 as a 345-kV line, but operated until 1974 at a voltage of only 115-kV. The Chestnut Hill 115-kV line is approximately 2 miles in length and connects VYNPS to the Chestnut Hill substation located across the river near Hinsdale, NH. This line is owned and operated by Public Service Company of New Hampshire, a subsidiary of Northeast Utilities.

The Northfield and Amherst 345-kV transmission lines owned by Northeast Utilities also connect at the VYNPS 345-kV substation. These lines were not constructed to connect VYNPS to the grid. They were constructed as part of the regional expansion of the 345-kV transmission grid expansion that occurred in the 1970's and would have been required to supply purchased power to the State of Vermont even if the station had not been located at the Vernon site.

The owners of the Coolidge 345-kV and Chestnut Hill 115-kV transmission lines were contacted for information regarding NESC code compliance related to potential induced shock hazards. The VELCO Transmission Engineering department stated that the 50-mile long Coolidge line meets the current NESC clearance standards and it has not been operated in excess of the recommended 212°F temperature limit (Reference 4-21). Routine aerial surveys of transmission line conductors, towers, equipment, and right-of-way are performed by VELCO. With over 30 years of safe operation, no conductor clearance issues have been observed and no construction infringement issues have been identified in the right-of-way. The VELCO Transmission Engineering department concluded that because the line meets minimum clearance standards and does not exceed recommended operating conditions, the 5 mA standard is not exceeded and no induced shock hazards to the public occur. Similarly, the Northeast Utilities Transmission Engineering department also stated that the 2-mile long Chestnut Hill 115-kV line is operated within the original design specifications and meets current NESC clearance standards (Reference 4-22). Northeast Utilities concluded that no induced shock hazard issues should exist.

4.13.6 Conclusion

The two transmission lines that were constructed to connect VYNPS to the regional transmission grid meet current NESC clearance criteria. Therefore, the impact of the potential for electric shock is SMALL and does not warrant mitigation.

The two transmission lines that were constructed to connect VYNPS to the regional transmission grid meet current NESC clearance criteria. Therefore, the impact of the potential for electric shock is SMALL and does not warrant mitigation.

4.14 Housing Impacts

4.14.1 Description of Issue

Housing Impacts

4.14.2 Findings from Table B-1, Appendix B to Subpart A

SMALL, MODERATE or LARGE. Housing impacts are expected to be of small significance at plants located in a medium or high population area and not in an area where growth control measures that limit housing development are in effect. Moderate or large housing impacts of the workforce associated with refurbishment may be associated with plants located in sparsely populated areas or in areas with growth control measures that limit housing development. See 10 CFR 51.53(c)(3)(ii)(I).

4.14.3 Requirement [10 CFR 51.53(c)(3)(ii)(I)]

An assessment of the impact of the proposed action on housing availability... within the vicinity of the plant must be provided.

4.14.4 Background

The impacts on housing are considered to be of small significance when a small and not easily discernible change in housing availability occurs, generally as a result of a very small demand increase or a very large housing market. Increases in rental rates or housing values in these areas would be expected to equal or slightly exceed the statewide inflation rate. No extraordinary construction or conversion of housing would occur where small impacts are foreseen.

Attachment 7

Vermont Yankee Nuclear Power Station

License Renewal Application

Amendment 9

Appendix E, Revision 2

Section 6.0, Pages 6-1 to 6-4

6.0 SUMMARY OF LICENSE RENEWAL IMPACTS AND MITIGATING ACTIONS

6.1 License Renewal Impacts

Entergy has reviewed the environmental impacts of renewing the VYNPS operating license and has concluded that all impacts would be SMALL and would not require mitigation. This environmental report documents the basis for Entergy's conclusion. Section 4 incorporates by reference NRC findings for the 55 Category 1 issues that apply to VYNPS (and for the 2 "NA" issues for which NRC came to no generic conclusion), all of which have impacts that are SMALL. The remainder of Section 4 analyzes Category 2 issues, all of which are either not applicable or have impacts that would be SMALL. Table 6-1 identifies the impacts that VYNPS license renewal would have on resources associated with Category 2 issues.

6.2 Mitigation

6.2.1 Requirement [10 CFR 51.45(c)]

The report must contain a consideration of alternatives for reducing adverse impacts, as required by §51.45(c), for all Category 2 license renewal issues in Appendix B to subpart A of this part. No such consideration is required of Category 1 issues in Appendix B to subpart A of this part. [10 CFR 51.53 (c)(3)(iii)]

6.2.2 Entergy Response

As discussed in Supplement 1 to Regulatory Guide 4.2, "Preparation of Supplemental Environmental Reports for Applications to Renew Nuclear Power Plant Operating Licenses," when adverse environmental effects are identified, 10 CFR 51.45(c) requires consideration of alternatives available to reduce or avoid these adverse effects. Furthermore, Regulatory Guide 4.2 states, "Mitigation alternatives are to be considered no matter how small the adverse impact; however, the extent of the consideration should be proportional to the significance of the impact." [Reference 6-2]

As described in Section 6.1 and shown in Table 6-1, analysis of the Category 2 issues found the impacts to be small for the applicable issues. For these issues, the current permits, practices, and programs that mitigate the environmental impacts of plant operations are adequate. This ER finds that no additional mitigation measures are sufficiently beneficial as to be warranted.

Table 6-1
Environmental Impacts Related to License Renewal at VYNPS

Issue	Environmental Impact
Surface Water Quality, Hydrology and Use (for All Plants)	
Water use conflicts (plants with cooling ponds or cooling towers using make-up water from a small river with low flow) 10CFR51.53(c)(3)(ii)(A)	SMALL. VYNPS's current cooling water makeup is a very small percentage (0.1%) of the average daily flow through Vernon Dam. Water withdrawal has caused no water availability concerns for the river, conflicts with other off-stream users, or adverse impacts on riparian or in-stream ecological communities. Consideration of mitigation is not required.
Aquatic Ecology (for All Plants with Once-Through and Cooling Pond Heat Dissipation Systems)	
Entrainment of fish and shellfish 10CFR51.53(c)(3)(ii)(B)	SMALL. Annual studies on potential impact of cooling water withdrawals from Vernon Pool on indigenous communities of fish in Vernon Pool have shown no adverse impact. Consideration of mitigation is not required.
Impingement of fish and shellfish 10CFR51.53(c)(3)(ii)(B)	SMALL. Annual studies on potential impact of cooling water withdrawals from Vernon Pool on indigenous communities of fish in Vernon Pool have shown no adverse impact. Consideration of mitigation is not required.
Heat shock 10CFR51.53(c)(3)(ii)(B)	SMALL. Studies on potential impact of cooling water discharges on aquatic biota have shown no adverse impact. Consideration of mitigation is not required.
Groundwater Use and Quality	
Groundwater use conflicts (plants using >100 gpm of ground-water) 10CFR51.53(c)(3)(ii)(C)	SMALL. VYNPS groundwater pump rate from all onsite potable wells is 8.54 gpm based on measured water usage during 2002 and 2003. Estimate of groundwater demand needed for 1,700 employees during a refueling outage was 35.4 gpm. Consideration of mitigation is not required.
Groundwater use conflicts (plants using cooling towers withdrawing make-up water from a small river) 10CFR51.53(c)(3)(ii)(A)	SMALL. VYNPS's current cooling water makeup is a very small percentage (0.1%) of the average daily flow through Vernon Dam and does not affect river or aquifer elevation, or aquifer recharge rates. Water withdrawal has caused no water availability concerns for the river or conflicts with other off-stream users. Consideration of mitigation is not required.
Groundwater use conflicts (Ranney Wells) 10CFR51.53(c)(3)(ii)(C)	NONE. VYNPS does not use Ranney wells. Consideration of mitigation is not required.
Degradation of groundwater quality 10CFR51.53(c)(3)(ii)(D)	NONE. VYNPS does not use cooling ponds. Consideration of mitigation is not required.

Table 6-1
Environmental Impacts Related to License Renewal at VYNPS
(Continued)

Issue	Environmental Impact
Terrestrial Resources	
Refurbishment impacts on terrestrial resources 10CFR51.53(c)(3)(ii)(E)	NONE. No major refurbishment activities identified. Consideration of mitigation is not required.
Threatened or Endangered Species (for All Plants)	
Threatened or endangered species 10CFR51.53(c)(3)(ii)(E)	SMALL. No major refurbishment activities identified. No threatened or endangered species impacted by continued operations of VYNPS. Consideration of mitigation is not required.
Air Quality	
Air quality during refurbishment 10CFR51.53(c)(3)(ii)(F)	NONE. No major refurbishment activities identified. Consideration of mitigation is not required.
Human Health	
Microbiological (Thermophilic) Organisms 10CFR51.53(c)(3)(ii)(G)	SMALL. Contact recreation on the Connecticut River is uncommon and there are no public swimming areas occurring on the river between Brattleboro and Vernon. Potential for exposure is extremely low. Consideration of mitigation is not required.
Electromagnetic fields Acute effects 10CFR51.53(c)(3)(ii)(H)	SMALL. Transmission lines are in conformance with NESC criteria. Consideration of mitigation is not warranted.
Socioeconomics	
Housing impacts 10CFR51.53(c)(3)(ii)(I)	SMALL. No major refurbishment activities identified. Entergy does not anticipate an increase in employment during period of extended operation. Therefore, there no additional impacts to housing are expected due to continued operations of VYNPS. Consideration of mitigation is not required.
Public utilities: public water supply availability 10CFR51.53(c)(3)(ii)(I)	SMALL. No major refurbishment activities identified and no additional workers anticipated during the period of extended operation. Public water systems near VYNPS have adequate system capacity to meet demand of residential and industrial customers in the area. Consideration of mitigation is not required.
Education impacts from refurbishment 10CFR51.53(c)(3)(ii)(I)	NONE. No major refurbishment activities identified. Consideration of mitigation is not required.
Offsite land use (effects of refurbishment activities) 10CFR51.53(c)(3)(ii)(I)	NONE. No major refurbishment activities identified. Consideration of mitigation is not required.

Table 6-1
Environmental Impacts Related to License Renewal at VYNPS
(Continued)

Issue	Environmental Impact
Socioeconomics (continued)	
Offsite land use (effects of license renewal) 10CFR51.53(c)(3)(ii)(I)	SMALL. Area around VYNPS has pre-established land patterns of development and has public services and regulatory controls in place to support and guide development. No additional workers anticipated during the period of extended operation. Consideration of mitigation is not required.
Local transportation impacts 10CFR51.53(c)(3)(ii)(J)	SMALL. No major refurbishment activities identified and no increases in total number of employees during the period of extended operation. Consideration of mitigation is not required.
Historic and archaeological properties 10CFR51.53(c)(3)(ii)(K)	SMALL. No major refurbishment activities identified and no archaeologically and historically sensitive areas present on-site. Consideration of mitigation is not required.
Postulated Accidents	
Severe accident mitigation alternatives 10CFR51.53(c)(3)(ii)(L)	SMALL. No impact from continued operation. Potentially cost-effective SAMAs are not related to adequately managing the effects of aging during period of extended operation. Consideration of mitigation is not required.