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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
Entergy Nuclear Vermont Yankee, LLC	)	Docket No. 50-271-LR
and Entergy Nuclear Operations, Inc.	)	ASLBP No. 06-849-03-LR
	)	
(Vermont Yankee Nuclear Power Station)	)	

ENTERGY'S ANSWER TO NEW ENGLAND COALITION'S PETITION FOR LEAVE TO INTERVENE, REQUEST FOR HEARING, AND CONTENTIONS

I. INTRODUCTION

Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (hereinafter collectively referred to as "Entergy") hereby answer and oppose the "Petition for Leave to Intervene, Request for Hearing, and Contentions" dated May 26, 2006 (the "Petition" or "Pet."), filed by the New England Coalition ("NEC") regarding Entergy's application to renew the operating license for the Vermont Yankee Nuclear Power Station ("VYNPS"). NEC's Petition should be denied because NEC has not identified any admissible contentions.[1]

II. PROCEDURAL BACKGROUND

Entergy submitted its application, dated January 25, 2006, requesting renewal of Operating License DPR-28 for the Vermont Yankee Nuclear Power Station (the "Application").

[1] NEC is also seeking to adopt the contentions of the Vermont Department of Public Service ("DPS"). New England Coalition's Notice of Adoption of Contentions, or in the Alternative, Motion to Adopt Contentions" (June 5, 2006). Entergy has filed a response opposing NEC's motion. Entergy's Answer to New England Coalition's Motion to Adopt Contentions (June 20, 2006). Entergy has also responded to DPS's contentions. Entergy's Answer to the Vermont Department of Public Service Notice of Intention to Participate and Petition to Intervene (June 22, 2006). Entergy's response to the DPS contentions will not be repeated here, but is incorporated by reference in the event that NEC's motion to adopt is granted.

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On March 27, 2006, the Nuclear Regulatory Commission ("NRC" or "Commission") published a Notice of Acceptance for Docketing of the Application and Notice of Opportunity for Hearing ("Notice") regarding Entergy's application. 71 Fed. Reg. 15,220 (Mar. 27, 2006). The Notice permitted any person whose interest may be affected to file a request for hearing and petition for leave to intervene within 60 days of the notice. Id. at 15,220-21.

The Notice directs that any petition shall set forth with particularity the interest of the petitioner and how that interest may be affected, and must also set forth the specific contentions sought to be litigated. Id. at 15,221. The Notice states:

> Each contention must consist of a specific statement of the issue of law or fact to be raised or controverted. In addition, the requestor/petitioner shall provide a brief explanation of the bases of each contention and a concise statement of the alleged facts or the expert opinion that supports the contention on which the requestor/petitioner intends to rely in proving the contention at the hearing. The requestor/petitioner must also provide references to those specific sources and documents of which the requestor/petitioner is aware and on which the requestor/petitioner intends to rely to establish those facts or expert opinion. The requestor/petitioner must provide sufficient information to show that a genuine dispute exists with the applicant on a material issue of law or fact. Contentions shall be limited to matters within the scope of the action under consideration. The contention must be one that, if proven, would entitle the requestor/petitioner to relief. A requestor/petitioner who fails to satisfy these requirements with respect to at least one contention will not be permitted to participate as a party.

Id. (footnote omitted).

III. STANDING

Entergy does not contest NEC's standing to seek to participate in this proceeding.

IV. STANDARDS FOR ADMISSIBILITY OF CONTENTIONS

A. Contentions Must Be Within the Scope of the Proceeding and May Not Challenge NRC's Rules

As a fundamental requirement, a contention is only admissible if it addresses matters within the scope of the proceeding and does not seek to attack the NRC's regulations governing the proceeding. This fundamental limitation is particularly important in a license renewal proceeding, because the Commission has conducted extensive rulemaking to define and limit the technical and environmental showing that an applicant must make. As discussed later in this answer, a number of NEC's contentions fall outside the scope of this proceeding.

10 C.F.R. Part 54 governs the health and safety matters that must be considered in a license renewal proceeding. The Commission has specifically limited this safety review to the matters specified in 10 C.F.R. §§ 54.21 and 54.29(a),[2] which focus on the management of aging of certain systems, structures and components, and the review of time-limited aging evaluations. See Florida Power & Light Co. (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-01-17, 54 N.R.C. 3, 7-8 (2004); Duke Energy Corp. (McGuire Nuclear Station, Units 1 and 2), CLI-02-26, 56 N.R.C. 358, 363 (2002). Thus, the potential effect of aging is the issue that essentially defines the scope of license renewal proceedings. Dominion Nuclear Connecticut, Inc. (Millstone Nuclear Power Station, Units 2 and 3), CLI-04-36, 60 N.R.C. 631, 637 (2004).

The rules in 10 C.F.R. Part 54 are intended to make license renewal a stable and predictable process. 60 Fed. Reg. at 22,461, 22,462, 22,463, 22,485. As the Commission has explained, "We sought to develop a process that would be both efficient, avoiding duplicative

[2] The Commission has stated that the scope of review under its rules determines the scope of admissible issues in a renewal hearing. 60 Fed. Reg. 22,461, 22,482 n.2 (May 8, 1995). "Adjudicatory hearings in individual license renewal proceedings will share the same scope of issues as our NRC Staff review, for our hearing process (like our Staff's review) necessarily examines only the questions our safety rules make pertinent." Turkey Point, CLI-01-17, 54 N.R.C. at 10.

assessments where possible, and effective, allowing the NRC Staff to focus its resources on the most significant safety concerns at issue during the renewal term." Turkey Point, CLI-01-17, 54 N.R.C. at 7 (2001). "License renewal reviews are not intended to 'duplicate the Commission's ongoing reviews of operating reactors.'" Id. (citation omitted). To this end, the Commission has confined 10 C.F.R. Part 54 to those issues uniquely determined to be relevant to the public health and safety during the period of extended operation, leaving all other issues to be addressed by the existing regulatory processes. 60 Fed. Reg. at 22,463. This scope is based on the principle established in the rulemaking proceedings that, with the exception of the detrimental effects of aging and a few other issues related to safety only during the period of extended operation, the existing regulatory processes are adequate to ensure that the licensing bases of currently-operating plants provide and maintain an adequate level of safety. 60 Fed. Reg. at 22,464, 22,481-82. Consequently, license renewal does not focus on operational issues, because these issues "are effectively addressed and maintained by ongoing agency oversight, review, and enforcement." Millstone, CLI-04-36, 60 N.R.C. at 638 (footnote omitted).

The NRC rules governing environmental matters – which are contained in 10 C.F.R. §§ 51.53(c), 51.95(c), and Appendix B to Part 51 – are similarly intended to produce a more focused and, therefore, more effective review. 61 Fed. Reg. 28,467 (June 5, 1996); Turkey Point, CLI-01-17, 54 N.R.C. at 11. To accomplish this objective, the NRC prepared a comprehensive Generic Environmental Impact Statement ("GEIS") for License Renewal of Nuclear Plants (NUREG-1437) and made generic findings reflected in the GEIS and in Appendix B to 10 C.F.R. Part 51. Those issues that could be resolved generically for all plants are designated as Category 1 issues and are not evaluated further in a license renewal proceeding (absent waiver or suspension of the rule by the Commission based on new and significant

information). 61 Fed. Reg. at 28,468, 28,470, 28,474; Turkey Point, CLI-01-17, 54 N.R.C. at 12. The remaining (i.e., Category 2) issues that must be addressed in an applicant's environmental report are defined specifically in 10 C.F.R. § 51.53(c). See generally, Turkey Point, CLI-01-17, 54 N.R.C. at 11-12.

10 C.F.R. § 2.309(f)(1)(iii)-(iv) requires a petitioner to demonstrate that the issue raised by each of its contentions is within the scope of the proceeding and material to the findings that the NRC must make. Licensing boards "are delegates of the Commission" and, as such, they may "exercise only those powers which the Commission has given [them]." Public Service Co. of Indiana (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-316, 3 N.R.C. 167, 170 (1976) (footnote omitted); accord Portland General Electric Co. (Trojan Nuclear Plant), ALAB-534, 9 N.R.C. 287, 289-90 n.6 (1979). Accordingly, it is well established that a contention is not cognizable unless it is material to a matter that falls within the scope of the proceeding for which the licensing board has been delegated jurisdiction. Id.; see also Commonwealth Edison Co. (Zion Station, Units 1 and 2), ALAB-616, 12 N.R.C. 419, 426-27 (1980); Commonwealth Edison Co. (Carroll County Site), ALAB-601, 12 N.R.C. 18, 24 (1980).

It is also well established that a petitioner is not entitled to an adjudicatory hearing to attack generic NRC requirements or regulations. Duke Energy Corp. (Oconee Nuclear Station, Units 1, 2 and 3), CLI-99-11, 49 N.R.C. 328, 334 (1999). "[A] licensing proceeding . . . is plainly not the proper forum for an attack on applicable statutory requirements or for challenges to the basic structure of the Commission's regulatory process." Philadelphia Electric Co. (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-216, 8 A.E.C. 13, 20, aff'd in part on other grounds, CLI-74-32, 8 A.E.C. 217 (1974) (footnote omitted). Thus, a contention which collaterally attacks a Commission rule or regulation is not appropriate for litigation and must be

rejected. 10 C.F.R. § 2.335; Potomac Electric Power Co. (Douglas Point Nuclear Generating Station, Units 1 and 2), ALAB-218, 8 A.E.C. 79, 89 (1974). A contention which "advocate[s] stricter requirements than those imposed by the regulations" is "an impermissible collateral attack on the Commission's rules" and must be rejected. Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), LBP-82-106, 16 N.R.C. 1649, 1656 (1982); see also Arizona Public Service Co. (Palo Verde Nuclear Generating Station, Units 1, 2, and 3), LBP-91-19, 33 N.R.C. 397, 410, aff'd in part and rev'd in part on other grounds, CLI-91-12, 34 N.R.C. 149 (1991). Likewise, a contention that seeks to litigate a generic determination established by Commission rulemaking is "barred as a matter of law." Pacific Gas & Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), LBP-93-1, 37 N.R.C. 5, 30 (1993).

These limitations are very germane to this proceeding in that the scope of admissible environmental contentions is constrained by 10 C.F.R. §§ 51.53(c), 51.95(c), and Appendix B to Part 51; and the scope of technical contentions is constrained by 10 C.F.R. Part 54. See Turkey Point, CLI-01-17, 54 N.R.C. at 5-13. See also Florida Power & Light Co. (Turkey Point Nuclear Generating Plant, Units 3 and 4), CLI-00-23, 52 N.R.C. 327, 329 (2000); Baltimore Gas & Electric Co. (Calvert Cliffs Nuclear Power Plant, Units 1 and 2), CLI-98-14, 48 N.R.C. 39, 41 (1998), motion to vacate denied, CLI-98-15, 48 N.R.C. 45, 56 (1998); Duke Energy Corp. (Oconee Nuclear Station, Units 1, 2 and 3), CLI-98-17, 48 N.R.C. 123, 125 (1998).

B. Contentions Must Be Specific and Supported By a Basis Demonstrating a Genuine, Material Dispute

In addition to the requirement to address issues within the scope of the proceeding, a contention is admissible only if it provides:

- a "specific statement of the issue of law or fact to be raised or controverted;"
- a "brief explanation of the basis for the contention;"

- a "concise statement of the alleged facts or expert opinions" supporting the contention together with references to "specific sources and documents on which the requestor/petitioner intends to rely to support its position on the issue;" and

- "[s]ufficient information to show that a genuine dispute exists with the applicant/licensee on a material issue of law or fact," which showing must include "references to specific portions of the application (including the applicant's environmental report and safety report) that the petitioner disputes and the supporting reasons for each dispute, or, if the petitioner believes that the application fails to contain information on a relevant matter as required by law, the identification of each failure and the supporting reasons for the petitioner's belief."

10 C.F.R. § 2.309(f)(1)(i), (ii), (v) and (vi). The failure of a contention to comply with any one of these requirements is grounds for dismissing the contention. Palo Verde, CLI-91-12, 34 N.R.C. at 155-56. As discussed later in this answer, none of Petitioners' contentions complies with these requirements.

These pleading standards governing the admissibility of contentions are the result of a 1989 amendment to 10 C.F.R. § 2.714, now § 2.309, which was intended "to raise the threshold for the admission of contentions." 54 Fed. Reg. 33,168 (Aug. 11, 1989); see also Oconee, CLI-99-11, 49 N.R.C. at 334; Palo Verde, CLI-91-12, 34 N.R.C. at 155-56. The Commission has stated that the "contention rule is strict by design," having been "toughened . . . in 1989 because in prior years 'licensing boards had admitted and litigated numerous contentions that appeared to be based on little more than speculation.'" Dominion Nuclear Connecticut, Inc. (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 N.R.C. 349, 358 (2001) (citation omitted). The pleading standards are to be enforced rigorously. "If any one . . . is not met, a contention must be rejected." Palo Verde, CLI-91-12, 34 N.R.C. at 155 (citation omitted). A licensing board is not to overlook a deficiency in a contention or assume the existence of missing information. Id.

The Commission has explained that this "strict contention rule" serves multiple purposes, which include putting other parties on notice of the specific grievances and assuring that full adjudicatory hearings are triggered only by those able to proffer at least some minimal factual and legal foundation in support of their contentions. Oconee, CLI-99-11, 49 N.R.C. at 334. By raising the threshold for admission of contentions, the NRC intended to obviate lengthy hearing delays caused in the past by poorly defined or supported contentions. Id. As the Commission reiterated in incorporating these same standards into the new Part 2 rules, "[t]he threshold standard is necessary to ensure that hearings cover only genuine and pertinent issues of concern and that issues are framed and supported concisely enough at the outset to ensure that the proceedings are effective and focused on real, concrete issues." 69 Fed. Reg. at 2,189-90.

Under these standards, a petitioner is obligated "to provide the [technical] analyses and expert opinion" or other information "showing why its bases support its contention." Georgia Institute of Technology (Georgia Tech Research Reactor, Atlanta, Georgia), LBP-95-6, 41 N.R.C. 281, 305, vacated in part and remanded on other grounds, CLI-95-10, 42 N.R.C. 1, aff'd in part, CLI-95-12, 42 N.R.C. 111 (1995). Where a petitioner has failed to do so, "the [Licensing] Board may not make factual inferences on [the] petitioner's behalf." Id., citing Palo Verde, CLI-91-12, 34 N.R.C. 149. See also Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation), LBP-98-7, 47 N.R.C. 142, 180 (1998) (a "bald assertion that a matter ought to be considered or that a factual dispute exists . . . is not sufficient"; rather "a petitioner must provide documents or other factual information or expert opinion" to support a contention's "proffered bases") (citations omitted).

Further, admissible contentions "must explain, with specificity, particular safety or legal reasons requiring rejection of the contested [application]." Millstone, CLI-01-24, 54 N.R.C. at

359-60. In particular, this explanation must demonstrate that the contention is "material" to the NRC's findings and that a genuine dispute on a material issue of law or fact exists. 10 C.F.R. § 2.309(f)(1)(iv), (vi) (emphasis added). The Commission has defined a "material" issue as meaning one where "resolution of the dispute would make a difference in the outcome of the licensing proceeding." 54 Fed. Reg. at 33,172 (emphasis added).

As observed by the Commission, this threshold requirement is consistent with judicial decisions, such as Conn. Bankers Ass'n v. Bd. of Governors, 627 F.2d 245, 251 (D.C. Cir. 1980), which held that:

> [A] protestant does not become entitled to an evidentiary hearing merely on request, or on a bald or conclusory allegation that . . . a dispute exists. The protestant must make a minimal showing that material facts are in dispute, thereby demonstrating that an "inquiry in depth" is appropriate.

Id. (footnote omitted); see also Calvert Cliffs, CLI-98-14, 48 N.R.C. at 41 ("It is the responsibility of the Petitioner to provide the necessary information to satisfy the basis requirement for the admission of its contentions . . . ."). A contention, therefore, is not to be admitted "where an intervenor has no facts to support its position and where the intervenor contemplates using discovery or cross-examination as a fishing expedition which might produce relevant supporting facts." 54 Fed. Reg. at 33,171.[3] As the Commission has emphasized, the contention rule bars contentions where petitioners have what amounts only to generalized suspicions, hoping to substantiate them later, or simply a desire for more time and more

[3] See also Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), ALAB-687, 16 N.R.C. 460, 468 (1982), vacated in part on other grounds, CLI-83-19, 17 N.R.C. 1041 (1983) ("[A]n intervention petitioner has an ironclad obligation to examine the publicly available documentary material pertaining to the facility in question with sufficient care to enable [the petitioner] to uncover any information that could serve as the foundation for a specific contention. Stated otherwise, neither Section 189a. of the Act nor Section 2.714 [now 2.309] of the Rules of Practice permits the filing of a vague, unparticularized contention, followed by an endeavor to flesh it out through discovery against the applicant or staff.").

information in order to identify a genuine material dispute for litigation. Duke Energy Corp. (McGuire Nuclear Station, Units 1 and 2), CLI-03-17, 58 N.R.C. 419, 424 (2003).

Therefore, under the Rules of Practice, a statement "that simply alleges that some matter ought to be considered" does not provide a sufficient basis for a contention. Sacramento Municipal Utility District (Rancho Seco Nuclear Generating Station), LBP-93-23, 38 N.R.C. 200, 246 (1993), review declined, CLI-94-2, 39 N.R.C. 91 (1994). Similarly, a mere reference to documents does not provide an adequate basis for a contention. Baltimore Gas & Electric Co. (Calvert Cliffs Nuclear Power Plant, Units 1 and 2), CLI-98-25, 48 N.R.C. 325, 348 (1998).

Rather, NRC's pleading standards require a petitioner to read the pertinent portions of the license application, including the safety analysis report and the environmental report, state the applicant's position and the petitioner's opposing view, and explain why it has a disagreement with the applicant. 54 Fed. Reg. at 33,170; Millstone, CLI-01-24, 54 N.R.C. at 358. If the petitioner does not believe these materials address a relevant issue, the petitioner is "to explain why the application is deficient." 54 Fed. Reg. at 33,170; Palo Verde, CLI-91-12, 34 N.R.C. at 156. A contention that does not directly controvert a position taken by the applicant in the license application is subject to dismissal. See Texas Utilities Electric Co. (Comanche Peak Steam Electric Station, Unit 2), LBP-92-37, 36 N.R.C. 370, 384 (1992). Furthermore, an allegation that some aspect of a license application is "inadequate" or "unacceptable" does not give rise to a genuine dispute unless it is supported by facts and a reasoned statement of why the application is unacceptable in some material respect. Florida Power & Light Co. (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-90-16, 31 N.R.C. 509, 521 & n.12 (1990).

V. NEC'S CONTENTIONS ARE BEYOND THE SCOPE OF THIS PROCEEDING, VAGUE, UNSUPPORTED, BASED ON ERRONEOUS FACTUAL ASSERTIONS, AND OTHERWISE INADMISSIBLE

As explained below, none of NEC's proposed contentions meet the applicable standards for the admission of contentions in NRC licensing proceedings.

A. Contention 1: Water Quality

NEC's Contention 1, which alleges that "Entergy failed to assess impacts to water quality" (Pet. at 10), is inadmissible for numerous reasons. First, it is inadmissible as a challenge to the NRC's license renewal rules and barred by the Clean Water Act. In addition, it is not supported by a basis indicating any genuine dispute concerning a material issue.

At the outset, it should be noted that the Petition is premised on a mischaracterization of the Application. NEC states that "Entergy proposes to increase the Connecticut River's temperature by one degree F" (Pet. at 10), implying that such an increase is somehow related to the license renewal. In its Application, Entergy merely disclosed that there was a pending application to amend the National Pollution Discharge Elimination System ("NPDES") permit for VYNPS to increase the thermal discharge limits for the facility. See ER at 4-17. This amendment was not proposed for license renewal.[4] Further, the Vermont Agency of Natural Resources ("VANR") has now granted this amendment, approving a 1° increase in the thermal limitations during the period from June 16 through October 14, but denying such an increase during the period from May 16 through June 15. See Amended Fact Sheet at 1. A copy of the

[4] Entergy applied for this amendment on February 20, 2003, in order to facilitate increased power generation during summer time peak load periods, improve operational flexibility by reducing the need for the Station to react to unexpected temporary reductions in River flow, to increase operational efficiency, and to reduce the frequency of operation of the VY cooling towers. See Letter from B. Kooiker, Vt. Agency for Natural Resources, to L. DeWald, Entergy Nuclear Vermont Yankee, LCC, "Final Amended Discharge Permit #3-1199" (Mar. 31, 2006) ("Final Amended Permit"), Amended Fact Sheet at 9. The VANR amended the existing NPDES permit which has an expiration date of March 31, 2006, but remains in effect because of a separate timely renewal application still pending before the agency. See Attachment 1 hereto.

Final Amended Permit and Amended Fact Sheet is enclosed as Attachment 2 hereto for the convenience of the Board and petitioners.

In any event, Contention 1 is inadmissible because it challenges the NRC's license renewal rules at 10 C.F.R. § 51.53(c)(3)(ii)(B). That rule provides:

> If the applicant's plant utilizes once-through cooling or cooling pond heat dissipation systems, the applicant shall provide a copy of current Clean Water Act 316(b) determinations and, if necessary, a 316(a) variance in accordance with 40 CFR part 125, or equivalent State permits and supporting documentation. If the applicant can not provide these documents, it shall assess the impact of the proposed action on fish and shellfish resources resulting from heat shock and impingement and entrainment.

When the NRC proposed this provision, it explained:

> The permit process authorized by the FWPCA is an adequate mechanism for control and mitigation of these potential aquatic impacts. If an applicant to renew a license has appropriate EPA or State permits, further NRC review of these potential impacts is not warranted. Therefore, the proposed rule requires an applicant to provide the NRC with certification that it holds FWPCA permits, or if State regulation applies, current State permits. If the applicant does not so certify, its must assess these aquatic impacts.

56 Fed. Reg. 47,016, 47,019 (Sep. 17, 1991).

Entergy's Application provided the NPDES permit which constituted Vermont's 316(a) determination for the thermal discharges permitted at the time, and Entergy subsequently provided the amended permit constituting the 316(a) determination for the thermal discharge with the 1°F increase. Therefore, under the NRC rules, no further analysis was required. NEC's assertion to the contrary is barred by the rules.

NEC appears to argue that NEPA requires Entergy and the NRC to evaluate the thermal impacts notwithstanding the issuance of the NPDES permit. This position is contrary to law. Section 511(c) of the Clean Water Act provides:

(2) Nothing in the National Environmental Policy Act of 1969 (83 Stat. 852) shall be deemed to –

> (A) authorize any Federal agency authorized to license or permit the conduct of any activity which may result in the discharge of a pollutant into the navigable waters to review any effluent limitation or other requirement established pursuant to this chapter or the adequacy of any certification under section 1341 of this title; or
>
> (B) authorize any such agency to impose, as a condition precedent to the issuance of any license or permit, any effluent limitation other than any such limitation established pursuant to this chapter.

33 U.S.C. § 1371(c)(2) (2004).

10 C.F.R. § 51.53(c)(3)(ii)(B), which governs the extent to which a license renewal applicant must assess aquatic impacts, is intended to be consistent with the limitations on the NRC's authority under section 511(c) of the Clean Water Act. In promulgating its, rule, the Commission stated:

> The Commission has considered the impacts of license renewal on aquatic ecology and, in so doing, has reviewed existing NPDES permits.... Agencies responsible for existing permits are not constrained from reexamining the permit issues if they have reason to believe that the basis for their issuance is no longer valid. The Commission does not have authority under NEPA to impose an effluent limitation other than those established in permits issued pursuant to the [FWPCA].

61 Fed. Reg. 28,467, 28,475 (Jun. 5, 1996).

Accordingly, the NRC's rules explain:

> Where an environmental assessment of aquatic impact from plant discharges is available from the permitting authority, the NRC will consider the assessment in its determination of the magnitude of environmental impacts for striking an overall cost-benefit balance at the construction permit and operating license stages, and in its determination of whether the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy planning decision makers would be unreasonable at the license renewal stage.

10 C.F.R. § 51.71(d) n.3 (2003). Such acceptance of the NPDES permitting agency's assessment of aquatic impacts is justified under section 511 of the Clean Water Act. Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-422, 6 N.R.C. 33, 69 (1977), aff'd, CL-78-1, 7 N.R.C. 1, 26 (1978), aff'd sub nom., New England Coalition on Nuclear Pollution v. NRC, 582 F.2d 87 (1st Cir. 1978). In New England Coalition, the Court stated:

> The NRC did not shirk its NEPA duties. It performed its . . . FWPCA duties by deciding to accept as dispositive EPA determinations concerning one aspect of the overall environmental impact. We cannot agree with the petitioners that this course of action unfairly deprives them of a chance for input. If any party chose not to appear before the EPA, it was not for lack of opportunity to do so. . . . Clearly what [petitioners] seek is a second forum in which to present their case in hopes of improving their chance of success. Fairness does not require that they be accorded such an opportunity. NEPA does not require that the NRC offer such an opportunity.

582 F.2d at 98-99.

Thus, NRC case law holds that where the EPA or an authorized state has approved a plant's cooling water system, the obligations of the NRC is to weigh the overall project in light of the conclusions of the EPA or authorized state. Public Service Co. of New Hampshire (Seabook Station, Units 1 and 2), ALAB-366, 5 N.R.C. 39, 62 (1977); Seabrook, ALAB-422, 6 N.R.C. at 70. Where the EPA or an authorized state has assessed the aquatic impacts in approving a plant's cooling water system, the NRC must take that assessment at face value. Carolina Power & Light Co. (H. B. Robinson, Unit No. 2), ALAB-569, 10 N.R.C. 557, 562 (1979). NRC may not undercut these judgments by undertaking independent analyses or setting its own standards. Tennessee Valley Authority, (Yellow Creek Nuclear Plant, Units 1 and 2), ALAB-515, 8 N.R.C. 702, 712-13, 715 (1978).

The NPDES permit for VYNPS and the supporting documentation (the amended fact sheet issued with the license) provide such an assessment. The amended NPDES permit is supported by a § 316(a) demonstration submitted by Entergy and credited by the State of Vermont in granting the permit, substantive input from the New Hampshire Fish and Game Department and the U.S. Fish and Wildlife Service, and review by an independent third-party consultant for the VANR. See Attachment 2, Amended Fact Sheet at 3, 4. In approving the 1°F increase in the thermal limitations during the period from June 16 through October 14, the VANR concurred with the determination that the existing discharge under the thermal effluent limitations in effect at the time had resulted in "no appreciable harm" to the aquatic biota. Id., Amended Fact Sheet at 4. The VANR also agreed that, with its decision limiting the 1°F increase to the period from June 16 through October 14, the proposed limits would continue to assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife during this period (id. at 4-5), as is required by section 316(a) of the Clean Water Act (33 U.S.C. § 1326(a)).

> The Applicant's predictive analysis for the Demonstration indicates that the approved temperature increase will create insignificant changes in the thermal structures of the receiving waters affected by the project's discharge and that as a result the use of the waters by all species will be maintained and protected.
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> * * *
>
> The Agency has concluded that there will be no significant impact from the proposed discharge on the aquatic biota that are present in the area affected by the proposed discharge. The agency therefore agrees with the Applicant's analysis that the use of the waters by all species present will be maintained and protected.

Id. at 6-7. Further findings related to the American shad are included in the VANR's Responsiveness Summary, which responds to public comments received during that agency's proceeding and hearing. A copy of the Responsiveness Summary is enclosed as Attachment 3 for the Board's convenience. Thus, with respect to the 1°F increase in thermal limitations which

NEC contends must be assessed by both Entergy and the NRC, the NPDES permit and supporting documentation contain an assessment that is dispositive in this proceeding.

Perhaps recognizing the dispositive effect of the NDPES permit and 316(a) determinations, NEC argues that the NPDES permit is "under *de novo* appeal and is not final" and similarly argues that the permit is valid for only five years. Pet. at 11. The NPDES permit is final on its face: it is captioned "Final Amended Discharge Permit #3-1199," see Attachment 2 (emphasis added). Therefore, it is effective once issued unless stayed. In addition, if the amended permit were vacated on appeal, the 1°F temperature increase of which NEC complains would not occur. Further, whether the permit might later be amended again, either as the result of an appeal, some further application, of the State of Vermont's own initiative, is a matter beyond the NRC's jurisdiction.[5] Section 511 prohibits the NRC from reviewing the State's determinations, and the Commission has made it clear that Licensing Boards should narrowly construe their scope to avoid where possible the litigation of issues that are the primary responsibility of other agencies. Hydro Resources, Inc. (2929 Coors Road, Suite 101, Albuquerque, NM 87120), CLI-98-16, 48 N.R.C. 119, 121-22 (1998). The VANR and the Vermont Environmental Court to which VANR decisions may be appealed are the appropriate forums in which NEC can raise its concerns, and indeed, NEC is one of the parties currently pursuing an appeal of the VYNPS final amended permit. As the First Circuit has held, neither fairness nor NEPA require any more. New England Coalition, 582 F.2d at 99.

[5] The five-year review of a permit's conditions are a strength supporting the conclusions that the conditions are protective, not a weakness. Because of this periodic review, there is a mechanism ensuring that limits remain adequate to assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife. Thus, the five-year review period supports rather than undercuts the agency's conclusions and the NRC's reliance thereon.

Even if NEC's Contention 1 were permitted by the rules and statute – which it is not – it would still be inadmissible because the proffered bases in support of its admissibility are irrelevant. NEC relies on statements in a declaration from its consultant Dr. Ross T. Jones (Pet. Exhibit 6) ("Jones Decl.") as bases for its proposed Contention 1. After stating that recent studies have shown "a dramatic decline in the population of some species" in the Connecticut River over the last ten years, Dr. Jones acknowledges that "[t]he relative importance of thermal discharge and other environmental factors in these biological changes is not yet known." Id. ¶ 8, emphasis added. He concludes that " . . . even a 1°F increase in water temperature, in conjunction with constant thermal discharge into the Connecticut River and the cumulative effects of atmospheric warming and other sources of pollution or stress, may adversely impact American shad and cause further decline in this species over the next twenty years." Id. ¶ 12, emphasis added. After acknowledging once more that "[t]he adverse effect of increased temperature on other components of the Connecticut River ecology is not well documented," he concludes that "further study is needed." Id.[6]

Dr. Jones' assertions, taken at face value, do not "show that a genuine dispute exists with the applicant/licensee on a material issue of law or fact" as required by 10 C.F.R. § 2.309(f)(2)(vi). Dr. Jones does not assert that allowing the temperature of the discharge to increase by 1°F from previously authorized limits will cause an adverse impact on the shad population but only that it is a matter as to which "further study is needed."[7] It is well settled that "neither mere speculation nor bare or conclusory assertions, even by an expert, alleging that a matter should be considered will suffice to allow the admission of a proffered contention."

[6] The NPDES Permit requires Entergy to monitor, inter alia, the shad population on the Connecticut River and perform trend analyses on the population. See Final Amended Discharge Permit at 20-22.

[7] If such an assertion were made, it would be contradicted by the plethora of information and studies concerning the thermal discharge on which the VANR relied in issuing the amended discharge permit.

System Energy Resources, Inc. (Early Site Permit for Grand Gulf ESP Site), LBP-04-19, 60 N.R.C. 277, 289 (2004), citing Fansteel, CLI-03-13, 58 N.R.C. at 203.

The only instances of demonstrated adverse temperature effects on shad population cited by Dr. Jones are those of "temperature shock" caused by rapid temperature increases of nine degrees (68° to 77°F) or eighteen degrees (68° to 86°F). Jones Decl. ¶ 10. Such temperature increases are not allowed under the NPDES Permit. Under the NPDES Permit, when the ambient river temperature is 63°F or greater, the maximum water temperature increase above ambient from VYNPS discharge is limited to 3°F. See Final Amended Discharge Permit at 4-5. Thus, Dr. Jones' references to rapid 9 and 18 degree increases are irrelevant and establish no genuine material dispute.

For the above stated reasons, NEC's Proposed Contention 1 is inadmissible.

B. Contention 2: Metal Fatigue

NEC's Contention 2, which alleges that the Application does not include "a plan to manage aging due to metal fatigue" (Pet. at 14) is inadmissible because it fails to provide a factual basis demonstrating the existence of any genuine, material dispute with the Application.

NRC regulations allow a license renewal applicant to address time-limited aging analyses ("TLAAs"), such as analyses of metal fatigue, by one of three approaches: (i) demonstrating that existing analyses "remain valid for the period of extended operation;" (ii) revising existing analyses to demonstrate their validity "to the end of the period of extended operation;" or (iii) demonstrating that "[t]he effects of aging on the intended function(s) will be adequately managed for the period of extended operation." 10 C.F.R. § 54.21(c)(1). For metal fatigue analyses, the Application adopts a combination of the first and the third option, demonstrating

either that the existing analyses for the metal fatigue for components remain valid for the period of extended operation or demonstrating that the effects of metal fatigue will be adequately managed for the period of extended operation. See Application, Section 4.3 ("Metal Fatigue") and Appendix B, Section B.1.11 ("Fatigue Monitoring").

The analyses that are the subject of the TLAA here are the ASME Code fatigue analyses required to be performed for the reactor vessel and other key plant components based on thermal and pressure transients, e.g. plant heatup and cooldown, expected over the plant over its lifetime, and the number of cycles assumed in establishing allowable stress limits for components designed under ANSI Code B.31.1. The VY plant design specified the number transients cycles assumed to occur over the life of the plant. See Application at 4.3-2. These transient cycles are monitored by the plant's Fatigue Monitoring Program (id. at Appendix B at B-39 to B-41).

Section 4.3.1 of the Application evaluates the analysis of metal fatigue for Class 1 components (reactor vessel and recirculation system piping) for the period of extended operation. For components designed under section III of the ASME Code, cumulative usage factors (CUF) can be calculated for plant components that identify the proportion of the allowable fatigue cycles that have been, or are projected to be, experienced by the various plant components. Table 4.3-1 shows the CUFs for Class 1 components based on the number of transients projected to occur over the operating life of VYNPS. As reflected in Table 4.3-1, the ASME Code design basis CUFs are significantly below 1 for all components.[8] The actual numbers of transient cycles projected to occur through the period of extended operation are shown in Table 4.3-2. None of the transient cycles are projected to occur more often than the allowable values. Moreover, the

[8] Table 4.3.2 shows the design basis cycles projected through 60 years of operation based on projecting the number cycles that occurred as of May 2004 through the period of extended operation of the plant.

Fatigue Monitoring Program described in the Application will track actual transient cycles and would require an evaluation before such transient cycles exceed the limiting values, if this were to occur.

Section 4.3.2 addresses the CLB fatigue evaluation for non-Class 1 components designed under ANSI Code B31.1 and demonstrates that the design-basis fatigue cycle limit for these components also remains valid and bounding for the period of extended operation of the plant.

Section 4.3.3 assesses the effects of the reactor water environment on fatigue life, or environmentally assisted fatigue, which was the subject of Generic Safety Issue ("GSI") 190, "Fatigue Evaluation of Metal Components for 60-year Plant Life." The origin of GSI 190 was test data and related studies indicating that light water reactor environments could potentially have significant effects on the fatigue life of reactor components not expressly accounted for in the ASME Code methods of fatigue analysis.[9] GSI 190 was closed out by the Staff on December 26, 1999 based on studies showing that the effect of environmentally assisted fatigue cracking on core damage frequency for the period of extended operation (from 40 to 60 years of plant life) was low and insignificant. Thadani Memo at 1; see also id. at Attachment 2 (ACRS Letter of December 10, 1999 approving closeout of GSI-190). Accordingly, the Staff concluded that no generic regulatory action imposing new requirements on licensees was required. However, because the studies showed an increase in the frequency of pipe leaks as plants continue to

[9] GSI-190 was preceded by GSI-166, "Adequacy of Fatigue Life of Metal Components," which addressed adequacy of the ASME Code design basis fatigue analyses for operating plants in light of this new test data. GSI-166 was closed out based on the conservatisms in the ASME Code CUFs which the Staff determined were sufficient to ensure plant safety through the end of the plants' original 40-year license terms. See NRC Memorandum from Thadani, A., Director, Office of Nuclear Regulatory Research, to W. Travers, Executive Director of Operations, "Closeout of Generic Safety Issue 190, 'Fatigue Evaluation of Metal Components for 60-Year Plant Life,'" (Dec. 26, 1999), ("Thadani Memo"), Adams Accession No. ML031480383, Attachment 1 at 1-2. GSI-190 was then established to address the residual concerns regarding the effect of environmentally assisted fatigue on pressure boundary components for 60 years of plant operation. Id.

operate, the Staff concluded that, consistent with requirements in 10 C.F.R. § 54.21, licensees should address the effects of reactor coolant environment on component fatigue life in aging management programs developed for license renewal. Id.

To account for the effects of environmentally assisted fatigue, Entergy evaluated limiting locations for environmentally assisted fatigue by multiplying the ASME Code CUFs by a factor that accounts for environmentally assisted fatigue.[10] See Application at 4.3-6 and Table 4.3-3. For each location with a projected environmentally adjusted CUF greater than 1, the Application commits Entergy to manage the effects of aging "[p]rior to entering the period of extended operation" by implementing one or more of the following:

1. "further refinement of the fatigue analysis to lower the predicted CUFs to less than 1.0";
2. "management of fatigue at the affected location by an inspection program that has been approved by the NRC (e.g., periodic non-destructive examination of the affected locations at inspection intervals to be determined by method acceptable to the NRC)'
3. "repair or replacement of the affected locations."

Application at 4.3-7.

NEC Contention 2 solely challenges the aging management plan for environmentally assisted fatigue set forth in Section 4.3.3 of the Application. Contention 2 does not refer to or challenge the evaluations in Sections 4.3.1 or 4.3.2 showing that the design-basis fatigue analyses or limits will remain valid through the period of extended operation.

The gravamen of the Contention is that the program described in the application to manage environmentally assisted fatigue is too vague, because it does not include a "monitoring

[10] For components in limiting locations that do not have specific CUFs because they were designed under ANSI Code B.31.1, CUFs were estimated based on generic values in NUREG/CR-6260. See Application, Table 4.3-1 n.1.

plan with a clear inspection schedule." Pet. at 16. NEC's assertion that such a plan is needed is in turn predicated on NEC's dismissal of the option of further refining the fatigue analyses, which NEC attacks as suggesting analytical techniques that lend themselves to arbitrary adjustments. Pet. at 16.

NEC, however, provides no basis – indeed nothing other than dismissive rhetoric – to support its assertion that fatigue reanalysis is arbitrary and lacks scientific validity. NRC's guidance identifies that "more rigorous analysis of the component" to demonstrate that its CUF will not exceed 1 is a permissible option for managing the aging effects due to environmentally assisted fatigue (NUREG 1801 at Section X.M1), exactly as proposed by Entergy in its Application.

The conservatisms in existing fatigue analyses are well known and documented. For example, a report issued by Sandia National Laboratories concludes:

> After review of numerous Class 1 stress reports, it is apparent that there is a substantial amount of conservatism present in many existing component fatigue evaluations. . . . It was concluded that the potential increase in predicted fatigue usage due to environmental effects should be more than offset by decreases in predicted fatigue usage if re-analysis were conducted to reduce conservatisms that are present in existing component fatigue evaluations.

SAND94-0187, "Evaluation of Conservatisms and Environmental Effects in ASME Code, Section III, Class 1 Fatigue Analysis" (Aug. 1994) at iii. Such conservatisms are present due to transient grouping, analytical methods for heat transfer and stress evaluation, simplified elastic-plastic analysis, material property selection, and Code edition. Id. at 7-1. Another conservatism found in the Sandia Report results from use of design transients that are based on "idealized" or design time histories. Sandia Rept. at 3-1. An 2005 EPRI Report similarly states:

> Possible reasons for updating the fatigue analysis could include:

- Excess conservatism in the original fatigue analysis with respect to modeling, transient definition, transient groups and/or use of an early edition of the ASME Code.

EPRI, "Materials Reliability Program: Guideline for Addressing Fatigue Environmental Effects in a License Renewal Application" MPR-47, Rev. 1 (Sept. 2005) at 3-7.

In short, recalculating fatigue usage factors by using more recent, NRC approved versions of the code, or by using more realistic transient definitions, is a feasible option available to VYNPS. Neither NEC nor Dr. Hopenfeld provide any meaningful discussion of such techniques, or any explanation why they are impractical. Because NEC's assertion that a monitoring program with a clear inspection schedule rests entirely on NEC's baseless dismissal of reanalysis as an option, its entire Contention fails to establish any genuine, material issue.

For the same reason, there is no basis for the Contention's claims that the data in Section 4.3.3 of the Application shows that "key reactor components will crack and/or fail due to metal fatigue during the proposed renewed license term, potentially resulting in catastrophic failure" of these key components. Pet. at 14 (emphasis added). Similarly, the supporting declaration of Dr. Joram Hopenfeld, Pet. Exhibit 7 (Hopenfeld Decl.) claims that "Entergy determined, as stated in the license renewal application . . . that a large number of key reactor components will begin to crack before 2032." Hopenfeld Decl. at ¶ 8 (emphasis added). Because of the conservatism in existing fatigue analyses, all that Section 4.3.3. shows is that there are certain components that must be properly managed. Moreover, the resolution of GSI-190 discussed above – which underpins the requirement to consider environmentally assisted fatigue for license renewal even though outside a plant's CLB – shows that catastrophic failure resulting in damage to the reactor core is not the concern being addressed here. Thus, NEC provides no basis indicating the

existence of any significant safety concern, and thus fails to demonstrate a genuine, material dispute – one that would make a difference in the outcome of this proceeding.

The availability of reanalysis aside, NEC and Dr. Hopenfeld provide no explanation why it is necessary to establish an inspection interval now. ASME Section XI, Appendix L (1998) establishes a flaw tolerance evaluation methodology that may be used to determine an inspection interval if inspection were necessary (i.e., if CUFs were to exceed 1.0). This methodology postulates a flaw that is consistent with volumetric inspection capabilities; determines how much that postulated flaw would grow during an evaluation (i.e., inspection) interval when subjected to the stresses from normal operating (including upset and test, emergency, and faulted) conditions; and applies appropriate acceptance criteria (i.e., shows that the end-of-evaluation-period flaw size would not cause the component to fail).[11] In a 1999 rulemaking proceeding, the NRC stated that it has reviewed Appendix L and determined that its use is generally acceptable, but indicated that there are two items that may affect future revisions (one related to the postulated flaw and the other to crack growth rate). 64 Fed. Reg. 51,370, 51,386 (Sep. 22, 1999). These items are currently being addressed in a revision to Appendix L expected to be issued by the end of the year.[12] Because a reanalysis of the fatigue analysis may be affected by transient data through the period of extended operation, and because the revised Appendix L has not yet been issued, Entergy has sensibly elected to refine fatigue analysis later. Further, until such analysis is performed, there is no sense in preparing flaw tolerance evaluations. Certainly, NEC and Dr. Hopenfeld provide no basis indicating that such reanalysis or evaluation cannot be performed

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[11] The precise inspection interval therefore depends on the postulated flaw size (which in turn depends on volumetric inspection capabilities), the flaw growth rate (which depends on the stresses), and the acceptance criteria for the material.

[12] In response to an NRC question during an onsite audit of the VYNPS aging management programs credited for license renewal, Entergy has committed to clarify its application to explicitly state that reanalysis will be performed pursuant to an NRC-approved version of the ASME Code.

when it is needed. Nor is there any indication that Entergy will fail to comply with the revised Appendix to the ASME Code when issued and approved by the NRC.[13]

In summary, the Application commits to an aging management plan that is sufficient to meet the requirement of 10 C.F.R. § 54.21(c)(1)(iii) to demonstrate that "[t]he effects of aging on the intended function(s) will be adequately managed for the period of extended operation." As reflected by the guidance in NUREG 1801, an adequate program for managing the aging effects caused by environmentally assisted fatigue would be to establish an appropriate monitoring program to ensure that the CUFs remain below 1, considering environmental fatigue effects, and taking preventive action as required during the period of extended operation to prevent the CUF from exceeding 1. The preventive action may include "more rigorous analysis of the component" to show that the limit in fact will not be exceeded, "repair of the component," or "replacement of the component."[14] The Application meets each of these elements. See Application at 4.3-7 and Appendix B, Section B.1.11 ("Fatigue Monitoring").

For the above stated reasons, NEC's Proposed Contention 2 is inadmissible.

C. Contention 3: Aging Management of the Steam Dryer

NEC's Contention 3, which alleges that the Application "does not include an adequate plan to monitor and manage aging of the steam dryer during the period of extended operation" (Pet. at 17), is inadmissible because it is not supported by a basis demonstrating a material dispute with the Application. The contention and related opinions expressed by Dr. Hopenfeld in

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[13] If NEC is suggesting that Entergy will ignore its obligations, such suggestion forms no basis for a contention. NRC precedent clearly establishes that speculation that a licensee will violate regulatory requirements provides no basis for an admissible contention. Carolina Power & Light Co. (Shearon Harris Nuclear Power Plant), LBP-99-25, 50 N.R.C. 25, 34 (1999) citing General Public Utilities Corp. (Oyster Creek Nuclear Generating Station), LBP-96-23, 44 N.R.C. 143, 164 (1996).

[14] NUREG 1801, Generic Aging Lessons Learned (GALL) Report, Vol. 2, Rev. 1 (Sept. 2005) at Section X.M1(Metal Fatigue of Reactor Coolant Pressure Boundary).

¶¶ 15-20 of his Declaration are based on a mischaracterization of the VYNPS program, and ignore and fail to take issue with documentation available on the docket establishing the absence of any genuine issue.

As a threshold matter, "an intervention petitioner has an ironclad obligation to examine the publicly available documentary material pertaining to the facility in question with sufficient care to enable [the petitioner] to uncover any information that could serve as the foundation for a specific contention." Catawba, ALAB-687, 16 N.R.C. at 468. The adequacy of monitoring for flow induced cracking in the steam dryers was addressed extensively by Entergy and the NRC Staff in EPU proceeding. NEC has no excuse for ignoring this material, as it is a party in the EPU proceeding. Indeed, this contention appears in large measure an attempt to litigate an NEC contention that was rejected as late in the EPU proceeding. Entergy Nuclear Vermont Yankee, LLC (Vermont Yankee Nuclear Power Station), LBP-06-14, 63 N.R.C. __, slip op. at 23-26 (May 25, 2006).

Dr. Hopenfeld acknowledges that Entergy's aging management program for the VYNPS steam dryer "will be in accordance with current guidance per NUREG 1801, GE-SIL-644 and possibly future guidance from BWRRVIP-139, if approved by the NRC." Hopenfeld Dec. at ¶ 18. Dr. Hopenfeld, however, asserts that Entergy's proposed techniques for monitoring the condition of the steam dryer do not rely on actual measurements of crack propagation and growth but on "unproven computer models and moisture monitors which only indicate that the dryer was already damaged." Id. at ¶ 19. Dr. Hopenfeld opines that the predictions of the two computer models used by Entergy, the Computational Fluid Dynamics Model (CFD) and the Acoustic Circuit Model (ACM) "are subject to large uncertainties" because neither model was "benchmarked against properly scaled dryer structure." Id. Dr. Hopenfeld cites, as sole support

for this opinion, testimony and discussions at the Advisory Committee on Reactor Safeguards ("ACRS") meeting on December 7, 2005 with respect to the then proposed EPU at VYNPS. Id.

This contention lacks basis and fails to demonstrate the existence of any genuine, material dispute with the application, because the monitoring program for the steam dryer is not just based on "the predictions of the two computer models" to predict crack formation on the steam dryer. The ability to predict steam dryer crack formation was addressed by the ACRS when (after the meeting referred to by Dr. Hopenfeld) it issued its recommendation that the EPU be approved. Letter from G. Wallis, ACRS, to N. Diaz, Chairman, NRC (Jan. 4, 2006), Adams Accession No. ML060040431. The letter includes the following conclusions regarding the steam dryer:

> Increased flow rates also have the potential to induce vibrations that could lead to failure of components. Because of the previous experience at Quad Cities, the steam dryer has been the primary focus of attention. A number of cracks have been found in inspections of the VY steam dryer. Two cracks found near the lifting lugs were attributed to the initial fabrication of the steam dryer. These cracks have been ground out and repaired. The other cracks that have been found appear to be superficial and were deemed to be the result of intergranular stress corrosion, not flow-induced vibration. Stiffeners have been added to the dryer to provide additional strength and also to raise its natural frequencies.
>
> Entergy has performed hydrodynamic, acoustic and structural resonance analyses to assess the potential for stimulation of a resonant mode of the dryer. These analyses indicate that there is margin between the magnitude of the potential stresses imposed on the steam dryer and the level at which fatigue failure would occur. However, the state of validation of these methods is poor.
>
> To provide further assurance of the integrity of the dryer, additional strain gages have been added to the steam lines at VY. Experiments performed in a scale-model system by GE indicate that acoustic signals initiated in the region of the steam dryer can be correlated with signals measured by strain gages on the steam lines. A similar correlation has been observed at Quad Cities Unit 2 where both the steam dryer and steam lines have been instrumented.
>
> Entergy has developed a program for power ascension involving holds at a number of power levels. The steam line strain gages will be monitored at the various power levels. Any anomalies will lead to a reduction in power until the

> issue is resolved. Entergy has also committed to inspections of the steam dryers in the next three outages following the uprate. The additional monitoring, the power ascension program, and the inspections provide confidence that, if excessive excitation does occur in the steam dryer, it will be identified before substantial damage is incurred.

Id. at 5. As the ACRS determined, the program instituted by Entergy to identify crack formation in the steam dryer includes, besides the analytical tools challenged by Dr. Hopenfeld, additional monitoring, strain measurements during the power ascension program, and added post-EPU inspections. The added strain gauges and additional monitoring and inspections were included in the program because of the perceived uncertainties in analytical models and "provide confidence that, if excessive excitation does occur in the steam dryer, it will be identified before substantial damage is incurred." Id. NEC fails to address this material and provides no basis to dispute the adequacy of the described measures.

The tools referred to by the ACRS are part of Entergy's Steam Dryer Monitoring Plan ("SDMP") for monitoring and evaluating the performance of the VYNPS steam dryer during power ascension testing and operation at EPU levels. As defined in the EPU Application, the SDMP includes:

- A power ascension program towards EPU levels including hold points at each 2.5% power increase step, with moisture carryover being determined every 24 hours and main steam line pressure data from strain gages being obtained hourly when initially increasing power above a previously attained level and at least once every 2.5% power step and within 1 hour after achieving every 2.5% power step.

- A licensing condition for steam dryer monitoring to require operational surveillances as well as visual inspections of all accessible, susceptible locations of the steam dryer the steam dryer during each of the three scheduled refueling outages (beginning with the Spring 2007 refueling outage).

- The surveillance and visual inspection requirements to continue in effect until the completion of one full operating cycle at EPU. If an unacceptable structural flaw (due to fatigue) is detected during the subsequent visual inspection of the steam dryer, the surveillance and visual inspection requirements shall extend another

> full operating cycle until the visual inspection standard of no new flaws/flaw growth based on visual inspection is satisfied.

Supplement 33 of EPU Application, Adams Accession No. ML052650122, Attachment 6 at 6-8. Again, NEC fails to acknowledge, discuss or dispute this publicly available information.

In the Final Safety Evaluation Report (FSER) for the EPU, the NRC Staff determined that the SDMP including the post-EPU inspections provided adequate assurance of structural integrity of the VYNPS steam dryer:

> The NRC staff has reviewed the information provided by the licensee in support of its analysis of the structural integrity of the VYNPS steam dryer under EPU conditions, and for monitoring steam dryer loads and performance during plant operation. Although significant uncertainty exists regarding the licensee's method for calculating specific stress values on the VYNPS steam dryer from its CFD and ACM analyses, the licensee's current MSL instrumentation suggests minimal excitation of the pressure frequency spectra in the MSLs at CLTP conditions. As a result, the staff finds that the licensee has demonstrated that the flow-induced stress imposed on the VYNPS steam dryer at CLTP conditions is within the fatigue stress limits provided in the ASME Code. However, the available margin to those stress limits is not readily verifiable. Therefore, the NRC staff considers the licensee's planned actions specified in Supplement 33 of its EPU request, and included in the proposed license condition in Supplement 36, to be an important part of the licensee's effort to provide confidence that the structural integrity of the steam dryer will be maintained during EPU operation.

Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 229 to Facility Operating License No. DPR-28 Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. Vermont Yankee Nuclear Power Station Docket No. 50-271 (Mar. 2006), Adams Accession No. ML0600500280 at 49. NEC provides no basis to dispute this conclusion.

Thus, the issues raised in proposed NEC Contention 3 do not constitute a "genuine dispute exists with the applicant/licensee on a material issue of law or fact," 10 C.F.R. § 2.309(f)(1)(vi). NEC merely refers to uncertainties in certain modeling, but fails to discuss or

dispute the measures that were implemented to address these uncertainties and provide confidence that the integrity of the steam dryers will be maintained. These measures included the monitoring and evaluation of extensive VY flow induced vibration monitoring data throughout power ascension testing demonstrating that VY maintained significant margin in the ASME Fatigue Endurance Limit from original licensed thermal power through EPU operation. Accordingly, the proposed contention must be rejected.

D. Contention 4: Flow-Accelerated Corrosion

NEC's Contention 4, which in essence alleges that CHECWORKS cannot be used to manage flow accelerated corrosion ("FAC") because the EPU has changed plant parameters needed to benchmark the model (Pet. at 18-19; Hopenfeld Decl., ¶¶ 21-27), is inadmissible because it is vague and not supported by an adequate basis demonstrating the existence of a genuine, material dispute. Once more, NEC raises an issue that was addressed in the EPU proceeding, without any meaningful attempt to address the resolution of this issue in that proceeding.

NEC's Contention 4 is unduly vague because it does not identify any particular system or component of concern. NEC makes a vague reference to carbon steel piping and valve components (Pet. at 19; Hopenfeld Decl., ¶ 27), but makes no attempt to identify any particular systems or components that both contain such materials and are affected in a significant way by EPU conditions. Without any identification of systems and components alleged to be inadequately managed, NEC has failed to meet the requirement to state its contention with particularity, and has also failed to meet is burden of demonstrating the Contention's materiality.

NEC's failure to identify any particular system or component of concern is particularly egregious because there is considerable pertinent information that was presented in the EPU

proceeding, to which NEC was a party and which NEC has entirely ignored. As described before the ACRS Subcommittee on Uprates, VYNPS has a significant amount of FAC-resistant piping. Advisory Committee on Reactor Safeguards, Subcommittee on Uprates, Transcript (Nov. 30, 2005), Adams Accession No. ML053500187 ("ACRS Tr."), at 14. All 10 feedwater heater shells have been replaced with resistant material, as well as the low pressure turbine casings. The majority of the two-phase flow piping has also been changed out to FAC resistant material. Id. at 15, 21. A number of small bore piping segments have also been replaced proactively. Id. at 16. Further, the two systems most affected by the EPU – the condensate and feedwater systems – have experienced minimal FAC. Id. at 13. NEC fails to mention any of this information from the EPU proceeding, which is publicly available on the docket, and thus fails to demonstrate the existence of any genuine, material dispute.

In addition, NEC fails to demonstrate that its concerns about CHECWORKS have any basis or would materially affect the adequacy of the FAC program at VYNPS. It is apparent that neither NEC nor Dr. Hopenfeld know how CHECWORKS is used in this FAC program, because they only infer its use from the Application's statement that the FAC program is consistent with the GALL Report.[15] Based on this inference, NEC alleges that Entergy proposes to use CHECWORKS "to determine the scope and the frequency of inspections of components that are susceptible to FAC" (Pet. at 18), but NEC provides no basis supporting this characterization of CHECWORKS use.

[15] Section B.1.13 if the Application indicates that the VYNPS program for addressing flow-accelerated corrosion ("FAC") is comparable to the program described in NUREG-1801, Section XI.M17, Flow Accelerated Corrosion. That section of NUREG-1801 specifies use of a predictive code, such as CHECWORKS, as part of the described program.

Once more, NEC ignores considerable information from the EPU proceeding explaining how inspections for FAC are in fact determined, and belying NEC's suggestion that they are based entirely on CHECWORKS. In response to an RAI in the EPU proceeding, VYNPS provided the portion of its procedure establishing the criteria for selecting components for inspection. As stated therein:

> The outage inspection scope is determined by the FACPC using: pipe wall thickness measurements from past outages, predictive evaluations performed using the CHECWORKS computer code, industry events related to FAC, results from other plant inspection programs, and engineering judgment.

Supplement 5 to EPU Application (Jan. 31, 2004), Adams Accession No. ML040480640, Att. 3, Exh. 2 (Appendix E to Vermont Yankee Program Procedure PP 7028, "Piping Flow Accelerated Corrosion Inspection Program").[16] Other factors considered in planning future inspections include: the consequences of failure of a particular component with respect to personnel safety and plant availability, and the margin of nominal wall thickness to code minimum wall thickness. Id. The testimony before the ACRS also confirmed that inspection scope is determined not only by use of the CHECWORKS tool, but also is based on past VYNPS inspections, engineering judgment and industry operating experience. ACRS Tr. at 13. As Entergy clearly explained, CHECWORKS is a tool to identify the highly susceptible areas, which is then used with trend data from actual inspections, operating experience and engineering judgment. Id. at 18. Thus, CHECWORKS is only a tool that is considered among other factors.

Nor does NEC provide any real basis indicating that CHECWORKS cannot be used after the EPU, other than Dr. Hopenfeld's bald assertion that it would take "10 - 15 years" before CHECWORKS can be benchmarked by inspection data. Dr. Hopenfeld provides absolutely no

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[16] The FAC program is now controlled by Entergy Nuclear Management Manual Procedure ENN-DC-315, "Flow Accelerated Corrosion Program," but the factors used to determine the inspection scope and priority are substantively the same.

support for this assertion. Unsupported conclusory assertions, even by an expert, cannot support the admission of a proffered contention. Calvert Cliffs, CLI-98-14, supra; Fansteel, CLI-03-13, supra. Moreover, CHECWORKS has only been in use by the industry since 1993.[17] Were Dr. Hopenfeld correct in his opinion that it takes 10-15 years of accumulated data before CHECWORKS can be used reliably, every plant that has been using CHECWORKS in the last ten to fifteen years has been in error in doing so. Further, neither Dr. Hopenfeld nor NEC address the conservatism in CHECWORKS. NUREG-1801 states:

> CHECWORKS is acceptable because it provides a bounding analysis for FAC. CHECWORKS was developed and benchmarked using data obtained from many plants.

NUREG-1801 at XI M-61 - M-62 (emphasis added). NEC provides no basis to dispute these NRC statements.

Moreover, NEC yet again ignores considerable information from the EPU proceeding in which it was a party showing that increases in rate of wear can be projected. As the testimony before the ACRS indicates, generally the increase in wear is less than the increase in velocity; and typically, from EPU studies, the maximum increase in projected wear rates is in proportion to the velocity increase ACRS Tr. at 17-18. Indeed, the NRC Staff testified:

> The rates of [FAC] are affected, but several operational parameters some of which will be – will change after the EPU. These parameters are flow velocity, temperature, moisture and oxygen content. After EPU, the licensee will determine new values for these parameters and introduce them into the revised predictive cod[e] CHECWORKS, making it applicable for predicting flow-accelerated corrosion wear rates after EPU.

Id. at 46-47. Entergy addressed these factors in its EPU application:

> VYNPS has evaluated CPPU system operating conditions for changes in FAC effects on plant piping and components. Implementation of CPPU primarily

[17] EPRI Report NASC-202L-R3, Recommendations for an Effective Flow-Accelerated Corrosion Program, Appendix D.

> affects moisture content, temperature, oxygen, and flow velocity. The magnitude of predicted wear rates increase and vary throughout the BOP piping due to increased flows, temperatures, and the moisture removal capabilities of plant equipment....Based on experience at pre CPPU operating conditions and previous FAC modeling results, CPPU operating conditions will result in the need for additional FAC inspections.
>
> The increase in MS *(Main Steam)* and FW *(Feedwater)* flow rates at CPPU conditions do not significantly affect the potential for FAC in these systems. Increases in the low measured wear rates are expected to increase proportionately with flow. Operation under CPPU conditions will require additional focus for the FAC inspection program for the Main Steam Drains, Moisture Separator Drains, and the Turbine Cross Around System piping. The Extraction Steam System piping at VYNPS is constructed of FAC resistant material.

Supplement 8 to EPU Application (July 2, 2004), Adams Accession No. ML042090103, Attachment 2 at 126. With respect to the Main Steam Drains, Moisture Separator Drains, and Turbine Cross Around System piping, Entergy provided projected wear rates. Supplement 5 to EPU Application (Jan. 31, 2004), Adams Accession No. ML040480640, Attachment 2 at 16 -18. Entergy also provided the changes in velocity and temperature for the Feedwater piping. Id. at 16, 19. In short, there is a wealth of information on the projected increases in wear. Neither NEC nor Dr. Hopenfeld identifies any error or deficiency in any of it. If VYNPS could project FAC prior to the uprate (a matter which NEC does not dispute) and if it is possible to project the increase in the rate of wear (which NEC has also not disputed), NEC's bald allegation that CHECWORKS needs years to benchmark is irrelevant.

Based on the wealth of information presented in the EPU proceeding, the NRC Staff concluded in its Final Safety Evaluation Report on the EPU:

> Some of these [plant operating] parameters will be affected by the proposed EPU and their changes will have an impact on FAC wear rates. Increase in velocity of flow of single- or two-phase fluid (which is expected to occur in some lines) will produce higher FAC wear rates. The licensee has determined that an increase in the velocities in the main steam line and feedwater lines will cause proportional increases in FAC wear rates. The proposed EPU will also have an effect on moisture and oxygen content, and on temperature. A change of these parameters

> will impact FAC in the main steam drains, moisture separator drains, and the turbine cross around system piping and will require the licensee to suitably modify the FAC inspection program for these systems. The piping in the extraction steam system at VYNPS is made from material immune to FAC. In response to an NRC staff RAI, the licensee, in Reference 6, provided information on typical expected changes due to FAC in several plant systems subsequent to EPU. After reviewing this information, the staff concurred with the licensee's assessment that the proposed EPU could cause an increase of FAC in some plant systems. Accordingly, the licensee plans to modify the inputs to the CHECWORKSTM program and introduce some changes to the FAC inspection program to account for the changes due to the EPU.
>
> Conclusion
>
> The NRC staff has reviewed the licensee's evaluation of the effect of the proposed EPU on the FAC analysis for the plant and concludes that the licensee has adequately addressed changes in the plant operating conditions on the FAC analysis. The NRC staff further concludes that the licensee has demonstrated that the updated analyses will predict the loss of material by FAC and will ensure timely repair or replacement of degraded components following implementation of the proposed EPU. Therefore, the NRC staff finds the proposed EPU acceptable with respect to FAC.

FSER at 23-24, Adams Accession No. ML060050028, Exhibit 7. NEC and Dr. Hopenfeld do not identify any error or deficiency in this conclusion.

NEC and Dr. Hopenfeld also ignore the testimony on the increased inspections that Entergy is performing at VYNPS. As described in the ACRS testimony, the amount of inspections will be increased by 50 percent over the next three refueling outages. ACRS Tr. at 23.

> We'll use the CHECWORKS predictions to inspect more components, do repeat inspections on components that we already have data for, and develop a level of confidence under EPU operation. . . . We'll be looking at the highest length locations and the highest velocity locations in the next three outages.

Id. at 24 - 25. Thus, not only can CHECWORKS continue to be used at VYNPS following the EPU, but by the time the license renewal is in effect (in the year 2012), six years of expanded

inspection data under EPU conditions will have accumulated and been added to the CHECWORKS database.[18]

In summary, NEC seeks to raise an issue that was considered extensively in the EPU proceeding in which it was a party, but makes no effort to discuss or identify any error in the consideration of FAC in that proceeding. NEC's sole purported basis for its contention is an unsupported assertion that CHECWORKS cannot be used without 15 years of data, but this statement does not raise any genuine material dispute because it ignores how CHECWORKS is used at VYNPS, ignores the specific wear rates projected in the EPU proceeding, and ignores the increased inspection activities that are being implemented. Neither Dr. Hopenfeld nor NEC makes any attempt to address or identify any error in this information publicly available on the docket. Therefore, NEC's proposed Contention 4 does not raise a genuine, material dispute and must accordingly be rejected.

E. Contention 5: Aging Management of the Condenser

NEC's Contention 5, which claims that the Application does not state an adequate plan to manage and monitor aging of the main condenser in that the Application "does not address the actual condition of the condenser" (Pet. at 19-20) is inadmissible because it is not supported by an adequate basis demonstrating the existence of a genuine, material dispute with the application.

NEC's Contention 5 is entirely predicated on the erroneous and unsupported assumption that the condenser must retain its integrity (i.e., must remain intact) in order to perform its post-accident function. See, e.g., Pet. at 20 ("any 'unusual accident or occurrence – just what the condenser is intended to mitigate – would destroy the integrity of the condenser."); Declaration

[18] The adequacy of CHECWORKS to predict FAC effects after implementation of the EPU but prior to the license renewal period is, of course, outside the scope of this proceeding.

of Arnold Gundersen ("Gundersen Decl.") (Pet. Exhibit 8), ¶ 17 ("an 'unusual accident of occurrence' would destroy the integrity of the condenser. It is exactly such an 'unusual accident or occurrence' in which Vermont Yankee needs the condenser to remain intact. . ."). Neither the Petition nor the Mr. Gundersen declaration provide any basis for their suggestion that the condenser must remain intact to perform its post-accident function.

Contrary to NEC's unfounded assumption, note 401 on Table 3.4.2-1 of the Application states:

> 401. Aging management of the main condenser is not based on analysis of materials, environments and aging effects. Condenser integrity required to perform the post-accident intended function (holdup and plateout of MSIV leakage) is continuously confirmed by normal plant operation. <u>This intended function does not require the condenser to be leak-tight</u>, and the post-accident conditions in the condenser will be essentially atmospheric. Since normal plant operation assures adequate condenser pressure boundary integrity, <u>the post-accident intended function to provide holdup volume and plateout surface</u> is assured. Based on past precedence (NUREG-1796, Dresden and Quad Cities SER, Section 3.4.2.4.4, and NUREG-1769, Peach Bottom SER, Section 3.4.2.3), the staff concluded that main condenser integrity is continually verified during normal plant operation and no aging management program is required to assure the post-accident intended function.

Application at 3.4-26, Table 3.4.2-1.[19]

Thus, Note 401 indicates:

- The main condenser operates continuously and its ability to maintain adequate pressure boundary integrity (that is to say, maintain vacuum) is confirmed by the normal plant operations.
- Such ability indicates that the rate of condenser leakage is not large enough to cause loss of adequate pressure boundary integrity. Conversely, if the main condenser's leak rate became excessive, this would manifest

[19] The Condenser is not a safety-related component, but in the alternative source term ("AST") analysis is credited for hold-up and plate-out of gases that might, in the event of a loss-of –coolant accident ("LOCA"), leak past the main steam isolation valves ("MSIV"). See Letter from R. Ennis, NRC, to M. Kansler, ENO, "Vermont Yankee Nuclear Power Station – Issuance of Amendment Re: Alternative Source Term (TAC No. MC0253)" (Mar. 29, 2005), Adams Accession No. ML041280490, Encl. 2 ("AST Safety Evaluation") at 18.

itself in a loss of adequate pressure boundary integrity requiring Entergy to take appropriate corrective action.

- In an accident condition, a leak-tight condenser in not required to maintain adequate structural condenser integrity.
- The post-accident function of the main condenser is only to provide holdup volume and plate-out surface of MSIV leakage.

NEC does not controvert any of these statements. It provides no basis indicating that the condenser's function is to remain intact and prevent leakage in the event of an accident. Thus, NEC fails to demonstrate any genuine, material dispute with the Application.

Further, even if their unfounded assumptions concerning the function of the condenser were supported – they are not – neither NEC nor Mr. Gundersen explains how condenser integrity would be suddenly lost in an accident, or provide any support for such a scenario being plausible.[20] Neither NEC nor Mr. Gunderson provide any explanation of the degree of damage that would prevent the condenser from providing holdup volume and plateout surface, or any specific, design-basis accident scenario that could cause such failure. Because the condenser is located in the turbine building, it is not apparent how any design-basis accident condition would affect it. Further, in approving alternative source terms for VYNPS, the NRC concluded that the condenser was seismically rugged to perform its MSIV leakage treatment function. AST Safety Evaluation at 10, 18. NEC provides no basis to dispute this conclusion. Broad, speculative claims are not sufficient to support a proposed contention. Fansteel, CLI-03-13, supra.

[20] Mr. Gundersen cites a November 1999 "Vermont Yankee Plant Condenser Evaluation" as containing the statement: "If programs are formulated and acted upon, this condenser would be in satisfactory service in 2012 baring [sic] any unusual accident or occurrence not yet seen." Gundersen Decl., ¶ 16. Mr. Gundersen, without any analysis of his own, turns this statement on its head as an acknowledgment "that an "unusual accident or occurrence' would destroy the integrity of the condenser." Id. ¶ 17. It goes without saying that such an unsupported interpretation of language in someone else's report does not rise above mere speculation. A mere reference to documents does not provide an adequate basis for a contention. Calvert Cliffs, CLI-98-25, supra.

The various documents cited by Mr. Gunderson do not provide any basis for the suggestion that a design-basis accident might prevent the condenser from performing the credited function. The documents all relate to evaluations whether the condenser will need to be replaced or refurbished prior to 2012 to perform its non-safety function supporting power generation. They predate the 2005 approval of the alternative source terms and therefore clearly are not addressing any accident mitigation function. Further, while Mr. Gunderson places particular emphasis on a 1999 report indicating that the "condenser should be in satisfactory service in 2012 baring [sic] any unusual accident or occurrence not yet seen" (Gunderson Decl. ¶¶ 16-19), there is no indication that this statement is referring to the type of design basis accidents that might result in radiological releases. Nor does the reference to "satisfactory service" have any relationship to the ability to provide hold-up and plate-out capacity, because those functions were not credited until the alternative source terms were approved in 2005 – 6 years after this report.

Support for Entergy's position that no aging management program is needed for the main condenser is found in NRC Staff approvals of two license renewal applications in which the applicant did not identify any condenser aging effects requiring management. See NUREG-1796, Safety Evaluation Report Related to the License Renewal of the Dresden Nuclear Power Station, Units 2 and 3 and Quad Cities Nuclear Power Station, Units 1 and 2, Section 3.4.2.4.4 at 3-382 – 3-383; NUREG-1769, Safety Evaluation Report Related to the License Renewal of Peach Bottom Atomic Power Station Units 2 and 3, Section 3.4.2 at 3-208 – 3-209.

The SER for the Dresden and Quad Cities license renewal explains in detail the rationale for the NRC Staff's concurrence that aging effects on the main condenser need not be included in a facility's aging management program for license renewal:

> In RAI 3.4.4-3, sent by letter dated August 4, 2003, the staff asked the applicant to explain the conclusion that the components in the main condenser do not require aging management. . . . In its response dated October 3, 2003, the applicant stated that the license renewal intended function of the main condenser is to provide postaccident containment, holdup and plate-out of iodine for MSIV bypass leakage. This intended function is dependent on the condenser's surface area, volume, and leakage integrity, and aging degradation would only affect leakage integrity. The applicant argued that leakage integrity sufficient to perform the post accident intended function is continuously confirmed by normal plant operation because the main condenser must perform a significant pressure boundary function (maintain vacuum) in support of normal plant operation. Therefore, the applicant concluded that there are no creditable aging effects that would affect the intended function of the main condenser, and no AMP is required. The staff has reviewed the applicant's response and concurs that the condenser's intended function is continually verified during normal plant operation. Therefore, the staff finds that there are no aging effects that require management for the main condenser.

NUREG-1796 at 3-382 – 3-383.[21]

This rationale applies to the VY main condenser as well. Thus, as long as the condenser has sufficient integrity to support normal plant operation, it will also have sufficient integrity to perform the holdup and plate-out functions credited for a LOCA. If at some point in the future, the condenser reaches the end of its service life and needed to be replaced, then the plant would be shutdown while the replacement is performed, and the risk of a design-basis LOCA would not exist in this interval. All NEC shows is that the condenser may eventually have to be replaced. Therefore, NEC presents no evidence that controverts Entergy's Application regarding the main condenser, and nothing to demonstrate the existence of a genuine, material dispute.. Accordingly, proposed Contention 5 raises no litigable issues and must be dismissed.

---

[21] Mr. Gundersen dismisses the Quad Cities and Peach Bottom SER precedents because reliance on those precedents "fails to acknowledge the degraded condition of the condenser at Vermont Yankee." Gundersen Decl., ¶12. However, neither SER refers to the condition of the main condenser as a factor in deciding whether aging management is required. To the contrary, the intended safety function of the main condenser "is dependent on the condenser's surface area, volume, and leakage integrity, and . . . aging degradation would only affect leakage integrity. . . . leakage integrity sufficient to perform the post accident intended function is continuously confirmed by normal plant operation because the main condenser must perform a significant pressure boundary function." NUREG-1796 at 3-382.

F. Contention 6: Primary Containment Corrosion

NEC's Contention 6, which alleges that the license renewal application does not include an adequate plan to monitor and manage the primary containment (Pet. at 20), is inadmissible because it does not address and therefore fails to identify any deficiency in the discussion of this issue in the application. Therefore, Contention 6 fails to establish a genuine dispute concerning a material issue.

NEC cites as the basis for its contention Proposed License Renewal Interim Staff Guidance LR-ISG-2006-01: Plant-Specific Aging Management Program for Inaccessible Areas of Boiling Water Reactor Mark I Steel Containment Drywell Shell.[22] Pet. at 25. NEC does not mention or address, however, the amendment to the License Renewal Application that Entergy submitted on May 15, 2006 to provide additional information concerning the aging management of the drywell shell. Letter from T. Sullivan to U.S. Nuclear Regulatory Commission, BVY 06-043, Vermont Yankee Nuclear Power Station, License No. DPR-28 (Docket No. 50-271), License Renewal Application, Amendment No. 2 (May 15, 2006), Adams Accession No. ML06380079 (hereinafter referred to as "Amendment No. 2"). Referring to the proposed interim staff guidance, this amendment describes Vermont Yankee's operating experience and the actions taken to prevent drywell corrosion.

As previously discussed, a petitioner has an ironclad obligation to examine publicly available documentary material to uncover relevant information (see note 3 supra), and is required to explain why the application is deficient. 54 Fed. Reg. at 33,170; Palo Verde, CLI-91-12, 34 N.R.C. at 156. Where, as here, a petitioner's contention does not directly controvert a

[22] This proposed interim staff guidance, which is attached as Exhibit 9 to NEC's Petition, was published for comment in the Federal Register on May 9, 2006. 71 Fed. Reg. 27,010 (2006).

position taken by the applicant in the license application, its contention is subject to dismissal. Comanche Peak, LBP-92-35, 36 N.R.C. at 384 (1992).

NEC asserts that Entergy has not provided an aging management plan for areas of the primary containment which are difficult to inspect, maintain, and repair because of limited access. As described in Amendment No. 2, the accessible portions of the drywell shell are examined in accordance with the ASME Code three times during each ISI ten-year interval. ASME Section XI, Subsection IWE, Table IWE-2500-1. NEC identifies no deficiency in these measures, and no basis to question their adequacy.

With respect to inaccessible areas (e.g. the bottom of the drywell liner, in the sand cushion region, which is embedded in concrete), the proposed interim staff guidance does not require an aging management plan. Rather, it recommends development of a corrosion rate that can be inferred from past UT examinations; and if degradation has occurred, a technical basis using the developed corrosion rate to demonstrate that the drywell shell will have sufficient wall thickness to perform its intended function during the period of extended operation. 71 Fed. Reg. at 27,012. As stated in Amendment No. 2, UT examinations to determine the drywell wall thickness at the sand cushion region indicated no detectable loss of thickness and hence no discernable corrosion rate. Therefore, no discernable loss of drywell shell thickness is projected during the period of extended operation. Amendment No. 2, Attachment 1 at 4. NEC provides no basis to dispute the adequacy of this information.

NEC also refers to a 1999 inspection report as indicating the presence of corrosion at the intersection of the concrete slab and primary containment shell moisture barrier. Pet. at 22- 24. This operating experience is addressed in Amendment No. 2. The corrosion was identified in an

area where a section of the moisture barrier was missing. The maximum pit depth was 1/16 of an inch, while the nominal plate thickness in that area was 2.5 inches. A replacement moisture barrier was subsequently installed. As described in Amendment No. 2,

> Prior to installation, the drywell shell interior and the concrete floor were stripped of all coatings and sealant for approximately a six inch band on either side of the intersecting joint. The corrosion was removed. The drywell shell was then examined by VT-3, VT-1 and UT measurement processes. Observations and measurements met acceptance criteria. The replacement moisture barrier was installed. The moisture barrier was subsequently examined in 2002, 2004 and 2005. The examination evaluated the adherence of the drywell shell coating, no evidence of corrosion, elastomer to shell and concrete interface and hardening of the elastomer.

Amendment No. 2, Attachment 1 at 3. NEC provides no basis to dispute the sufficiency of these actions, or any explanation how this experience would indicate the presence of corrosion in the embedded area.[23]

In sum, NEC Contention 6 has failed to identify any deficiency in the Application, and has provided no basis to dispute the adequacy of the aging management programs described therein. Accordingly, the Contention should be dismissed.

VI. SELECTION OF HEARING PROCEDURES

Commission rules require the Atomic Safety and Licensing Board designated to rule on the Petition to "determine and identify the specific procedures to be used for the proceeding" pursuant to 10 C.F.R. §§ 2.310 (a)-(h). 10 C.F.R. § 2.310. The regulations are explicit that "proceedings for the . . . renewal . . . of licenses subject to [10 C.F.R. Part 50] may be conducted under the procedures of subpart L." Id. § 2.310(a). The regulations permit the presiding officer

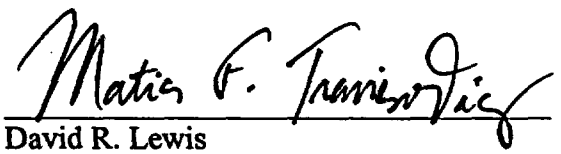
[23] NEC refers to an August 20, 2001 VY 2001 Summary Reports for In-Service Inspection and Repairs or Replacements (Adams Accession No. ML012350087, incorrectly cited as ML0122350087) as reporting the existence of certain conditions in the VY drywell. While the document is dated August 20, the in-service inspections to which it refers took place during the period December 1999 to May 2001 (including Refueling Outage 22), see cover letter, and reflected the conditions prior to the moisture barrier replacement made during that refueling outage. See Amendment No. 2, Attachment 1 at 3.

to use the procedures in 10 C.F.R. Part 2, Subpart G ("Subpart G") in certain circumstances. Id. § 2.310(d). It is the proponent of the contentions, however, who has the burden of demonstrating "by reference to the contention and bases provided and the specific procedures in Subpart G of this part, that resolution of the contention necessitates resolution of material issues of fact which may be best determined through the use of the identified procedures." Id. § 2.309(g). NEC did not address the selection of hearing procedures in the Petition and so failed to satisfy its burden to demonstrate why Subpart G procedures should be used in this proceeding. Accordingly, any hearing should be governed by the procedures of Subpart L.

VII. CONCLUSION

For the reasons stated above, NEC has not offered any admissible contention in this proceeding. Therefore, its Petition for Leave to Intervene and Request for Hearing should be denied.

Respectfully Submitted,



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Counsel for Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.

Dated: June 22, 2006

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
Entergy Nuclear Vermont Yankee, LLC	)	Docket No. 50-271-LR
and Entergy Nuclear Operations, Inc.	)	ASLBP No. 06-849-03-LR
	)	
(Vermont Yankee Nuclear Power Station)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "Entergy's Answer to New England Coalition's Petition for Leave to Intervene, Request for Hearing, and Contentions" dated June 22, 2006, were served on the persons listed below by deposit in the U.S. Mail, first class, postage prepaid, or with respect to Judge Elleman by overnight mail, and where indicated by an asterisk by electronic mail, this 22nd day of June, 2006.

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Matias F. Travieso-Diaz

State of Vermont

Department of Fish and Wildlife
Department of Forests, Parks, and Recreation
Department of Environmental Conservation
State Geologist
RELAY SERVICES FOR THE HEARING IMPAIRED
1-800-253-0191 TDD>Voice
1-800-253-0195 Voice>TDD

AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation
Wastewater Management Division
103 South Main Street, Sewing Building
Waterbury VT 05671-0405
PHONE: 802-241-3822 FAX: 802-241-2596
www.anr.state.vt.us/dec/ww/wwmd.cfm

September 30, 2005

Entergy Nuclear VT Yankee LLC
Lynn DeWald
320 Governor Hunt Rd
Vernon VT 05354

SUBJECT: Renewal of Permit 3-1199

Dear Ms. DeWald

The Department of Environmental Conservation has determined that your application for renewal is timely and sufficient for the purposes of Title 3 Section 814. Therefore your existing permit does not expire until the application has been finally acted upon by the Department.

We expect to be processing your renewal as soon as staff resources allow. If you have any questions, feel free to contact us at 802-241-3822.

Respectfully,

Carole Fowler
Administration & Compliance Section

cc: Permit File: 3-1199

State of Vermont

AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation
Wastewater Management Division
103 South Main Street, Sewing Building
Waterbury VT 05671-0405
PHONE: 802-241-3822 FAX: 802-241-2596
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Department of Fish and Wildlife
Department of Forests, Parks, and Recreation
Department of Environmental Conservation
State Geologist
RELAY SERVICES FOR THE HEARING IMPAIRED
1-800-253-0191 TDD>Voice
1-800-253-0195 Voice>TDD

Received
OCT 5 2005
By Lynn DeWald

September 30, 2005

This is acknowledgement that an application, as described below, was received at this office. This is not a determination of whether or not the application is complete. Your submittal has been given to Carol Carpenter who will contact you if additional administrative or technical information is needed to process your application.

The Secretary of the Agency of Natural Resources has adopted performance standards for permit and licensing programs administered by the Department of Environmental Conservation. The standard for review of an application in this program is 120 calendar days.

DEC processing time began with application receipt and will end with approval or denial of the application exclusive of time you use to respond to requests for additional information.

APPLICANT: Entergy Nuclear VT Yankee LLC
ADDRESS: Lynn DeWald
320 Governor Hunt Rd
Vernon VT 05354

APPLICATION ID: 3-1199.0509
PROJECT ID: NS75-0006

PERMIT PROGRAM: DISCHARGE PERMIT Discharge, Renewal, Individual

PROJECT: Entergy Nuclear VT Yankee
TOWN(s): Vernon

DESCRIPTION: request to renew existing NPDES discharge permit

RECEIVED: 9/30/2005

FEE TRANSACTION DATE(s)	AMOUNT	CHECK NUMBER	PAID BY or NOTATION
9/30/2005	$100.00	1701	Entergy Nuclear VT Yankee LLC

The above information has been entered into our application tracking database. Please contact me at 802-241-3822 if any of the information is inaccurate or if you have any questions.

Carole Fowler
Administration & Compliance Section

cc: Permit File

Attachment 2

State of Vermont

AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Wastewater Management Division
103 South Main Street - Sewing Bldg.
Waterbury, Vermont 05671-0405

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Fax: (802) 241-2596
www.anr.state.vt.us/dec/ww/wwmd.cfm

Department of Fish and Wildlife
Department of Forests, Parks, and Recreation
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1-800-253-0195 Voice>TDD

Received
MAR 3 1 2006
By Lynn DeWald

March 30, 2006

Ms Lynn DeWald
Entergy Nuclear Vermont Yankee, LLC
320 Governor Hunt Road
Vernon, VT 05354

Re: Final Amended Discharge Permit #3-1199

Dear Ms DeWald:

Enclosed is your copy of the above referenced permit, which has been signed by the Director of the Wastewater Management Division for the Commissioner of the Department of Environmental Conservation. Please read the permit carefully and familiarize yourself with all its terms and conditions. Your attention is particularly directed to those conditions which may require written responses by certain dates.

One change has been made to the final permit. In response to comments received during the public notice period, a 85° F upper temperature limit at downstream Station 3 during the period of June 16 through October 14 has been included. The condition requires that Entergy reduce the thermal output of the discharge to the extent that the average hourly temperature at Station 3 does not exceed 85° F.

As you are aware, Part IV – *Environmental Monitoring Studies, Connecticut River* of Entergy's NPDES Discharge Permit includes a section on the role of the Environmental Advisory Committee (EAC) in defining objective specific investigations for Entergy to complete. Conceptually a juvenile shad outmigration study has been discussed and agreed to during the application review period (see 7/9/04 Ken Cox memorandum, 8/16/04 Entergy letter, and 9/10/04 Versar review). In addition, US Fish and Wildlife Service and New Hampshire Fish and Game Department have reiterated the need for such studies via recent correspondence. EAC members will be meeting in the near future to begin developing this study plan.

If you have any questions concerning your permit, please contact Carol Carpenter at 241-3828.

Sincerely,

Brian D. Kooiker

Brian D. Kooiker, Chief
Discharge Permits Section

Enclosures

cc: EAC members (w/o enclosures)

Permit No. 3-1199
File No. 13-17
NPDES No. VT0000264
Project ID No. NS75-0006

AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WASTEWATER MANAGEMENT DIVISION
103 SOUTH MAIN STREET
WATERBURY, VERMONT 05671-0405

AMENDED[1] DISCHARGE PERMIT

In compliance with the provisions of the Vermont Water Pollution Control Act, as amended, (10 V.S.A. Chap. 47 §1251 et. seq;) and the Federal Clean Water Act, as amended (33 U.S.C. §1251 et seq),

Entergy Nuclear Vermont Yankee, LLC
320 Governor Hunt Road
Vernon, VT 05354

(hereinafter referred to as the "permittee") is authorized, by the Secretary, Agency of Natural Resources, to discharge from a facility located at:

320 Governor Hunt Road
Vernon, Vermont

to the Connecticut River, Class B at the point of discharge

in accordance with effluent limitations, monitoring requirements, and other conditions set forth in Parts I, II, III hereof.

This permit shall become effective on the date of signing

This permit and the authorization to discharge shall expire on March 31, 2006.

Signed this 30th day of March, 2006.

Received
MAR 31 2006
By Lynn Dewald

Jeffrey Wennberg, Commissioner
Department of Environmental Conservation

By Christine Thompson
Christine Thompson, Director
Wastewater Management Division

(1) *Amended sections (Part I.A.6.c. and Part IV. Trend Analysis) are italicized.*

Part I

A. EFFLUENT LIMITATIONS, MONITORING REQUIREMENTS, AND SPECIAL CONDITIONS

1. Through March 31, 2006, the permittee is authorized to discharge from outlet serial number S/N 001: Circulating water discharge - main condenser cooling water and service water. Such discharges shall be limited by the permittee as specified below:

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS lbs/day Monthly Avg.	Daily Max.	Other units Monthly Avg.	Daily Max.	MONITORING REQUIREMENTS Measurement Frequency	Sample Type
Flow: Open/Hybrid-Cycle				543 MGD	Daily	Calculated Flow
Closed Cycle				12.1 MGD	Daily	Calculated Flow
Temperature	see Part 1.6.a-f, pp.4-5					
Free Residual Chlorine	(b)		0.2 mg/l		(c)	Grab
Total Residual Oxidant	(a)(b)		Monitor Only		(c)	Grab
pH		6.5 to 8.5 Standard Units			1 x daily	Grab (d)

The effluent shall not have concentrations or combinations of contaminants including oil, grease, scum, foam, or floating solids which would cause a violation of the water quality standards of the receiving water.

Samples taken in compliance with the monitoring requirements specified above shall be collected at locations which are representative of the effluents discharged.

(a) Where "Total Oxidant" is chlorine, chlorine plus bromine, or bromine.
(b) Oxidant or chlorine injection is limited to discharge during closed cycle only and detectable residuals are not to exceed 2 hours/day with the exception that the service water system may be treated during open/hybrid cycle provided that treatment does not exceed 2 hours/day with no detectable oxidant being measured at the discharge structure.
(c) Monitoring is required during the period that oxidant, or chlorine, treatment is occurring. The duration of the treatment shall be reported for each treatment day in the monthly discharge monitoring report.
(d) A daily grab represents the minimum monitoring frequency. Continuous pH monitoring is acceptable and if utilized will require reporting daily minimum and maximum values on the monthly monitoring report.

2. Through March 31, 2006, the permittee is authorized to discharge from outfall serial number S/N 002: Radioactive liquid. Such discharges shall be limited by the permittee as specified below:

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type
Flow		0.01 MGD	(a)	Estimate
Radioactivity	see Part 1.10.a-f., p. 8		(a)	see Part 1.10.a-f.
pH	6.5 to 8.5 Standard Units		(a)	Grab

The effluent shall not have concentrations or combinations of contaminants including oil, grease, scum, foam, or floating solids which would cause a violation of the water quality standards of the receiving water.

Samples taken in compliance with the monitoring requirements specified above shall be collected at locations that are representative of the radioactive effluent discharge.

(a) Shall be monitored daily when the discharge occurs. When it is determined that a discharge of radioactive liquid wastewater is necessary, the permittee shall notify the Wastewater Management Division prior to the discharge or, if necessary, within 24 hours following the discharge.

3. Through March 31, 2006, the permittee is authorized to discharge from outfall serial number S/N 003: Plant Heating Boiler Blowdown. Such discharges shall be limited by the permittee as specified below:

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type
Flow		0.001 MGD (a)	Each discharge	Estimate
BetzDearborn Cortrol OS7700	(b)		No Monitoring Required	

The effluent shall not have concentrations or combinations of contaminants including oil, grease, scum, foam, or floating solids which would cause a violation of the water quality standards of the receiving water.

Samples taken in compliance with the monitoring requirements specified above shall be collected before combining with other waste streams.

(a) Each of the two boilers may be drained of 0.002 MGD at the end of the heating season.
(b) See Part 1.15.

4. Through March 31, 2006, the permittee is authorized to discharge from outfall serial number S/N 004: Water treatment carbon filter backwash. Such discharges shall be limited by the permittee as specified below:

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type
Flow		0.010 MGD	(a)	Estimate
Total Suspended Solids		8.3 lbs.	No Monitoring Required	

The effluent shall not have concentrations or combinations of contaminants including oil, grease, scum, foam, or floating solids which would cause a violation of the water quality standards of the receiving water.

(a) Shall be monitored daily when the discharge occurs.

5. Through March 31, 2006, the permittee is authorized to discharge from outfall serial number S/N 005: Cooling water discharge from the four RHR-Service Water pumps.

   The permittee may discharge up to 46,500 gpd. No effluent limits or monitoring is required for this waste stream.

6. The permittee is required to operate its circulating water cooling facilities (S/N 001) whether closed, open, or in a hybrid mode as follows:

   a. During the period **October 15 through May 15**:

      i. The temperature at Station 3 shall not exceed 65°F.

      ii. The rate of change of temperature at Station 3 shall not exceed 5°F per hour. The rate of change of temperature shall mean the difference between consecutive hourly average temperatures.

      iii. The increase in temperature above ambient at Station 3 shall not exceed 13.4°F. The increase in temperature above ambient shall mean plant induced temperature increase as shown by equation 1.1 (defined on page 1-8 of Vermont Yankee's 316 Demonstration: Engineering, Hydrological and Biological Information and Environmental Impact Assessment (March 1978).

   b. During the period **May 16 through June 15**, the increase in temperature above ambient at Station 3 shall not exceed the limits set forth in the following table:

Station 7 Temperature:	Increase in Temperature Above Ambient at Station 3:
Above 63°F	2°F
>59°F, ≤63°F	3°F
≥55°F, ≤59°F	4°F
Below 55°F	5°F

The increase in temperature above ambient shall mean plant induced temperature increase as shown by equation 1.1 (defined on page 1-8 of Vermont Yankee's 316 Demonstration: Engineering, Hydrological and Biological Information and Environmental Impact Assessment (March 1978).

c. *During the period June 16 through October 14, the increase in temperature above ambient at Station 3 shall not exceed the limits set forth in the following table:*

Station 7 Temperature:	*Increase in Temperature Above Ambient at Station 3:*
Above 78°F	*2°F*
>63°F, ≤ 78°F	*3°F*
>59°F, ≤63°F	*4°F*
≤59°F	*5°F*

The increase in temperature above ambient shall mean plant induced temperature increase as shown by equation 1.1 (defined on page 1-8 of Vermont Yankee's 316 Demonstration: Engineering, Hydrological and Biological Information and Environmental Impact Assessment (March 1978).

Notwithstanding the temperature limits in table 6.c. above, when the average hourly temperature at Station 3 equals or exceeds 85°F, the permittee shall, as soon as possible, reduce the thermal output of the discharge to the extent that the average hourly temperature at Station 3 does not exceed 85°F.

d. Experimental open/hybrid cycle test programs with alternative thermal limits (to 6a., 6b. and 6c. above) may be administered as approved by the Vermont Yankee Environmental Advisory Committee (defined in Part I.11.) and which receive written authorization from the Secretary of the Agency of Natural Resources.

e. During power operation, if an unexpected failure results in a complete loss of the cooling tower system, the above restrictions may be modified for a period not to exceed 24 hours to allow an orderly shutdown by utilizing the main condenser as a heat sink and operating in an open-cycle mode. The cooling tower system includes all auxiliary components required for cooling tower operation.

f. Notwithstanding the above, the Secretary may reopen and modify the permit to incorporate more stringent effluent limitations for control of the thermal component of Entergy Nuclear Vermont Yankee's discharge, including the requirements of closed-cycle operation, if the Secretary determines that open-cycle operation is having an adverse effect in resident or anadromous fish species in the river. Entergy Nuclear Vermont Yankee will be given notice and opportunity for a hearing prior to the imposition of such more stringent effluent limitations.

7. Through March 31, 2006, the permittee is authorized to discharge from outfall serial numbers S/N 006, 007, 008, 010, 011: Stormwater runoff, and demineralized trailer rinse down water (S/N 006 only).

   006 - North Storm System Discharge Point: to the north of the intake structure.
   007 - South Storm System Discharge Point: to the forebay of the discharge structure; includes discharges from S/N 003, S/N 004 and S/N 005.
   008 - Southeast Storm System Discharge Point: to the southeast of the east cooling tower.
   010 - 345 kV Switchyard Storm System Discharge Point: about 300 yards north of the intake structure.
   011 - 115kV Switchyard Storm System Discharge Point: about 350 yards north of the intake structure.

   Effluent limits and monitoring are not required for the stormwater discharges; however, future storm drain and manhole construction shall conform to the Agency's policy for stormwater treatment.

   The permittee is authorized to discharge demineralized trailer rinse down water to the stormdrain system (S/N 006). The permittee may discharge up to 10,000 gpd. No effluent limits or monitoring is required for this waste stream.

8. Through March 31, 2006, the permittee is authorized to discharge from outfall serial number S/N 009: Strainer and traveling screen backwash.

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type
Flow		0.050 MGD	(a)	Estimate
Bulab 8006	(b)		No Monitoring Required	

The effluent shall not have concentrations or combinations of contaminants including oil, grease, scum, foam, or floating solids which would cause a violation of the water quality standards of the receiving water.

Samples taken in compliance with the monitoring requirements specified above shall be collected before combining with other waste streams.

(a) Shall be monitored daily when the discharge occurs.
(b) See Part I.15.

9. The permittee will conduct an environmental monitoring program to measure and record physical, chemical, and biological data to assure compliance with the requirements of this permit in accord with Part IV of this permit: Environmental Monitoring Studies, Connecticut River. The permittee shall submit an annual report by May 31 of each year to the Secretary of the Agency of Natural Resources and the Environmental Advisory Committee.

10. All radioactive liquid waste collected in the plant will be processed through a treatment system, including filtering and/or demineralization, and the liquid will be processed and disposed of in accordance with the Nuclear Regulatory Commission Regulations. Low level radioactive wastes may be released to the Connecticut River after treatment pursuant to Final Safety Analysis Report, Volume 111, Section 9.2; Station Radioactive Liquid Waste System, Vermont Yankee Nuclear Power Station, as amended, subject to the following restrictions:

    a. The maximum instantaneous concentration of radionuclides in liquid effluents released to the unrestricted environment shall not exceed the limits specified in 10 CFR Part 20.1001 - 20.2401, Appendix B, Table 2, including applicable notes thereto.
    b. The maximum annual quantity of radionuclides, except tritium, in liquid effluents released to the unrestricted environment shall not exceed five (5) curies.

    c. The maximum annual quantity of tritium in liquid effluents released to the unrestricted environment shall not exceed five (5) curies.

    d. The dose or dose commitment to a member of the public from radionuclides in liquid effluents released to the unrestricted environment shall be limited to the following:

        i. During any calendar quarter: less than or equal to 1.5 millirems to the total body, and less than or equal to 5 millirems to any organ.
        ii. During any calendar year: less than or equal to 3 millirems to the total body, and less than or equal to 10 millirems to any organ.

    e. The permittee shall report to the Agency of Natural Resources any abnormal releases of radioactivity in liquid effluents in a manner and timeframe consistent with Nuclear Regulatory Commission requirements.

    f. The permittee shall monitor and report concentrations, quantities, and calculated doses of gamma radionuclides and tritium in liquid effluents released to the Connecticut River and report such data to the Agency of Natural Resources. Other radionuclides shall be reported to the Agency of Natural Resources in a manner consistent with the reports submitted to the Nuclear Regulatory Commission.

11. An Environmental Advisory Committee (EAC) is comprised of one individual each representing (1) Vermont Department of Environmental Conservation; (2) Vermont Department of Fish and Wildlife; (3) New Hampshire Fish and Game Department; (4) New Hampshire Department of Environmental Services; (5) Massachusetts Office of Watershed Management; (6) Massachusetts Division of Fisheries and Wildlife; and, (7) Coordinator of the Connecticut River Anadromous Fish Program, U.S. Fish and Wildlife Service. The EAC shall be advisory in function and Entergy Nuclear Vermont Yankee, LLC shall meet with the EAC as often as necessary, but at least annually, to review and evaluate the aquatic environmental monitoring and studies program. The Entergy Nuclear Vermont Yankee, LLC Chemistry Manager or designee will serve as the administrative coordinator and Secretary for the EAC.

12. The temperature probe in the Vernon fishway shall be compatible with the temperature monitoring system utilized at Stations 3 and 7 in the Connecticut River.

13. Racks and screens preventing fish and other wildlife from entering the condenser water intake must be operated and maintained in a manner as previously approved by the Vermont Water Resources Board. Solids collected on the traveling screen shall not be returned to the Connecticut River.

14. The permittee is authorized to pump river silt, as necessary, that deposits in the intake structure and cooling tower basins, in the form of a silt-water slurry to be deposited on land on the plant site in the sedimentation area. Slurry volumes to be pumped shall not exceed 0.500 MGD or 350 gpm. River sediment/silt will be pumped from the West Cooling Tower into the existing spray pond where it will be passively filtered to reduce turbidity before the water portion is routed to the discharge structure. The remaining sediment will be removed form the spray pond and disposed of properly in accordance with state and federal statutes and regulations.

15. The permittee is authorized to use either the following chemicals, or chemicals which are similar in composition, concentration, and toxicity, to the maximum concentrations indicated below. An increase in dosage rate or a substantial change in the chemicals identified must be reviewed and approved by the Department to assure that no adverse impact will occur. A substantial change in chemicals shall be defined as chemicals that are not similar in composition, concentration, and toxicity to those identified. A change of chemical vendors will require, as a minimum, a submittal of the appropriate MSDS, prior to use of the chemical, to the Wastewater Management Division of the Department.

    Bulab 8006: penetrant/biodispersant for use in minimizing and removing fouling within the Service Water System; maximum concentration 20 ppm.

    Bulab 7034 or Depositrol BL5303: general corrosion inhibitors for use in service water or circulating water; maximum concentration 30 ppm.

    Bulab 9027 or Inhibitor AZ8103: copper corrosion inhibitors for use in the circulating water for condenser corrosion control. Maximum concentration for Bulab 9027 is 10 ppm. Maximum concentration for Inhibitor AZ8103 is 50 ppm (used monthly for a 10 minute period).

    Dianodic DN2301: a dispersant for use in the circulating and service water systems; maximum concentration 20 ppm.

    Ondeo Nalco H-550 or Spectrus NX-1104: a biocide for use in service waters as an alternative or in addition to bromine/chlorine. The use of these chemicals must be controlled such that the discharge concentration to the Connecticut River of either chemical is maintained at less than 2.0 ppm.

    Cortrol OS7700: an oxygen scavenger and pH control agent containing hydroquinone as the oxygen scavenger. Use concentration varies from approximately 100 ppm to 2,000 ppm. Boiler discharges are limited to 15 ppm as hydroquinone.

    Ferroquest FQ7101: a chemical for use in the service water system to correct biological/corrosion fouling with the service water pumps. The maximum concentration is

96 ppm for one minute approximately eight times per year.

Ferroquest FQ7102: a pH control agent. Less than two gallons are used to maintain a neutral pH when using FQ 7101. The maximum concentration is 7 ppm for one minute approximately eight times per year.

Oxidizing biocides (chlorine or chlorine with bromine) for treatment of the Service Water System (SWS)

a. Open/hybrid cycle, treatment of the SWS shall not exceed 2 hours per day with no detectable free residual oxidant being measured at the discharge structure (S/N 001).

b. Closed cycle, free residual oxidant as measured at the discharge structure (S/N 001) is limited to 0.2 mg/l and detectable residual oxidant shall not exceed 2 hours per day.

16. There shall be no discharge of polychlorinated biphenyl compounds, such as those commonly used for transformer fluids.

17. There shall be no discharges of metal cleaning waste including wastewater from chemical cleaning of boiler tubes, air preheater washwater, and boiler fireside washwater.

B. REAPPLICATION

If the permittee desires to continue to discharge after the expiration date of this permit, the permittee shall apply on the application forms then in use at least 180 days before the permit expires.

Reapply for a Discharge Permit by **September 30, 2005.**

C. OPERATING FEES

This discharge is subject to operating fees. The permittee shall submit the operating fees in accordance with the procedures provided by the Secretary.

D. MONITORING AND REPORTING

1. Sampling and Analysis

The sampling, preservation, handling, and analytical methods used shall conform to regulations published pursuant to Section 304(g) of the Clean Water Act, under which such procedures may be required. Guidelines establishing these test procedures have been published in the Code of Federal Regulations, Title 40, Part 136 (Federal Register, Vol. 56, No. 195, July 1, 1999 or as amended).

Samples shall be representative of the volume and quality of effluent discharged over the sampling and reporting period. All samples are to be taken during normal operating hours. The permittee shall identify the effluent sampling location used for each discharge.

2. Reporting

The permittee is required to submit monitoring results as specified on a Discharge Monitoring Report (Form WR-43). Reports are due on the 15th day of each month, beginning with the month following the effective date of this permit.

If, in any reporting period, there has been no discharge, the permittee must submit that information by the report due date.

Signed copies of these, and all other reports required herein, shall be submitted to the Secretary at the following address:

Agency of Natural Resources
Department of Environmental Conservation
Wastewater Management Division
103 South Main Street
Waterbury, Vermont 05671-0405

All reports shall be signed:

a. In the case of corporations, by a principal executive officer of at least the level of vice president, or his/her duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge described in the permit form originates;

b. In the case of a partnership, by the general partner;

c. In the case of a sole proprietorship, by the proprietor;

d. In the case of a municipal, state, or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

3. Recording of Results

The permittee shall maintain records of all information resulting from any monitoring activities required including:

a. The exact place, date, and time of sampling;
b. The dates and times the analyses were performed;
c. The person(s) who performed the analyses;
d. The analytical techniques and methods used including sample collection, handling, and preservation techniques;
e. The results of all required analyses;
f. The records of monitoring activities and results, including all instrumentation and calibration and maintenance records;
g. The original calculation and data bench sheets of the operator who performed analysis of the influent or effluent pursuant to requirements of Section I.A of this permit.

The results of monitoring requirements shall be reported (in the units specified) on the Vermont reporting form WR-43 or other forms approved by the Secretary.

l. Additional Monitoring

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report. Such increased frequency shall also be indicated.

PART II

A. MANAGEMENT REQUIREMENTS

1. Facility Modification / Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. Such a violation may result in the imposition of civil and/or criminal penalties as provided for in Section 1274 and 1275 of the Vermont Water Pollution Control Act. Any anticipated facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new permit application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

2. Noncompliance Notification

In the event the permittee is unable to comply with any of the conditions of this permit due among other reasons, to:

a. breakdown or maintenance of waste treatment equipment (biological and physical-chemical systems including, but not limited to, all pipes, transfer pumps, compressors, collection ponds or tanks for the segregation of treated or untreated wastes, ion exchange columns, or carbon absorption units),

b. accidents caused by human error or negligence, or

c. other causes such as acts of nature,

the permittee shall notify the Secretary within 24 hours of becoming aware of such condition or by the next business day and shall provide the Secretary with the following information, in writing, within five (5) days:

i. cause of non-compliance

ii. a description of the non-complying discharge including its impact upon the receiving

water;

ii. anticipated time the condition of non-compliance is expected to continue or, if such condition has been corrected, the duration of the period of non-compliance;

iv. steps taken by the permittee to reduce and eliminate the non-complying discharge; and

v. steps to be taken by the permittee to prevent recurrence of the condition of non-compliance.

3. Operation and Maintenance

All waste collection, control, treatment. And disposal facilities shall be operated in a manner consistent with the following:

a. The permittee shall, at all times, maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit; and

b. The permittee shall provide an adequate operating staff which is duly qualified to carry out the operation, maintenance, and testing functions required to insure compliance with the conditions of this permit.

4. Quality Control

The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at regular intervals to ensure accuracy of measurements or shall ensure that both activities will be conducted.

The permittee shall keep records of these activities and shall provide such records upon request of the Secretary.

The permittee shall analyze any additional samples as may be required by the Agency of Natural Resources to ensure analytical quality control.

5. Bypass

The diversion or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except where authorized under terms and conditions of an emergency pollution permit issued pursuant to 10 V.S.A. Section 1268.

6. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any adverse impact to waters of the State resulting from non-compliance with any condition specified in this permit, including accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.

7. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed, calibration and maintenance of instrumentation, and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, and shall be submitted to Department representatives upon request. This period shall be extended during the course of unresolved litigation regarding the discharge of pollutants or when requested by the Secretary.

8. Solids Management

Collected screenings, sludges, and other solids removed from liquid wastes shall be stored, treated and disposed of in accord with the terms and conditions of any certification, interim or final, transitional operation authorization or order issued pursuant to 10 V.S.A., Chapter 159 that is in effect on the effective date of this permit or is issued during the term of this permit.

9. Emergency Pollution Permits

Maintenance activities, or emergencies resulting from equipment failure or malfunction, including power outages, which result in an effluent which exceeds the effluent limitations specified herein, shall be considered a violation of the conditions of this permit, unless the permittee immediately applies for, and obtains, an emergency pollution permit under the provisions of 10 V.S.A., Chapter 47, Section 1268. The permittee shall notify the Department of the emergency situation within 24 hours.

10 V.S.A., Chapter 47, Section 1268 reads as follows:

"When a discharge permit holder finds that pollution abatement facilities require repairs, replacement, or other corrective action in order for them to continue to meet standards specified in the permit, he may apply in the manner specified by the Secretary for an emergency pollution permit for a term sufficient to effect repairs, replacements or other corrective action. The permit may be issued without prior public notice if the nature of the emergency will not provide sufficient time to give notice; provided that the Secretary shall give public notice as soon as possible but in any event no later than five days after the effective date of the emergency pollution permit. No emergency pollution permit shall be issued unless the applicant certifies and the Secretary finds that:

(1) there is no present, reasonable alternative means of disposing of the waste other than by discharging it into the waters of the State during the limited period of time of the emergency;

(2) the denial of an emergency pollution permit would work an extreme hardship upon the applicant;

(3) the granting of an emergency pollution permit will result in some public benefit;

(4) the discharge will not be unreasonably harmful to the quality of the receiving waters;

(5) the cause or reason for the emergency is not due to willful or intended acts or omissions

of the applicant."

Application shall be made to the Secretary of the Agency of Natural Resources, Department of Environmental Conservation, Wastewater Management Division, 103 South Main Street, Waterbury, Vermont 05671-0405.

10. Power Failure

In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

a. Provide an alternative power source sufficient to operate the wastewater control facilities; or, if such alternative power source is not in existence,

b. Halt, reduce, or otherwise control production and/or all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities.

B. RESPONSIBILITIES

1. Right of Entry

The permittee shall permit the Secretary or authorized representative, upon presentation of proper credentials:

a. to enter upon the permittee's premises where an effluent source or any records required to be kept under the terms and conditions of this permit are located; and

b. to have access to and copy any records required to be kept under the terms and conditions of this permit;

c. to inspect any monitoring equipment or method required in this permit; or

d. to sample any discharge of pollutants.

2. Transfer of Ownership or Control

This permit is not transferable without prior written approval of the Secretary. All application and operating fees must be paid in full prior to transfer of this permit. In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall provide a copy of this permit to the succeeding owner or controller and shall send written notification of the change in ownership or control to the Secretary. The permittee shall also inform the prospective owner or operator of their responsibility to make an application for transfer of this permit. This application must include as a minimum; a written statement from the prospective owner or operator certifying:

a. The conditions of the operation that contribute to, or affect, the discharge will not be materially different under the new ownership.

b. The prospective owner or operator has read and is familiar with the terms of the permit and agrees to comply with all terms and conditions of the permit.

c. The prospective owner or operator has adequate funding to operate and maintain the treatment system and remain in compliance with the terms and conditions of the permit.

d. The date of the sale or transfer of the business.

The Department may require additional information dependent upon the current status of the facility operation, maintenance, and permit compliance.

3. Confidentiality

Pursuant to 10 V.S.A. 1259(b):

"Any records, reports or information obtained under this permit program shall be available to the public for inspection and copying. However, upon a showing satisfactory to the secretary that any records, reports or information or part thereof, other than effluent data, would, if made public, divulge methods or processes entitled to protection as trade secrets, the secretary shall treat and protest those records, reports or information as confidential. Any records, reports or information accorded confidential treatment will be disclosed to authorized representatives of the state and the United States when relevant to any proceedings under this chapter."

4. Permit Modification

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

5. Toxic Effluent Standards

If a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307 (a) of the Federal Clean Water Act for a toxic pollutant which is present in the discharge, and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, the secretary shall revise or modify the permit in accordance with the toxic effluent standard or prohibition and so notify the permittee.

6. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under 10 V.S.A. Section 1281.

7. Civil and Criminal Liability

Except as provided in permit conditions on Bypass (Part II, A. 5.), Power Failure (Part II, A. 10.), and Emergency Pollution Permits (Part II, A. 9.), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Civil penalties as authorized under 10 V.S.A. §1274 and 10 V.S.A. §8010, shall not exceed $10,000 a day for each day of violation. Criminal penalties, as authorized under 10 V.S.A. §1275, shall not exceed $25,000 for each day of violation, imprisonment for up to six months, or both.

8. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Clean Water Act.

9. Property Rights

Issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

11. Authority

This permit is issued under authority of 10 V.S.A. Section 1259 which states that: "No person shall discharge any waste, substance, or material into waters of the State, nor shall any person discharge any waste, substance, or material into an injection well or discharge into a publicly owned treatment works any waste which interferes with, passes through without treatment, or is otherwise incompatible with those works or would have a substantial adverse effect on those works or on water quality, without first obtaining a permit for that discharge from the Secretary", and under the authority of Section 402 of the Clean Water Act, as amended.

PART III

A. OTHER REQUIREMENTS

This permit shall be modified, suspended or revoked to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:

1. Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or

2. Controls any pollutant not limited in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Vermont Water Pollution Control Act then applicable.

B. DEFINITIONS

For purposes of this permit, the following definitions shall apply:

The Act - The Vermont Water Pollution Control Act, 10 V.S.A. Chapter 47.

Average - The arithmetic mean of values taken at the frequency required for each parameter over the specific period.

The Clean Water Act - The federal Clean Water Act, as amended.

Composite Sample - A sample consisting of a minimum of one grab sample per hour collected over a normal operating day and combined proportional to flow, or a sample continuously collected proportional to flow over a normal operating day.

Daily Discharge - The discharge of a pollutant measured during a calendar day or any 24 hour period that reasonably represents the calendar day for purposes of sampling.

For pollutants with limitations expressed in pounds, the daily discharge is calculated as the total pounds of pollutants discharged over the day.

For pollutants with limitations expressed in mg/l, the daily discharge is calculated as the average measurement of the pollutant over the day.

Grab Sample - An individual sample collected in a period of less than 15 minutes.

Maximum Day (maximum daily discharge limitation) - The highest allowable "daily discharge" (mg/l, lbs., or gallons).

Mean - The mean value is the arithmetic mean.

Monthly Average (average monthly discharge limitation) - The highest allowable average of daily

discharges (mg/l, lbs., or gallons) over a calendar month, calculated as the sum of all daily discharges (mg/l, lbs., or gallons) measured during a calendar month, divided by the number of daily discharges measured during that month.

NPDES - The National Pollutant Discharge Elimination System.

Secretary - The Secretary of the Agency of Natural Resources

Closed-Cycle Operation and Blowdown - The circulating water system mode in which water is circulated through the cooling towers to dissipate condenser heat. The only water discharged to the River during closed-cycle operation is the blowdown from the cooling towers except for minor leakage through the intake gates which is less than 1% of the circulating water flow. Blowdown refers to the water continuously removed from the cool side of the cooling tower collection basins to rid cooling towers of dissolved solids.

Instantaneous Maximum - A value not to be exceeded in any grab sample.

PART IV

ENVIRONMENTAL MONITORING STUDIES, CONNECTICUT RIVER

The environmental monitoring and studies specified in Part IV are intended to assure that the discharges authorized by this permit do not violate applicable Vermont Water Quality Standards and are not adverse to fish and other wildlife that inhabit the Connecticut River in and around the vicinity of Vernon.

In the event the US Fish and Wildlife Service determines that the field sampling activities as required in the **Larval Fish, Fish, Anadromous Fish,** and **Fish Impingement** sections of this permit may violate the applicable provisions of Endangered Species Act of 1973 as amended (16 USC 1531-43) the Agency, after consultation with other appropriate governing agencies, may direct the permittee to make changes and/or substitutions in the sampling protocol as required in this permit.

CONNECTICUT RIVER MONITORING

River Flow Rate

Frequency/Date: Once per hour - All months
Location: Vernon Dam
River flow data shall be tabulated based on data supplied by the Wilder Station.

Temperature

Frequency/Date: Once per hour - All months
Location: Stations 3 and 7
Water temperature shall be measured to within 0.1°F.

Frequency/Date: Once per hour - During fishway operation
Location: Vernon Fishway
Water temperature shall be measured to within 0.1°F. These data shall be collected only when the fishway is officially operating. Data shall be reported as hourly, daily, monthly means.

Water Quality Parameters

Frequency/Date: Once per month - All months
Location: Stations 3 and 7, and the Plant discharge
Water quality parameters shall be grab samples collected via monitor pumps or directly from the River for the following:

Parameter	Station 7	Discharge	Station 3
Total Copper, mg/l	*	*	*
Total Iron, mg/l	*	*	*
Total Zinc, mg/l	*	*	*

* Monitoring required only if Entergy Nuclear Vermont Yankee is operating during the specified sample period.

Macroinvertebrates

Macroinvertebrates shall be collected according to the following schedule:

Frequency/Date: June, August, and October (once each month)
Locations: Stations 2 and 3

Cage samplers shall be deployed in June, August, and October. Multiple samplers (minimum of three) should be set at each deployment. Physical characteristics at deployment sites should be standardized between stations to the greatest extent possible. Final sampling plan to be approved by the DEC.

Larval Fish

Larval fish shall be collected when the plant cooling water intake is operating in open/hybrid cycle according to the following schedule and methods:

Frequency/Date: Weekly - May through July 15
Location: Connecticut River adjacent to the plant intake

Collect three plankton net samples on the same day in each week. The net shall be deployed as close as possible to the intake allowing each sample to be representative of the water column, bottom to surface. The volume sampled shall be measured with a flow meter mounted near the net mouth and used to calculate the density of larval fish in each tow. Larval fish shall be identified to the lowest distinguishable taxonomic level and enumerated.

With the written concurrence of the Agency, the sampling method may be modified or replaced.

Fish

Fish shall be collected according to the following schedule and methods:

Frequency/Date: Monthly - May, June, September, and October
Locations: Connecticut River at Rum Point; Station 5; Station 4; N.H. Setback; 0.1 mile south of the Vernon Dam; Station 3; Stebbin Island; and, Station 2

Fish shall be collected at each location with boat mounted electrofishing gear. All fish caught shall be identified, enumerated to the lowest distinguishable taxonomic level, and measured for length and weight. A representative sample of American Shad and Atlantic Salmon shall be scaled for annuli determination of age. Catch-per-unit-of-effort (CPUE)

shall be calculated for each species sampled.

Anadromous Fish

Juvenile and adult American shad shall be monitored according to the following schedule:

Frequency/Date: Twice monthly - July through October
Locations: Connecticut River 0.1 mile south of Vernon Dam; Station 3; and Stebbin Island

Juvenile shad shall be collected at each location with boat mounted electrofishing gear. All captured juvenile American shad shall be identified, enumerated, and measured for length and weight. Catch-per-unit-of-effort shall be calculated.

Frequency/Date: Twice monthly - July through October
Location: Connecticut River between Vernon Dam and the confluence of the West River

Collect 20 beach seine hauls and 12 surface trawl tows (utilizing midwater trawl tow gear) per sampling event. All fish caught shall be identified, enumerated to the lowest distinguishable taxonomic level, and measured for length and weight. Catch-per-unit-of-effort shall be calculated for American shad.

Frequency/Date: Weekly - May 15 through June
Location: Vernon Fish Ladder

Adult American shad shall be sampled in the fish trap and enumerated, measured for length and weight and evaluated for sex and sexual condition. Scale samples shall be taken from each fish and used for annuli determination of age.

All sampling activities at the Vernon Fish Ladder are under the direction of the Vermont Department of Fish & Wildlife.

Fish Impingement

Impingement samples shall be collected when the plant cooling water intake is operating in open/hybrid cycle according to the following schedule and methods:

Frequency/Date: Weekly - April 1 through June 15; August 1 through October 31
Locations: Circulating water traveling screens

Prior to the start of each weekly sample, the three circulating water screens shall be backwashed and the debris removed. Debris shall be examined for American shad and Atlantic salmon. On the following day, the three circulating water screens shall be backwashed and the debris shall be

sorted to remove all impinged fish. Fish shall be identified to the lowest distinguishable taxonomic level, enumerated, measured for total length and weighed.

(When air temperatures are at freezing the permittee may be unable to rotate the traveling screens until the air temperature rises above freezing. In such cases, the scheduled sample may be collected once air temperatures have risen above freezing.)

Trend Analysis

Fish: The annual report required under Part I.A.9. shall include a time series trend analysis consistent with the non-parametric Mann-Kendall test that was used in the permittee's §316(a) Demonstration in Support of a Request for Increased Discharge Limits at Vermont Yankee Nuclear Power Station During May through October, dated April 2004 (Normandeau Associates). The trend analysis shall statistically test for significant ($p<0.05$) increasing or decreasing trends in the annual total catch per unit of effort for each of the nine representative important species collected since 1991 according to the schedule and methods required in the ***Fish*** *section of* ***Part IV****.*

Each year's annual report shall include a long term trend analysis. Specifically this shall include an analysis of the current and preceding years back through 1991.

Macroinvertebrates: The annual report required under Part I.A.9. shall include a time series trend analysis consistent with the non-parametric Mann-Kendall test that was used in the permittee's §316(a) Demonstration in Support of a Request for Increased Discharge Limits at Vermont Yankee Nuclear Power Station During May through October, dated April 2004 (Normandeau Associates). The trend analysis shall statistically test for significant ($p<0.05$) increasing or decreasing trends in the annual total catch per unit of effort (numbers of orgs/basket/30 days of deployment) for each of five macroinvertebrate abundance measures: total abundance; ephemeroptera; trichoptera; diptera; and crustacea. Analysis shall incorporate all rock basket data collected at stations 2 and 3 since 1996 according to the schedule and methods required in the Benthic Macroinvertebrate section of Part IV.

Standard Operating Procedures

Field sampling required as specified in the **Macroinvertebrates, Larval Fish, Fish, Anadromous Fish,** and **Fish Impingement** sections shall be performed according to approved Standard Operating Procedures. A Standard Operating Procedures Manual describing the field sampling activities shall be provided to the Agency for review and approval prior to the start of field sampling.

Atlantic salmon: The plant shall revert to closed cycle if the annual Atlantic salmon impingement limit as determined by the U.S. Fish and Wildlife Service, is exceeded and shall remain on closed cycle until June 15 of the current calendar year. If any anadromous Atlantic salmon are impinged, the Vermont Department of Fish and Wildlife shall be notified.

1. If Atlantic salmon are impinged, the frequency of impingement sampling shall increase to daily sampling when either of the following criteria are met:

a. when any daily impingement of Atlantic salmon exceeds 10% of the annual impingement limit or,

b. when 50% or more of the annual limit have been exceeded during the current year.

Daily impingement sampling shall continue until three consecutive daily samples have been collected and no Atlantic salmon obtained. Sampling frequency shall then revert to weekly sampling.

2. If the criteria listed above are not met, impingement sampling will remain on a weekly schedule.

The maximum number of Atlantic salmon which can be impinged by Entergy Nuclear Vermont Yankee, LLC during a calendar year is determined by:
Impinged Atlantic salmon limit = 0.001 x (smolt equivalents)

Smolt equivalents (SE) are defined as:

$$SE = SE_F + SE_P + SE_S + SE_N$$

where:

SE_F is defined as the total number of smolt equivalents available from fry plants upstream of Vernon Dam. This number is calculated by:

SE_F = 0.0675 x (two year previous fry)

Two year previous fry is defined as the total number of fry stocked upstream of the Vernon Dam two years previous.

SE_P is defined as the total number of smolt equivalents available from parr plants upstream of the Vernon Dam. This number is calculated by:

SE_P = [(0.25 x (yearling parr)) + (0.11 x (two-year previous under yearling)]

Yearling parr is defined as the total number of 1+ parr stocked upstream of the Vernon Dam during the previous calendar year.

Two-year previous under yearling parr is defined as the total number of 0+ parr stocked two years previous.

SE_S is defined as the total number of smolt equivalents available from smolt stocked upstream of Vernon Dam. This number is calculated by:

SE_S = 1 x (smolts stocked)

Smolts stocked is defined as the total number of smolts stocked upstream during the current monitoring year.

SE_N is defined as the total number of smolt equivalents available from natural reproduction upstream of Vernon Dam. This number is calculated by:

$SE_N = 0.58 \times 7000 \times 0.01 \times$ (adult salmon)

0.58 represents 58% of the run as female.
7000 represents the average number of eggs per female.
0.01 represents a 1% survival of eggs to the smolt stage.

Adult salmon is defined as the number of adult salmon passed through the Vernon Fishway three years previous.

American shad: The plant shall revert to closed cycle if the annual American shad impingement limit, as determined by the U.S. Fish and Wildlife Service, is exceeded and shall remain on closed cycle until November 15 of the current calendar year. If any anadromous American shad are impinged, the Vermont Department of Fish and Wildlife shall be notified.

1. If 50% or more of the annual limit have been exceeded during the current year, impingement sampling frequency shall increase to daily sampling upon the impingement of any American shad and continue until three consecutive daily samples not containing these fishes are obtained. Sampling would then revert back to weekly sampling.

2. If the above criterion is not met, impingement sampling shall remain on a weekly schedule.

The maximum number of American shad which can be impinged by Entergy Nuclear Vermont Yankee, LLC during a calendar year is determined by:

Impinged American shad limit = 1 x number of American shad

The number of American shad is defined as the number of American shad passed at the Vernon fish ladder or otherwise introduced above Vernon Dam during the calendar year.

Aquatic Biota Evaluation:

The above task-oriented monitoring program defines a minimal data collection study on the water quality and biota adjacent to the plant. In order to demonstrate that the operation of the plant assures the protection and propagation of a balanced and indigenous population of shellfish, fish and other wildlife, including their respective habitats, additional objective specific studies and data evaluation may be required. These additional study topics would be as a result of changes observed during the task-oriented program and/or Environmental Advisory Committee (EAC) concerns raised for fish or other biota.

The Vermont Department of Fish and Wildlife may, on its own volition or at the recommendation of the EAC, modify the fish sampling protocol if it has been determined that the impact on biota adjacent to the plant may be adversely affected or the protection and propagation of the biota is not likely to be assured. The modifications shall be made in writing and submitted to the DEC and Entergy Nuclear

Vermont Yankee, LLC.

Objective specific investigations would be defined and reviewed by the EAC annually. A draft proposal for the following years studies, if any, would be submitted by Entergy Nuclear Vermont Yankee, LLC to the EAC for review by October 1 of the current year. A progress report on studies conducted during the current year would be submitted by Entergy Nuclear Vermont Yankee, LLC to the EAC by February 1. Proposed changes to the draft proposal would by submitted by March 1.

Macroinvertebrate Investigation:
During 2002-03 the permittee shall complete a study on the macroinvertebrate populations in the Vernon Pool. Specifics of the study shall be coordinated between the Department of Environmental Conservation and Entergy Nuclear Vermont Yankee, LLC prior to commencement of the study.

The Department may amend this permit to include other specific EAC investigations.

AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WASTEWATER MANAGEMENT DIVISION
103 SOUTH MAIN STREET
WATERBURY, VERMONT 05671-0405

FACT SHEET
(October 2005, revised March 2006)

AMENDED NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES

NPDES NO: VT0000264
FILE NO: 13-17
PERMIT NO: 3-1199
PROJECT ID NO: NS75-0006

Received
MAR 31 2006
By Lynn DeWald

NAME AND ADDRESS OF APPLICANT:

Entergy Nuclear Vermont Yankee
320 Governor Hunt Road
Vernon, VT 05302

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Entergy Nuclear Vermont Yankee
320 Governor Hunt Road
Vernon, Vermont

RECEIVING WATER: Connecticut River

CLASSIFICATION: Class B. Class B waters are suitable for bathing and recreation, irrigation and agricultural uses; good fish habitat; good aesthetic value; acceptable for public water supply with filtration and disinfection.

I. Proposed Action, Type of Facility, and Discharge Location

The above named applicant (Applicant) applied on February 20, 2003 to the Vermont Department of Environmental Conservation (Department) for an amendment of their permit to discharge into the designated receiving water. The Applicant is engaged in the operation of a nuclear electrical generating station. The discharge is from the outfall of the facility to the Connecticut River. The Department has made a decision to amend the discharge permit. The amendment approves a 1° F increase in the thermal discharge from the facility (S/N 001) at the compliance point downstream during the period of June 16 through October 14. The Applicant's request for increased thermal limitations during the period of May 16 through June 15 is denied as discussed below.

II. Description of Discharge

A quantitative description of the discharge in terms of significant effluent parameters is based on state and federal laws and regulations, the discharge permit application, and the recent self-monitoring data.

III. Limitations and Conditions

The effluent limitations of the S/N 001 discharge and the monitoring requirements may be found on the following pages of the permit:

Effluent Limitations:	Pages 2, 4, and 5 of 25
Monitoring Requirements:	Pages 2, 4, and 5 of 25

IV. Permit Basis and Explanation of Effluent Limitation Derivation for S/N 001

Facility Description and Background:
The Applicant owns and operates a nuclear power station in Vernon, Vermont. The facility is located on the west shore of Vernon Pool, an impoundment of the Connecticut River created by Vernon Dam. The dam and Vernon Station, a hydroelectric facility, are located approximately 0.75 miles downstream from the Vermont Yankee Nuclear Power Station (Facility). The Facility, which began operation in 1972, is classified as a Boiling Water Reactor (BWR) with a rated core thermal power level of 1593 MW, providing a gross electrical output of 537 MW. The remainder of the energy, 1056 MW, is removed as heat by the circulating water system as it passes by the condenser and discharges to the Connecticut River (S/N 001), or to the atmosphere via mechanical draft cooling towers.

The S/N 001 discharge is made up of the main condenser cooling water and service water. Open/Hybrid cycle flow is permitted at 543 MGD, daily maximum, and closed cycle flow is permitted at 12.1 MGD. This amendment does not propose a change in the flow limitations or any other limitations with the exception of temperature.

Description of Entergy's Permit Amendment Request:
The Applicant's February 20, 2003 application requested an amendment to the existing thermal effluent limitations which would allow it to increase the temperature of the Connecticut River by 1°F as determined at Station 3 (located 0.65 miles downstream from Vernon Dam) relative to upstream river temperatures (Station 7, approximately 4 miles upstream). This request was for the period May 16 through October 14 (summer period) only and does not affect the so-called winter period (October 15 through May 15).

The existing and requested thermal effluent limitations are listed below.

Existing Thermal Effluent Limitations:

Station 7 Temperature:	Increase in Temperature Above Ambient at Station 3:
Above 63° F	2° F
>59° F, ≤63° F	3° F
≥55° F, ≤59° F	4° F
Below 55° F	5° F

Requested Thermal Effluent Limitations:

Station 7 Temperature:	Increase in Temperature Above Ambient at Station 3:
Above 78°F	2°F
>63°F, ≤ 78°F	3°F
>59°F, ≤63°F	4°F
≤59°F	5°F

In support of its application, the Applicant submitted the following principle documents at the time of application as well as additional follow-up documentation to the Agency of Natural Resources' (Agency) requests for further information.

1. "§316(a) Demonstration In Support of a Request for Increased Discharge Temperature Limits at Vermont Yankee Nuclear Power Station During May Through October", dated April 2004, Normandeau Associates.

2. "Hydrothermal Modeling of the Cooling Water Discharge from the Vermont Yankee Power Plant to the Connecticut River", April 2004, Applied Science Associates, Inc.

3. Water temperature data pertaining to thermal conditions below the Vernon Dam during the period May 16 through October 14, 2004, Normandeau Associates (electronic copy).

4. "Adult American Shad Hourly Count Data and the Corresponding Hourly Water Temperature Data for the Vernon Dam Fishway on the Connecticut River, 1991-2001", January 2004 and March 2004, Normandeau Associates.

Legal and Regulatory Basis for ANR's Review:
The Agency's review of thermal discharges is governed by §316(a) of the Clean Water Act (CWA) and relevant portions of the Vermont Water Quality Standards, effective July 2, 2000 (VWQS). CWA §316(a) provides for the establishment of alternative thermal effluent limitations. EPA has adopted regulations pursuant to §316(a) at 40 CFR §125.70 through 125.73. 40 CFR §125.73 includes the "Criteria and standards for the determination of alternative effluent limitations under 316(a)" and §125.73(a) states that:

> "Thermal discharge effluent limitations or standards established in permits may be less stringent that those required by applicable standards and limitations if the discharger demonstrates to the satisfaction of the director that such effluent limitations are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife on the body of water into which the discharge is made."

For existing discharges, such as Entergy's, EPA's §316(a) regulations also provide for a retrospective analysis of the existing discharge. Specifically, 40 CFR §125.73(c)(1)(i) requires that any such retrospective analysis show:

> "That no appreciable harm has resulted from the normal component of the discharge (taking into account the interaction of such thermal component with other pollutants and the additive effect of other thermal sources to a balanced, indigenous community

of shellfish, fish, and wildlife in and on the body of water into which the discharge is being made);"

Section 3-01 B.1. of the VWQS establishes temperature criteria for all state waters and establishes conditions for the assimilation of thermal wastes. Specifically, Section 3-01 B.1.d. Assimilation of Thermal Wastes states:

> "The Secretary may, by permit condition, specify temperature limits that exceed the values specified above in order to authorize discharges of thermal wastes when it is shown that:
>
> (1) The discharge will comply with all other applicable provisions of these rules;
> (2) A mixing zone of 200 feet in length is not adequate to provide for assimilation of thermal waste; and
> (3) After taking into account the interaction of thermal effects and other wastes, that the change or rate of change in temperature will not result in thermal shock or prevent the full support of uses or the receiving waters."

The Agency has also determined that Section 1-03 Anti-Degradation Policy is applicable to this application (see below for further discussion).

Findings of ANR's Review Process

The proposed changes to the thermal effluent limitations reflected in the draft permit are the result of the Agency's partial approval of the Applicant's 2004 §316(a) demonstration request. The Agency found that during the period from June 16 through October 14 the limits will "assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife". However the Agency could not make the same finding for the period May 16 through June 15 based on existing data.

The Agency's review of the application consisted of two parts consistent with the Applicant's submittals. First, the hydrothermal modeling was reviewed. The modeling was designed to predict the spatial and temporal changes in the Connecticut River as a result of requested increases in the thermal effluent limitations. Second, the Agency reviewed the §316(a) Demonstration Report which evaluated the impacts of the proposed temperature increases on the Connecticut River biota (Demonstration). Reviewers of the Applicant's submittals and application materials included staff from the Vermont Department of Fish and Wildlife and the Vermont Department of Environmental Conservation (Reviewers). In addition the Agency solicited and received substantive input from the New Hampshire Fish and Game Department and the US Fish and Wildlife Service throughout the course of the review. The Agency also selected Versar, a Maryland based third-party consultant to assist the Agency with its review. Due to their extensive experience in the review of §316(a) demonstration studies, Versar conducted an analysis and provided a report to the Agency on the hydrothermal modeling portion of the Demonstration.

The Reviewers concurred with the Applicant's retrospective analysis that the existing discharge, under the existing permitted thermal effluent limitations, resulted in "no appreciable harm" to the aquatic biota of the Connecticut River within the area influenced by the Applicant's thermal discharge during the period May 16 through October 14. However, in order to approve the requested increase in temperature a *predictive* determination also needed to be made that the proposed limits would "assure the protection

and propagation of a balanced indigenous population of shellfish, fish, and wildlife". The Reviewers agreed that the temperature increase would assure this balanced indigenous population during the period of June 16 through October 14 but concluded there was limited information regarding whether migrating salmon smolt would be impacted by the increased thermal effluent limitations during the period of May 16 through June 15, the later part of the smolt outmigration period. The Reviewers concluded that more information (i.e. actual field studies) was needed to make this determination and therefore the Agency has not granted this portion of the Applicant's amended request.

In addition, in response to comments received during the public notice period, the Agency has included a 85° F upper temperature limit at downstream Station 3 (the downstream monitoring station) during the period of June 16 through October 14. The condition will require that the permittee reduce the thermal output of the discharge to the extent that the average hourly temperature at Station 3 does not exceed 85° F.

In accordance with the VWQS, Section 1-01 B.1.d. the discharge must also not prevent the 'full support of uses' which is defined as "the achievement of the level of water quality necessary to consistently maintain and protect existing and designated uses." Designated uses are described in the Management Objectives for each class of water. For Class B waters, Section 3-04 A. Management Objectives of the VWQS includes the following designated uses: Aquatic Biota, Wildlife, and Aquatic Habitat; Aesthetics; Public water supply; Irrigation of crops and other agricultural uses; Swimming and other primary contact recreation; and Boating, fishing, and other recreational uses. The §316(a) Demonstration specifically documents that the use Aquatic Biota, Wildlife, and Aquatic Habitat is fully supported by the increase in thermal effluent limits. The Demonstration also indirectly addresses recreational fishing in that there will continue to be a balanced indigenous population of fish available for the angler. Based on the information provided to the Agency, it has made a determination that the proposed increase in thermal effluent limits will maintain a level of quality that fully supports all designated uses. In addition, at this time, the Secretary has not identified any uses in the area affected by the project that require designation as an existing use. All aquatic biota, aquatic habitat, wildlife, and recreational uses in the affected area will be maintained and protected. There are no uses such as recognized swimming holes or other unique recreational activities nor rare, threatened or endangered species that will be affected by the project that would warrant further consideration by the Secretary for designation as an existing use.

Anti-Backsliding: §402(o) of the Clean Water Act requires that a permit cannot be amended to contain effluent limitations that are less stringent than the comparable effluent limitations in the prior permit. §402(o)(2)(D) makes an exception from the general prohibition for less stringent effluent limitations when the permittee has received a modification pursuant to §316(a) of the Act.

As noted above, the Agency has reached a tentative decision to amend the Applicant's permit and made a finding that the Applicant's request meets the requirements for thermal discharges pursuant to §316(a) and Section 3-01 B.1.d of the VWQS and therefore the exception to the anti-backsliding requirements apply to this proposed discharge.

Antidegradation:

Section 1-03.B. Existing Uses:

Section 1-03.B. of the Vermont Water Quality Standards requires that existing uses of waters and the level of water quality necessary to protect those existing uses shall be maintained and protected regardless of the water's classification. Determinations of what constitutes an existing use are made during the basin planning process or on a case-by-case basis during consideration of an application. Based on the information provided by the Applicant and further outlined below, the Agency has concluded that the proposed discharge meets the Policy established in Section 1-03.B. of the VWQS.

For purposes of the analysis, the area of the proposed discharge is defined as an approximately 1.5-mile segment of the Connecticut River that spans from the lower Vernon Pool to the Vernon Dam Tailwaters. The thermal discharge is located approximately 0.75 miles upriver from the Vernon Dam. The affected area spans to Station 3 (0.65 miles downstream from Vernon Dam).

Although the Applicant believes that an Anti-Degradation analysis is not required for the requested increase in thermal limits, at the Agency's request the Applicant presented an Anti-Degradation Policy Analysis. The Applicant's analysis considers each of the five factors that the Secretary must consider in the evaluation of existing uses and concludes that all existing uses will be maintained and protected. In doing so, the Applicant has assumed that all aquatic biota, wildlife, plant life, and recreational uses of the area affected by the discharge are existing uses. The Agency does not explicitly find herein that the mere presence of aquatic biota, wildlife, plant life, or incidental recreational use of a waterbody automatically constitutes an existing use. There are no uses such as recognized swimming holes or other unique recreational activities nor rare, threatened or endangered species that will be affected by the project that would warrant further consideration by the Secretary for designation as an existing use. However, the Agency does agree with the Applicant that all uses of the affected area whether designated as existing uses or recognized as designated uses for Class B waters will be maintained and protected for the summer period for which the Agency is granting amended thermal limits.

a. *Aquatic biota that utilize or are present in the waters;*

In support of this amendment, the Applicant examined the aquatic biota through the use of a retrospective and predictive demonstration project for the proposed discharge. In the development of this §316(a) Demonstration Project, the Applicant targeted representative important species (RIS) that were indicative of the overall ecological health of the aquatic biota and then analyzed the proposed discharge's affect on those RIS. The Applicant focused upon macroinvertebrate and fish communities in its demonstration and then drew inferences to the potential impacts to the wildlife and plankton communities. The Applicant's Demonstration provides a sound basis for the conclusion that there have been no adverse impacts from the existing thermal discharge on benthic macroinvertebrates or RIS. Most population levels and compositions have remained unchanged from 1991 to 2002 in the affected area and upstream in the unaffected area. Those fish species that have experienced a decline (juvenile American shad and White suckers) have experienced declines consistent with overall declines noted for the adjacent upstream Connecticut River and not in the waters only affected by the existing discharge. The Applicant's predictive

analysis for the Demonstration indicates that the approved temperature increase will create insignificant changes in the thermal structure of the receiving waters affected by the project's discharge and that as a result the use of the waters by all species present will be maintained and protected.

The Departments of Environmental Conservation and Fish and Wildlife from the State of Vermont, Department of Fish and Game from the State of New Hampshire, the United States Fish and Wildlife Service and a third party consultant with expertise in thermal and aquatic biota modeling from power plant discharges (Versar) reviewed the Demonstration. The Agency has concluded that the predictive Demonstration provided by the applicant reasonably assures a balanced aquatic community of fish and benthic macroinvertebrates.

The Agency has concluded that there will be no significant impact from the proposed discharge on the aquatic biota that are present in the area affected by the proposed discharge. The Agency therefore agrees with the Applicant's analysis that the use of the waters by all species present will be maintained and protected.

b. *Habitat that supports existing aquatic biota, wildlife, or plant life.*

An analysis of the waters has shown that biological growth in the area affected by the proposed discharge is generally limited by food and nutrients (as well as habitat considerations such as substrate) supplied more than by temperature and therefore there will be no significant enhancement of biological productivity.

Although some biota may be displaced temporarily from the area affected by the proposed temperature increase, these species are mobile and there is sufficient habitat available for use by the species so that the habitat required for these species is adequately available. The data provided by the Applicant on the retrospective use of the waters affected by the proposed discharge shows that the discharge has not significantly limited the habitat used by the aquatic biota, wildlife or plant life in the affected area.

The Agency has concluded that the affected area will continue to provide habitat that supports existing aquatic biota, wildlife, and plant life.

c. *The use of the waters for recreation or fishing*

Class B waters are designated to achieve and maintain the following uses: swimming and other primary contact recreational activities and boating, fishing and other recreational uses. VWQS Section 3-04.A.5. and 6.

The Agency has concluded that the proposed increase in thermal discharge will permit the waters to achieve and maintain their uses for swimming and other primary contact recreational activities to the extent that such activities are occurring. The Agency has also concluded that the proposed discharge will maintain and achieve the boating uses of the affected waters.

As described in paragraphs (a) and (b) above, based on the Agency's review of the Applicant's Demonstration, we have concluded that the receiving water will achieve and maintain its uses for fishing as a result of maintaining and protecting the uses for aquatic biota.

d. *The use of the waters for water supply, or commercial activity that depends directly on the preservation of an existing high level of water quality.*

The waters in the area of the proposed discharge are not used for water supply purposes and there is no commercial activity that directly depends on the preservation of an existing high level of water quality, therefore this subsection is not applicable to the proposed discharge.

e. *With regard to the factors considered under (a) and (b), evidence of the use's ecological significance in the functioning of the ecosystem or evidence of the use's rarity.*

The area affected by the proposed discharge serves as a transit corridor for migratory fishes, namely Atlantic salmon and American shad. The affected area is a transit corridor for Atlantic salmon, and the area is used by American shad as a spawning and nursery area during part of the first year of life until they emigrate downstream in the fall. Studies provided by the Applicant show that the population of American shad, while declining, is declining at a rate consistent with the decline above and below the discharge.

The receiving water does not contain any state or federally listed threatened or endangered species based on surveys from 1967 to 2000 and a recent specific search in 1997 for listed mussels. Although two listed species of mussels (the dwarf wedge mussel and the brook floater) occur in the Connecticut River, they do not occur in the area affected by the project. The triangle floater mussel, which is not threatened or endangered, does occur both upstream and downstream as well as in the affected area and has been subject to extensive monitoring by the Applicant.

A pair of nesting bald eagles was found in 1999 on Stebbins Island (located in New Hampshire) approximately 1.4 miles downstream from the Vermont Yankee facility. The bald eagle is federally listed as threatened and listed as endangered in Vermont. The bald eagle will not be impacted by the proposed thermal increase.

Based on the information provided by the Applicant and the information contained within the Demonstration, the Agency has concluded that the proposed discharge will not significantly affect the water's ecological significance or the rarity of this water and will not impact any use of the waters by rare, threatened or endangered species.

Section 1-03.C. High Quality Waters.

Waters whose existing ambient water quality exceeds the minimum water quality criteria are "high quality" and are therefore required to meet the standards contained in Section 1-03.C of the VWQS unless the discharge is determined to be insignificant. In determining whether a socioeconomic analysis is required for a discharge, the Agency examines whether the discharge will degrade a high quality water. In making the assessment for this proposed discharge, the Agency examined the following:

The proposed discharge will affect a nearly 1.5 mile span from the discharge to approximately Station 3. In the applicant's Demonstration, when examining the average operating condition (conditions occurring at least 50 percent of the time) the Applicant's Demonstration showed that approximately three percent of the Vernon Pool volume and approximately three percent of the bottom area will see a one degree F rise in temperature.

The Applicant's proposed discharge will be 81 degrees F for less than 14 hours between the June 16 and October 14 summer period.

The Agency has concluded that the magnitude, duration, and spatial extent of the proposed thermal discharge on the receiving waters and the expected impact on the aquatic biota as described above is insignificant and therefore does not require a socioeconomic analysis.

In examining the potential for the thermal discharge to increase pollutants or otherwise degrade the water quality of the segment, the Agency has determined that the proposed discharge will not have an affect on the amount of phosphorus in the River; the proposed increase will not have an affect on the levels of nitrates in the River; the proposed discharge will not have an affect on sludge deposits or solid refuse; the proposed discharge will not impact water taste, odor, or color; the proposed discharge will not affect toxic substances; the proposed discharge will not affect radioactive substances; the proposed discharge will not have an impact on turbidity in the waters; and the proposed discharge will not have an effect on the levels of *Escherichia coli.*

The Agency has concluded that the proposed discharge may result in slight but insignificant increases of plant, plankton and bacteria communities. These slight increases will have commensurately slight effects on the levels of settleable solids, floating or total suspended solids. The slight rise in biological activity may also have a slight or negligible affect on the alkalinity of the waters and the waters pH.

The increase in thermal levels in the waters affected by the proposed discharge will also have a slight effect on dissolved oxygen. Since there is an inverse relationship between temperature and the levels of dissolved oxygen that water is capable of holding, there will be a slight decrease in the levels of dissolved oxygen in the waters. The decrease, however, will be immeasurable.

The possible additive or synergistic effects of the pollutants associated with the activity in combination with other previously approved activities or the potential of the thermal discharge to stress sensitive biological resources such as indigenous species, rare species, and threatened and endangered species are insignificant.

While the Agency has concluded that the socio-economic balancing test is not necessary for this discharge because the discharge will not have significant impact on the water quality of the receiving waters, the Applicant has nevertheless provided information in support of that test. The Applicant asserts that its facility provides baseload unit of power in the Vermont market. In addition, this power source prevents Vermont from turning to the "spot market" during peak summer periods thereby preventing power purchases at a premium. Also, the Applicant asserts that it employs 495 permanent workers and 125 contractors at the Vermont facility. In addition to these permanent workers, every 18 months during refueling, the Applicant brings in between 600 to 1000 contractors to the area to refuel the reactors.

Most significantly for this analysis, this amendment allows less frequent operation of the Applicant's cooling towers. The operation of the cooling towers diverts 12 megawatts of power for transmission during the peak summer season. Reduced cooling tower use allows the facility's equipment to operate more efficiently and reduces wear on equipment.

When comparing the socioeconomic benefits of the Applicant's proposed discharge with the

insignificant effects that the proposed discharge will have on water quality and uses in the area, the Agency concludes that the requirements of Section 1-03.G.2. would be met if such an analysis was required.

V. Procedures for Formulation of Final Determinations

The public comment period for receiving comments on this draft amended permit was from October 24 through December 7, 2005. During the comment period interested persons submitted their written views on the draft permit. All written comments received by 4:30 PM on December 7, 2005 were retained by the Department and considered in the formulation of the final determination to issue, deny or modify the draft permit.

The Department also held a hearing on November 30, 2005 at the Brattleboro Middle School (All Purpose Room), 109 Sunny Acres Drive, Brattleboro, Vermont at 6:00 P.M. All statements, comments, and data presented at the public hearing were retained by the Department and considered in the formulation of the final determination to issue, deny, or modify the draft amended permit.

Comments received during the public notice period are responded to in the attached Responsiveness Summary.

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RESPONSIVENESS SUMMARY FOR DRAFT AMENDED DISCHARGE PERMIT No. 3-1199 for Entergy Nuclear Vermont Yankee

The above referenced draft amended permit was placed on public notice for comment from the period of October 24 through December 7, 2005. A hearing was held on November 30, 2005 in Brattleboro, Vermont. The draft permit proposed to amend the existing permit to include an increase in thermal effluent limitations during the period of June 16 through October 14.

Comments on the proposed permit were received during the November 30, 2005 public hearing and during the 45 day public notice period. The following is a summary of the relevant comments received and the Agency's responses to those comments. Similar comments were grouped together or combined into one comment. Comments received that were not relevant to the proposed amended permit were not responded to by the Agency. A copy of any or all comments received can be obtained by contacting the Agency's Wastewater Management Division at 802-241-3822.

1. **Comment**: The 316a Demonstration Report documents that the existing thermal discharge has had a negative impact on a wide range of species including American Shad, Atlantic Salmon, Spottail Shiner, Smallmouth Bass, Yellow Perch, Walleye, Largemouth Bass, Fallfish, White Sucker, and White Perch in the Connecticut River.

   Comment: The existing discharge has caused "appreciable harm" to the biological community in the Connecticut River.

   Comment: The Agency and Entergy say the American shad are at the same rate of decline, as sampled, above and below the discharge area. Therefore what is the harm if we throw some more hot water and chemicals at them? The error here is not to view the ecosystem as bumbling along in isolated species and individuals rather to view it as a whole system –interrelated and symbiotic.

   Response: The 316a Demonstration Report does not document that the existing thermal discharge has had a negative impact on any species. Data analyses presented in Entergy's 316a Demonstration Report show statistically significant population trends for four of the nine Representative Important Species (RIS) (American shad, smallmouth bass, walleye, white sucker) but do not show evidence of a detrimental thermal effect on the fish community. Trends for several species (smallmouth bass, walleye, white sucker) do not exhibit the consistency expected if these populations were responding to any thermal affects induced by Vermont Yankee's discharge. This suggests that the changes observed over the 12-year period (1991-2002) may be due to factors or mechanisms acting upon individual populations differently. These changes cannot be attributed to thermal affects. The Connecticut River is a complex biological system in structure and functional processes. This coupled with hydroelectric and nuclear power generation influences and the presence of both reservoir and riverine habitat add to the difficulty of teasing apart cause and effect sources solely related to the thermal discharge.

   The significant negative (decreasing) trend in American shad in lower Vernon pool does not demonstrate adverse affects as a result of the currently permitted thermal discharge. Shad trends based on electrofishing samples reflect the abundance of juvenile fish in the lower Vernon pool. At this time the abundance of adult fish in the river *above* Vernon dam is best measured by annual

passage counts through the Vernon ladder and has not indicated a significant decline that can be attributed to the discharge thermal regime.

Since 1993 total adult shad passage counts through the Vernon and Turners Falls fish ladders have followed similar declining trends. Total passage counts at Vernon in 1991 and 1992 were in excess of 30,000 fish per year, the highest count years for that facility on record. An ongoing problem with shad passage at the Turners Falls facility has been recognized and has been under study by Northeast Utilities and federal and state fishery agencies. Alternate fishway entrance designs have been tested and may have promise of improving passage there within the near future. Poor passage performance of the Cabot Station fish ladder is similarly being addressed. Adult shad passage at the Vernon ladder is in very large part a function of the numbers of fish passed above Turners Falls. Despite the decreasing Vernon passage trend, the Vernon ladder is thought to be an effective passage mechanism and has typically passed a high proportion (1991-2002 average 66.6%) of the shad passed above Turners Falls.

In addition to reduced numbers of spawning fish passed into Vernon pool, the sex ratio of the run through the ladder has been heavily skewed to males. The 10-year average (1990-2001, excluding 2000) is 79% males. This sex ratio is equivalent to the sex ratio at Turners Falls. The sex ratio of the adult shad run at the Holyoke fish lift was approximately 50:50. The cause of the sex ratios at Turners Falls is unknown, but it has been postulated that higher energetic costs to gravid female shad and possible size selectivity of the ladder designs may be factors. Both factors, reduced passage through the Turners Falls gatehouse ladder and a male dominated sex ratio, may account for the observed declining abundance of juvenile shad in Vernon pool. Based on the data Entergy has been required to collect and analyze, the data does not show that VY has caused prior appreciable harm.

Finally, shad trends have exhibited a regional decline since the peak passage counts at Vernon Dam in 1991 and 1992. The record adult shad runs occurred during the first two years of Vermont Yankee operating under their current thermal limits (although similar limits were included in the 1986 permit as part of an experimental program – Project S.A.V.E.). These years correspond with very high estimated run return years to the lower Connecticut River (1.2 million fish in 1991; 1.63 million in 1992). The 12-year (1981-1992) average return to the river was 1 million fish followed by a 12-year (1993-2004) average of 547,000 fish. Additionally, after 1990 commercial shad landings and stock abundance estimates for the Atlantic coast as a whole declined through 1995; thereafter, estimates have increased steadily. These data indicate declining shad abundance at Vernon may reflect larger issues affecting shad stocks regionally as well as run sizes entering the Connecticut River.

2. **Comment:** The 316a Demonstration fails to consider cumulative effects.

Comment: Entergy failed to conduct a cumulative assessment of the thermal impacts of the discharge together with "all other significant impacts on the species affected." Applicants must conduct such assessments as required under 40 CFR §125.73.

Response: The 316a Demonstration *has* considered cumulative effects as required under 40 CFR §125.73 which states "This demonstration must show that the alternative effluent limitation desired by the discharger, considering the cumulative impact of its thermal discharge together with all other significant impacts on the species affected, will assure the protection and propagation of the balanced indigenous community…".

The discharge permit has required extensive ecological monitoring for over thirty years. This monitoring by its very nature includes the assessment of other sources (including the Vermont Yankee cooling water intake structure) upstream of the Vermont Yankee discharge. The 2004 Demonstration assessed the monitoring data from the 1990's through 2002 (i.e. data not included in the previous 1978 and 1990 demonstrations). That assessment indicated the absence of prior appreciable harm, and the Agency agreed, during the annual period of June 16 – October 14.

By way of the predictive analysis, assessment of the proposed thermal increase was obtained by a computer simulation model which was calibrated and confirmed from data collected from a set of continuous monitoring thermistors placed in the Vernon pool during May through October 2002. Other data used included flow and temperature from permanent instruments. The purpose of this study was to determine what effects, if any, the proposed increase would have on the *existing* thermal structure of the river. Again, this data, by its nature, included the cumulative effects of other sources upstream of the discharge.

A similar predictive analysis for the tailwater reach (i.e., dam to Station 3) was not part of the computer simulation model used to assess thermal impacts in lower Vernon pool. Nonetheless, the Agency inspected available tailwater temperature data collected by Entergy in 2004 for the May 16-October 14 period. Specifically, the Agency wanted to determine from the data whether Entergy's assertion of complete mixing in the tailwater was valid. Data were successfully registered at 7 of the 12 monitoring stations distributed among four transects located within the 1.5 mile reach downstream of the dam. The loss of specific sampling stations in part or in entirety, particularly sites located nearest to the dam and fish ladder, prevented a more comprehensive analysis; however, inspection of the available data did not reveal any significant temperature variations outside the accuracy of the thermistors or natural variation. The data indicated fairly uniform temperatures from top to bottom within the water column at those stations yielding complete data sets. As concluded for lower Vernon pool, thermal conditions in the tailwater represent cumulative effects of Vermont Yankee's discharge as well as other thermal contributions to the system within the watershed.

3. **Comment**: The 316a Demonstration Report omits an important indicator species, the dwarf wedge mussel, from the list of Representative Important Species (RIS). In 1990 the dwarf wedge mussel was listed as endangered under the Endangered Species Act. Currently there are only 20 known small populations including one in the Connecticut River near Claremont, NH. The mussel depends on host fish species for its survival. They are species specific and will only live if they find the correct host. This particular mussel depends on two host species, the tessellated darter and the mottled sculpin.

   In 1993 the U.S. Fish and Wildlife Service approved a recovery plan for the wedge mussel that calls for the attempt to reestablish populations throughout its historical range including the Connecticut River. Reestablishing a population in or near Vernon Pool would require the presence of one of the host species. The tessellated darter is a fish species that has consistently been collected from the lower Vernon Pool. Although the nearest population of the wedge mussel is relatively far north of the Vermont Yankee, the fact that the species is endangered and depends on the tessellated darter for its survival reveals that the tessellated darter should have been and should now be included as a RIS; as part of the recovery of the wedge mussel throughout the Connecticut River. Without the inclusion of the tessellated darter as a RIS, the information presented "is too incomplete to provide a clear assessment," and thus is unacceptable and in violation of the decision making criteria for determining the acceptability of the RIS determination.

Response: The list of RIS evaluated in the 316a Demonstration was approved by the fisheries biologists from Vermont Fish and Wildlife Department, New Hampshire Fish and Game Department, as well as the US Fish and Wildlife Service. If the fish biologists from these agencies believed that the tessellated darter (or the dwarf wedge mussel) was an appropriate RIS, it would have been included and evaluated. Further, there are no known existing populations of the dwarf wedge mussel in Vernon pool. In fact, the Agency has no information that there has ever been a population of this mussel in Vernon Pool.

4. **Comment:** Entergy uses a flawed methodology to measure river temperature that grossly understates the localized impact on the biological community most directly affected by the discharge and makes it impossible to directly estimate the possibility that species will experience thermal shock in the lower Vernon Pool or in the fish ladder.

   Response: The purpose of the temperature monitor at Station 3 is to gauge compliance with the temperature limits in the permit not to *directly* measure the impact on aquatic biota. It is the on-going biological monitoring, as required by the permit, which is the mechanism used to determine impacts on the biological community of the Connecticut River. The evaluation of this monitoring data, whether via a 316a demonstration study or during periodic reviews, is what ultimately determines whether or not the biological community is impacted by Entergy's thermal discharge. Review of the 2004 316a Demonstration, which evaluated the aquatic biota in great detail indicated that there is a balanced, indigenous population present.

   Including a temperature monitor at the point of discharge would not serve any useful purpose. Extensive hydrothermal modeling as part of the recent 316a Demonstration has demonstrated (three dimensionally) how the thermal plume, with the proposed increase in thermal limits, will impact Vernon pool. This was evaluated using average (occurs 50% of the time) and extreme-case (occurs 1% percent of the time) in-river conditions that would result from the proposed increase in thermal discharge limits.

5. **Comment:** Entergy has failed to insure protection and propagation of the balanced indigenous population (BIP). As explained in Part VI.E. of our comment letter, the existing discharge has already caused appreciable harm to the biological community in the river. It necessarily follows that Entergy cannot show that the requested variance will assure the protection and propagation of the Balanced Indigenous Population (BIP).

   Comment: Section 316(a) and EPA regulations require that applicants must prove that thermal effluent standards are more stringent than necessary to "insure protection and propagation of a balanced, indigenous population of fish, shellfish, and wildlife in and on the body of water". The legislative history of 316(a) makes clear that Congress intended that there be "a very limited waiver for major sources of thermal effluents that could establish beyond any question" that the BIP would be protected. Entergy has not made this stringent burden of proof.

   Comment: Entergy has not demonstrated that thermal restrictions under the proposed permit are conservative in assuring "protection and propagation of a balanced indigenous population of fish, shellfish, and wildlife in and on the [affected] body of water" as required by §316(a) and EPA regulations generally.

   Comment: The effect on habitat that supports existing aquatic biota, wildlife, or plant life must be considered but the application and the Agency have only been able to conclude that biota that don't like hot water can swim away to suitable habitat elsewhere and those that like hot water (and

chemicals) will thrive. The applicant has failed to demonstrate under 316a that the permit remains and/or was ever protective of "a balanced indigenous community of shellfish, fish, and wildlife".

Comment: The methodology that Entergy is using to measure the effect of temperature increases in the river do not accurately reflect the impact on the Vernon Pool and Vernon Dam Fishway. Entergy's upstream monitoring location (Station 7) is a relatively narrow part of the river. Lower Vernon Pool is a broad, slow moving reservoir. Ambient temperature in the pool may frequently be higher than at Station 7. Entergy does not account for this in determining their thermal discharge. Station 3 (downstream compliance point) is also located in a relatively narrow section of the river that will likely warm up at different rates than the lower Vernon Pool or at or very near the fish ladder at Vernon Dam. These are areas where direct biological harm from increased water temperatures is most likely to occur. Thus, there is no sound scientific basis on which to draw any conclusions regarding the true effects of the proposed temperature increase.

Response: The Department disagrees that Entergy has failed to insure protection of the BIP. The conclusion of the 2004 316a Demonstration, with which the Agency concurs, is that the existing and proposed discharge assures "protection and propagation of a balanced indigenous population" during the June 16 through October 14 time period.

The Agency disagrees that the effect on habitat was not considered. The effect on habitat for each Representative Important Species (RIS) fish was considered on a species by species basis using the modeling of the thermal plume and the indicator thermal effects parameters selected from the literature (See Section 5.2 of the 2004 316a Demonstration). Based on that analysis no significant habitat exclusion for RIS was predicted as a result of the new thermal limits. Based on the predictive analysis there is no evidence that the BIP will fail to be protected.

The 316(a) Demonstration Report predicts changes in habitat availability in lower Vernon pool and duration (hours) exceeding specified temperatures for certain life history parameters at Station 3 under the proposed amended temperature permit limits. These changes are too small to predict with any confidence that balanced populations of RIS will not be maintained under the proposed thermal limits. The Agency is incorporating a temperature cap which will ensure the temperatures will not exceed 85°F, as discussed in Response 6. In addition, the RIS monitoring program specified in all future permits, as in the past, will be evaluated by the EAC and Agency and modified as appropriate with the intent that any significant changes in RIS populations will be able to be detected.

Entergy Vermont Yankee bears the burden of demonstrating to the satisfaction of the Agency that the proposed thermal effluent limitations are "more stringent than necessary to assure the projections and propagation of a balanced, indigenous population of shellfish, fish, and wildlife." The Agency has determined that the 316(a) Demonstration and the materials that the applicant has produced in support of the amendment request meet the applicable standards, as discussed in more detail in this Response Summary.

6. **Comment**: The permit fails to set an upper bound on the temperature, leaving the river vulnerable to extreme thermal shock. The existing discharge permit places no upper bound on the temperature of the river at which Entergy must stop adding waste heat through its cooling water discharge. The draft amended permit fails to address this shortcoming.

   ANR should require that Entergy not raise the ambient water temperature beyond 85°F at any point within the Connecticut River. If and when such limit is reached, Entergy should be required to take

all necessary steps—including reducing power output—to avoid raising the ambient water temperature any further.

Significantly, according to Entergy's own study as part of their 316(a) Demonstration of temperature impacts on fish, water temperatures above 88°F are the avoidance temperatures for all RIS found in the Vernon Pool except one.

Comment: Allowing an unlimited increase in water temperature inside the Vernon Pool cannot be said to enhance or protect the quality of the river, and in fact, just the opposite is true.

There is no showing that the temperature increase will not result in thermal shock to the biological community within Vernon Pool, or to species that migrate through this area such as Atlantic salmon or American shad.

Comment: What is the upper temperature limit of the discharge? Currently no temperature limit has been named at which Vermont Yankee must stop discharging waste heat. The CRWC recommends that the temperature upper limit be set no higher than 85°F at the discharge point. Not having an upper limit is unacceptable. The discharge temperature should have an appropriate maximum.

Response: Designation of an upper temperature limit has merit as added protection to the balanced indigenous populations within the affected project area. Under the proposed permit temperature limits, Entergy predicts "the maximum temperature at Station 3 might exceed 85°F for an average of only 6 hours per summer season and would never exceed 86°F" (Entergy's *Comments to the ANR Regarding the Draft Vermont Yankee NPDES Permit Amendment*, 7 December 2005). As cited by Entergy, Luxenberg (1990) analyzed the 22-year thermal history (1968-1989) of the Connecticut River within the project area during which maximum average hourly temperatures at Station 3 exceeding 84°F occurred on three occasions: July 21, 1968; August 5, 1979; and August 14, 1988. Over the same period of record maximum average hourly temperature values never exceeded 85°F. The 316a Demonstration Report assessed temperature effects on the RIS, including exclusionary (avoidance and upper incipient lethal) temperatures for each species. A discharge upper temperature limit of 85°F approximates the avoidance temperature for most RIS and is below the upper incipient lethal temperature for all species except Atlantic salmon which is unlikely to be migrating through the project area at times when temperatures might approach or exceed 85°F. Therefore the Agency has included in the final permit an upper temperature limitation for the period June 16 through October 14 (see Section I.A6.c., page 5 of 25) which requires Entergy to modify the operation of the cooling water system such that the average hourly temperature at Station 3 (downstream monitoring station) does not exceed 85°F.

7. **Comment**: The downstream compliance point should not be located downstream of the dam. The water temperatures in the pool are not used at all in connection with deciding what the change has been. The notion that there is a one degree temperature change is just false because it is measured 0.65 miles downstream of the dam. This information is given to the public and the way it appears makes it seem much more benign and much less hazardous to aquatic life than in actuality it is.

Response: The permittee's application, fact sheet to the proposed permit, and public notice document clearly state that compliance with the 1° F temperature increase is determined downstream at Station 3. There is no attempt on the Agency's part to misinform the public. The

compliance point has been identified in the Vermont Yankee permit over a period of 30 years and several five year permit cycles.

While it is true that the water temperature in Vernon Pool is not "used in connection with deciding what the change has been", decades of ecological monitoring as well as recent hydrothermal modeling has demonstrated that fish habitat and/or passage is available in the pool such that a balanced, indigenous population is maintained. A discussion of the habitat impacts due to the thermal increase is found in Response 5.

8. **Comment**: Entergy should be required to install temperature sensors at the point of discharge as well as every several hundred feet down river to 'Station 3'. Baseline and Delta T must be measured before 'Station 3'.

   Response: The commenter has not provided a reason as to *why* temperature sensors should be included at the point of discharge as well as every several hundred feet to Station 3. Provided that future ecological monitoring continues to demonstrate that there is a balanced, indigenous population, the Agency is satisfied with the current regime to determine permit compliance.

9. **Comment**: The Draft Amended Permit does not comply with Vermont WQS. The thermal mixing zone is illegal.

   Comment: The Draft Amended Permit does not comply with Vermont WQS. Entergy's discharge violates the 200 foot limit on thermal mixing zones. There is no showing in the record that a mixing zone of 200 feet in length is not adequate to provide for assimilation of thermal waste The analysis found in the 1978 §316(a) Demonstration fails to explain why a mixing zone of 200 feet is inadequate to provide for the assimilation of thermal wastes. It states that, "[r]ecording temperature systems were installed at Monitor 3, 0.65 miles down River from the Vernon Station, in December 1967 and at Monitor 7, 4.25 miles up the river from Vernon Station, in December 1969...River water temperatures have been recorded at these locations since the monitors were installed." (1978 Demonstration, 4-2) It appears from the lack of analysis in the record that the only reason Station 3 is used as the extent of the mixing zone is that Station 3 was already installed 1.4 miles downstream of Entergy when the facility was built.

   There apparently was a June 10, 1968 order issued by the Water Resources Board (a document which, according to the WRB, was destroyed) which apparently established a mixing zone to the foot of the Vernon Dam as the downstream extent of the thermal mixing zone. There is no document in the record that establishes a larger mixing zone. Nevertheless, the permit contains a mixing zone that extends 0.65 miles below Vernon Dam (to Station 3).

   Response: Consistent with Section 316(a) of the CWA, the Secretary of the Agency may approve an alternative effluent limitation in excess of the thermal limitations established by the Vermont Water Quality Standards, provided that:

   (1) The discharge will comply with all other applicable provisions of these rules;
   (2) A mixing zone of 200 feet in length is not adequate to provide for assimilation of thermal waste; and
   (3) After taking into account the interaction of thermal effects and other wastes, that the change or rate of change in temperature will not result in thermal shock or prevent the full support of uses or the receiving waters."

Section 3-01 B.1.d. Assimilation of Thermal Wastes. Essentially, section 3-01 B.1.d. provides that an alternative standard may be set forth in a permit condition provided that the three criteria set forth above are met. First, the thermal discharge shall "comply with all other applicable provisions of the VWQS." Second, the mixing zone must be inadequate to assimilate the thermal discharge. Third, similar to Section 316(a) of the CWA, ANR must evaluate the "interaction of other pollutants" with the thermal discharge and determine that the discharge "will not result in thermal shock or prevent the full support of uses."

As set forth in the fact sheet to the permit, the Agency has made specific findings regarding the impacts of the proposed discharge related to applicable water quality provisions, the interaction of the proposed thermal discharge with other wastes and the possibility of thermal shock. In addition, as described below, the Agency has also determined that a mixing zone of 200 feet is inadequate for assimilation in this matter and that the temperature change will not cause thermal shock or prevent the full support of uses.

The 1978 Demonstration Study as well as additional thermal plume studies conducted as part of the 1990 Demonstration Study demonstrate that an area within a 200 foot radius of the discharge point was not adequate to assimilate the thermal discharge under previous more conservative temperature limitations. It is apparent that a 200 foot mixing zone was inadequate to accommodate previous (lower) thermal limits. It follows also that it is inadequate to accommodate requests for higher thermal limits. Nonetheless, both the 2004 Hydrothermal Modeling Report and the 2004 Demonstration Study reconfirm through the use of color coded graphical presentations that the thermal discharge under both the existing limitations and the increased thermal limits can not be assimilated in a 200 foot radius from the discharge point.

The extensive biological monitoring in the Connecticut River and the Demonstration Study demonstrate that the existing and proposed discharge will assure the protection and propagation of a balanced indigenous biological community which supports the finding that the proposed discharge will not result in thermal shock or prevent the full support of uses (June 16 through October 14). As explained in the response to Comment 2., the biological monitoring by its very nature assesses the cumulative impacts of all environmental stressors.

10. **Comment**: The Draft Amended Permit does not comply with Vermont WQS. Entergy's discharge violates the 'Protect and Enhance' policy. Beyond the fact that the record contains no document authorizing a 1.4 mile thermal mixing zone for Entergy's discharge, ANR cannot make the showings required by Vermont Water Quality Standards to create such a large mixing zone. ANR is required to show that the discharge will comply with all other applicable provisions of Vermont WQS. This showing is not present in the record. In particular, ANR must show that the discharge will "protect and enhance the quality, character, and usefulness of the Connecticut River" and "assure the maintenance of water quality necessary to sustain existing aquatic communities." (10 VSA § 1250) Additionally, ANR must show that Vermont's Antidegradation policy is being followed and that this "high quality" water is being protected and maintained. Allowing an unlimited increase in water temperature inside the Vernon Pool cannot be said to enhance or protect the quality of the Connecticut River, and in fact, just the opposite is true.

Comment: High Quality Waters must be maintained and protected. The high temperature discharge plume would degrade the quality of the Connecticut River and 1) reduce available habitat for desirable species spawning and habitat; 2) promote predation by heat tolerant species on juvenile shad and other desirable species; 3) interfere with anadromous fish migration; and 4) reduce resident populations of indigenous species.

Response: Although 10 V.S.A. §1250 (and Section 1-02 of the Vermont Water Quality Standards) calls for the protection and enhancement of the state's waters, it also recognizes that discharges will occur and must be controlled. The regulatory scheme requires the maintenance of water quality necessary to sustain existing aquatic communities and manage waters to promote beneficial and environmentally sound development. The Vermont Water Quality Standards and 316a of the Clean Water Act allow for the discharge of controlled thermal waste when it can be demonstrated that there will be the full support of uses and a balanced indigenous population in the receiving waters, respectively. As set forth in the fact sheet to the permit (see pages 3 – 10), the proposed thermal increase satisfies the Anti-Degradation Policy and other requirements of the Vermont Water Quality Standards. As set forth in Response 9., a mixing zone of 200 feet is inadequate to assimilate the thermal waste.

11. **Comment**: The public has been denied the opportunity to review and comment on key documents and information being relied upon by the Agency. Two key documents are missing from the record. One is a letter from the Water Resources Board regarding the intake structure and the other is a document authorizing the thermal mixing zone.

    Comment: The draft permit relies on information not contained in the record. It does not contain sufficient information to provide the public with a meaningful opportunity to comment and thus is in violation of section 1259(b) of the Vermont Water Pollution Control Act (VWPCA) which states that "any records, reports, or information obtained under this permit program shall be available to the public for inspection and copying".

    The Connecticut River Watershed Council (CRWC) demands that a new public notice and opportunity to comment be issued which will conform to the VWPCA and give the public a meaningful opportunity to comment.

    The public does not have a fair opportunity to comment where key documents which ANR has relied upon to issue this permit are missing from the record, and have in fact been destroyed.

    Response: The documents referred to in this comment are not relevant to this amended permit request. The Agency evaluates each permit application and amendment request for compliance with the applicable state and federal requirements in place at the time of the permit application. The comment apparently refers to documents which were issued in 1968 to 1969 by the Water Resources Board. Initially the Agency believed that copies of these documents were destroyed by a fire according to the keeper of the records. However, the 1968 Water Resources Board Final Order of Permit and an October 2, 1969 letter regarding the intake structure were eventually located and have been supplied to the commenters. The failure of the Agency to initially produce two documents which are almost forty years old, and predate revisions to the Vermont Water Quality Standards as well as statutory requirements, does not in any way prejudice the public.

12. **Comment**: The public has not had an opportunity to comment on the information provided by the Environmental Advisory Committee (EAC). The EAC is made up of state and federal representatives. With its limited representation there is no input from the public; either as members of the EAC or via public hearings. The EAC has provided comments to the ANR relating to the 316a Demonstration Report. These comments have not been made public. The EAC is subject to the Vermont Open Meeting Law. ANR has failed to comply with the Open Meeting Law and has deprived the public of the opportunity to review and comment on the information and recommendations of the EAC on the current draft amendment.

Comment: The EAC is subject to the Vermont Open Meeting law (Title 1, Chapter 5, §312). Meetings must be open to the public and minutes must be taken. The public must have access to the minutes.

Comment: The EAC has provided comments to the ANR relating to the 316(a) Demonstration variance request yet these comments have not been made public. Without this information the public cannot provide meaningful comments on the draft permit.

CRWC requests that the information from the EAC to the ANR be made public and that the comment period be reopened to allow CRWC and the public to comment.

Comment: The EAC was created under the original permit with the responsibility for reviewing the scientific data and to provide technical and policy advice to the ANR and Entergy. With its limited representation (several state and federal agencies) there is no input from the public either as members or via public hearings. The EAC meets with no public notice of their meetings.

There are no 'non-governmental organizations', no regional planning agencies, and no potentially affected municipalities represented on the EAC as there should be.

Response: The Environmental Advisory Committee (EAC) is not a public body as defined by 1 V.S.A. §310(3). The statute defines a public body as "any board, council or commission of any agency . . . or any committee of any of the foregoing boards, councils or commissions . . ."

Here, the EAC was created as a condition of a permit for the sole purpose of soliciting technical and scientific input from the staff of the Agency and other state and federal agencies and organizations. The participation of staff outside the Agency is purely voluntary. This committee is not required by any statute or regulation and does not have any regulatory decision or policy making authority nor is it required by any authority for purposes of securing funding. The EAC does not perform any governmental function and the ultimate responsibility for determining permit conditions lies with the Agency.

In accordance with 1 V.S.A. §312(g) there are exemptions to the procedural requirements and the public's right to attend the meetings of a public agency. Section 312(g) provides that "[r]outine day-to-day administrative matters that do not require action by the public body, may be conducted outside a duly warned meeting, provided that no money is appropriated, expended, or encumbered." EAC activities are focused on the type of day to day work typical for Agency scientific staff, that of reviewing and assessing technical and scientific monitoring data in order to determine whether a permittee is in compliance with the applicable state and federal standards. The inclusion of public non-governmental entities and non-scientists in this process would politicize the process of scientific exchange and defeat the purposes of the EAC. Finally, the EAC has no control over the appropriation, expenditure, or encumbrance of public funds.

Although the EAC does not need to comply with the procedural requirements regarding public meetings, the correspondence of the active participants is a matter of public record and is available to the public. The Agency has not withheld any EAC documentation and has upon request, provided members of the public with the opportunity to review any documentation, including memoranda, notes and e-mails between active members of the EAC and Agency staff.

13. **Comment**: EPA regulations require that applicants must use a "representative important species" (RIS) approach to evaluating the effect of the thermal discharge on the biotic community (40 CFR §125.71(b)). However, the RIS chosen by Entergy is biased in favor of heat tolerant species and does not provide an accurate measure of the impact on the indigenous biological community 40 CFR §125.71(c)).

    Response: The representative important species (RIS) utilized in the 316a Demonstration were selected by the Agency at the suggestion of the Environmental Advisory Committee (EAC). The list, which was attached in a February 5, 2003 memo from the Agency to Entergy, included those fish selected for the previous 1990 demonstration (Atlantic salmon, American shad, smallmouth bass, white perch, walleye, yellow perch, and spottail shiner) as well as other species (sea lamprey, largemouth bass, black crappie, and white sucker) to represent the community of resident and anadromous fish present. The inclusion of the four additional species assures representation of both lentic and lotic habitats (i.e. above and below Vernon Dam).

    Specifically, for the amendment under consideration, the EAC reviewed the appropriateness of the six original species for assessing the potential impacts of the proposed temperature limits on the aquatic community recognizing that the existence of the Vernon hydroelectric power station has essentially partitioned the river within the Vermont Yankee project area into two distinct riverine environments, i.e. the upstream impoundment (lentic) and the downstream flowing water section (lotic). Each of these environments is characterized by its own fish community based on individual species habitat requirements. From a list of 33+ species observed within the project area the EAC consulted EPA's 316(a) guidance document to select appropriate RIS representative of different trophic levels within each environment. Consequently, the list of RIS adopted for the current assessment was expanded to two guilds: lentic community (impoundment), including largemouth bass, yellow perch, spottail shiner and white sucker; and lotic community (tailwater), including smallmouth bass, walleye, fallfish and white sucker. American shad and Atlantic salmon were included in both guilds because of their utilization of entire project area during migrations and, in the case of shad, for spawning and juvenile habitats. EPA recommends an appropriate suite of RIS not be less than two or greater than 15 species.

    If the RIS appear to over-represent "heat tolerant" species, that is because the greater Connecticut River is dominated by warm water fishes. Past development of the river for hydroelectric generation has been a significant habitat altering force shaping the fish communities that inhabit the river today. During the RIS selection process other species (i.e. American eel and sea lamprey) were also considered but eliminated because they tended to shift community representation to more temperature tolerant species. Atlantic salmon, a cold water species, was included among the RIS.

14. **Comment**: Section 1-03 C. of the VWQS requires that "high quality waters" be protected and maintained. The Connecticut River has been designated a high quality water. It is also classified as a coldwater fishery. Vermont Yankee's thermal discharge is impairing these waters by reducing available spawning and nursery habitat, interfering with migration of anadromous species, promoting an increase in predation on juvenile shad by heat tolerant species, and decreasing the abundance of several indigenous species of resident fish.

    Response: As pointed out under Response 13., the fish communities of the Connecticut River have been dominated by warm water species preceding the development of the Vermont Yankee Nuclear Power Station. Nonetheless, the river is a critical seasonal migration corridor for several anadromous fishes, including Atlantic salmon. The primary reason for the designation of the river

as a cold water fish habitat is to recognize this important function. The temperature limits as approved by the Agency protect and maintain this function.

15. **Comment:** While Entergy has documented the decline in the American shad population near Vermont Yankee, they have failed to conduct the laboratory or fieldwork necessary to demonstrate that their thermal discharge is not a cause of this harm.

    Response: Based on the data Entergy has been requested to collect and analyze, no prior appreciable harm can be found. However, as pointed out under Response #1, the exact cause(s) for the apparent decline in American shad abundance cannot be determined at this time and there is no evidence that the decline is linked to the Vermont Yankee thermal discharge. There are possible influences on the data gathered such as reduced passage through Turners Falls, a male dominated sex ratio, and the overall regional decline of shad. This apparent reduction in juvenile shad production in Vernon pool has exacerbated efforts to sample the population and obtain shad abundance estimates by collection methods used in the past (i.e. electrofishing).

    In 2000, the Agency, at the suggestion of the EAC approved significant modification and expansion of juvenile shad monitoring in the pool. Sampling procedures moved from primarily electrofishing and mid-water trawling to beach seining and mid-water trawling. Inconsistency of collection efforts and resulting abundance indices employed, including spatial (pool versus tailwater) and temporal (pre-2000 versus post-2000) variations, presents comparative data analysis challenges. Considerable research by the scientific community is needed to increase our general understanding of the thermal effects on shad behavior and physiology. More specific studies are recommended to better assess any impacts of the Vermont Yankee thermal discharge on shad migrating through and out of the project area. Such studies have been recommended by the United States Fish and Wildlife Service, New Hampshire Fish and Game Department, and the Connecticut River Atlantic Salmon Commission.

    The discharge permit provides for Entergy to conduct objective-specific studies to investigate and assess thermal effects on the fish community. The Agency recognizes this as an ongoing need to assure balanced, indigenous communities are maintained within the area influenced by the Vermont Yankee thermal discharge. The Agency can and will adjust the Applicant's permit conditions in the future, if necessary, to address any new data regarding impacts on shad.

16. **Comment:** If Vermont does not grant this permit amendment can the EPA over-ride the decision?

    Response: Once the decision is signed and finalized, EPA cannot "over-ride" the final decision. EPA does review draft permits prepared by Vermont and can file objections to a draft permit if EPA finds the draft permit does not comply with federal law and regulations. The EPA objection process can result in permit issuing authority reverting to EPA if the objections are not adequately addressed. In this case, the Agency is aware that the EPA has reviewed the draft permit and has chosen not to file an objection to its issuance.

17. **Comment:** At what point downstream of the discharge will the water temperature be at ambient? The permit does not meet the intent of the law governing mixing zones because there is no identified length from the point of discharge to the return of the ambient temperature condition.

    Response: By "ambient" we understand the commenter to mean the upstream ambient temperature. Where the downstream temperature reaches the ambient upstream temperature will vary depending on specific conditions such as river flow, water temperature, air temperature, etc.

During summer conditions the downstream river temperatures may never equal upstream temperatures, even in river systems unaffected by thermal discharges, because of the strong influence of solar radiation on river temperatures. During winter conditions however it may be theoretically possible for downstream river temperatures to equal upstream ambient temperatures due to low levels of solar radiation and the resulting cooling effects of air temperatures. (Also, see responses to mixing zone comments.) However, even during winter conditions the location where the Connecticut River returns to upstream ambient conditions is highly variable.

18. **Comment**: Vermont Yankee has made imprudent overuse of historic flow and temperature data in predicting the effects of its proposed temperature increase. CRWC believes that a river temperature of 78°F, which is the high temperature benchmark used by Vermont Yankee, could easily be exceeded in the future given unpredictable temperature extremes. Not only is the weather changing but the ownership of the hydro dams above and below the discharge has changed as well. Where previously Vermont Yankee could make a phone call and plead for additional flow through the Bellows Falls and Vernon dams under an informal arrangement with the previous owner operating from Wilder, Vermont, Entergy would now have to talk to an automated center in Maine that controls flow and the process is much more complicated. We request that the Agency consider this issue further.

    Response: It is not correct to say that Entergy must call an automated center in Maine; Entergy still calls staff in Wilder directly as necessary. Provided that Entergy continues to meet the requirements dictated by their discharge permit, the Agency is satisfied with the arrangement Entergy has with the dam's owner.

19. **Comment**: WRC staff contacted ANR staff seeking technical information. We were informed that Agency personnel wouldn't respond to technical questions during the public comment period. This makes providing informed comment difficult.

    Response: In order to ensure an open and unbiased process, the Agency does not discuss issues relating to a draft permit or hold 'closed door meetings' with individuals or a limited number of participants during the public notice period. This period of time (not less than 30 days) is an opportunity for interested parties to provide comment for consideration in an equal manner, either as verbal comments during the public hearing or as written comments during the duration of the public comment period.

20. **Comment**: Is the 'Trend Analysis' section in the proposed permit new or revised? What is its significance?

    Response: It is a new requirement of the permit. During the Agency's review of the 316a Demonstration it was requested that the Applicant provide a time series trend analysis with respect to collection of fish and macroinvertebrates. The analysis was completed as part of the Demonstration. In order for future analyses to be consistent with the trend analysis used in the Demonstration, the Agency included the analysis as a new specific requirement in the permit.

21. **Comment**: Further warming of the river will be worse for the environment. Economic gain (i.e. minimizing the costs of operating the cooling towers) for project proponents is not adequate grounds for the Agency to permit degradation of water quality by allowing this increase in thermal limits.

Comment: The permit amendment is unnecessary. Vermont Yankee wants to use the river rather than the cooling towers. There is no compelling reason stated in the application, other than a tiny increase in revenue, which requires Entergy to seek permission to increase the temperature and frequency of its discharges to the river.

Response: The issue at hand is not whether the permit amendment is necessary or unnecessary. Section 316(a) of the Clean Water Act allows an increase "whenever the owner or operator...can demonstrate to the satisfaction of the Administrator (or, if appropriate, the State) that any effluent limitation proposed for the control of the thermal component of any discharge from such source will require effluent limitations more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made, the Administrator (or, if appropriate, the State) may impose an effluent limitation under such sections for such plant, with respect to the thermal component of such discharge (taking into account the interaction of such thermal component with other pollutants), that will assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on that body of water." The Agency has made a determination that the permittee has demonstrated to the satisfaction of the Agency that the previously permitted thermal effluent limitations during the period of June 16 through October 14 are more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made.

22. **Comment**: I question whether the Agency is making political decisions at the influence of the governor with regard to this amendment. My concern is whether this is a political decision rather than a scientific decision.

    Response: The increase of 1° F above the existing thermal limits is based on the technical and scientific data submitted in the application and reviewed by an independent third party consultant for the Agency (Versar, Inc.), Agency staff, and EAC members representing other governmental jurisdictions (federal and State of New Hampshire).

23. **Comment**: The Connecticut River Atlantic Salmon Commission (CRASC) is concerned about the impacts of proposed thermal discharges on the restoration of American shad, Atlantic salmon, sea lamprey, and American eel. We are also concerned relative to potential impacts to migration of juvenile Atlantic salmon, American shad, and sea lampreys during the period May 16 through June 30 and juvenile shad during the period September 1 to October 14. Entergy has not demonstrated that the proposed discharges will protect these fish.

    Atlantic salmon smolts migrate downstream past Vermont Yankee from early April through mid-June. Smolts are undergoing physiological changes during migration to adapt to salt water. Research in the Connecticut River has shown that smolts exposed to high temperatures loose their salinity tolerance and other smolt characteristics, which negatively impacts their survival. Additionally, migration delays due to high water temperature avoidance could also decrease the number of smolts successfully reaching the ocean. The existing thermal discharges may be harmful to smolts and any increase in temperature could exacerbate this situation. Without studies specifically designed to evaluate the conditions at Vermont Yankee, and until we now otherwise, the Commission cannot support a 1° F increase in temperature.

    Comment: Adult American shad migrate to the VT/NH portion of the Connecticut River from mid-May to late June and spawn when water temperatures are near 70° F. Research has shown that

shad migrations and spawning are strongly influence by temperature. Increases in temperature cause the shad to expend their energy reserves resulting in higher mortality or interruption to their migration. Further increases in temperature could impact shad energetics migration. Juvenile shad spend the summer in the Vernon pool before migrating to the ocean in fall. Thermal discharges during fall are also a concern because of possible impacts to behavior and physiology during out migration.

Response: The Agency shares CRASC's concerns and has taken the position not to approve the 1° increase during the May 16-June 15 period requested by Entergy. In fact any future evaluation of the proposed limits will need to be based on predictive analyses following the pending two-year smolt out-migration study (objective specific study) required of Entergy by the Agency. Past smolt studies were conducted largely to address passage issues associated with Vernon dam and hydroelectric operations there. Additionally, no up-to-date studies evaluating possible affects of VY's permitted discharge on smolt behavior and physiology have been conducted. The May 16-June 15 period is consistent with the smolt out-migration window identified by CRASC and the fishery agencies and is the period the hydroelectric companies on the Connecticut River are held to for providing downstream migrating smolt passage. These dates also encompass the median dates when 95% of the upstream passage of shad (June 15) and sea lamprey (June 13) are expected to occur at the Vernon ladder based on a 12-year passage history (1990-2001). The earliest and latest 95% end point dates for shad was June 2 and June 29, respectively. Similar endpoints for lamprey fell within these dates. On average over the same years 82% and 81% of the season total shad and lamprey passage, respectively, has occurred by June 15.

The juvenile shad out-migration issue for the September 1-October 14 period is more challenging due to the lack of site specific data and the inherent problems with assessing *in situ* juvenile shad behavioral and physiological responses to the current and proposed temperature limits. Observations reported by O'Leary and Kynard (1986) suggest the proposed temperature limits could delay the onset and duration of juvenile shad out-migration from Vernon and Turners Falls pools. By how much has not been quantified nor whether the delay is substantial enough to reduce fish survival due to thermal effects before entering the estuary. No doubt additional information is needed to fully evaluate the impacts of current and proposed temperature limits on shad out-migration and survival. Unlike salmon smolts for which there is an abundance of information and accepted study protocols, shad are a fish species that are currently difficult to study and scientists are working to increase our general knowledge of these fish.

As outlined in the final permit cover letter to Entergy and in Response 15, the Agency will require an objective specific study relative to juvenile shad outmigration. The EAC will identify the necessary objective-specific study Entergy needs to conduct to evaluate the thermal effects of the discharge on juvenile shad behavior and survival. The Agency will continue to adjust the terms of the Applicant's permit as necessary, to address any new data regarding impacts to shad. However, based on the data Entergy has been asked to collect and analyze, no prior appreciable harm can be found.

24. **Comment**: The documentation provided to date by Entergy and existing research is insufficient to document that the proposed temperature increase of 1° F during the period of June 16 through October 14 will not harm anadromous fish. Further studies of the effects of temperature increases on Atlantic salmon and American shad are necessary before any change in the thermal discharge is approved.

Response: Based on the data collected and analyzed by Entergy, the Agency has concluded that no prior appreciable harm has been demonstrated. As stated previously the Agency, with input from other fishery agencies, will be reviewing and adjusting Entergy's permit monitoring requirements as necessary during the permit renewal period(s) such that the resulting data and its presentation have greater statistical power to detect any changes that may be occurring in the RIS populations and fish community at large. Also, Entergy is required to conduct objective-specific fish studies to better assess issues affecting salmon and shad.

25. **Comment:** CRASC would like the opportunity to review and comment on future study designs and reports related to diadromous fish impacts associated with the operation of Vermont Yankee.

    Response: As with any draft permit issued by the Agency CRASC and other members of the public are welcome to review the Agency's files which are public information and submit documentation to the Agency. The Agency maintains an electronic notice bulletin board with a listing of all permit applications. With respect to the special studies language in the permit (assuming this is what CRASC is referring to with the words "future study designs"), the EAC defines and recommends special studies as is deemed appropriate and, if the Agency concurs, it will require that the permittee complete these studies. It is the Agency's understanding that key fishery agencies represented on EAC, and providing advice to this Agency on the issue of anadromous fish, are also members of CRASC (VTDFW, NHDFG and USFWS) and therefore the issues raised by these agencies would be the same or similar to those held by CRASC. However if CRASC has particular suggestions regarding future studies, in addition to those raised by the EAC, CRASC can submit the suggestions to the Agency. The Agency will consider forwarding any suggestions to the EAC for their review.

26. **Comment:** The permit should acknowledge the pending uprate and 20% increased heat. Falsely segregating the permit amendment and Vermont Yankee's extended power uprate (EPU) is tantamount to mischaracterizing the amendment in order to avoid EPA strictures against increased use of once-through cooling. EPA has engaged in Clean Water Act, Section 316 rule making over the past few years that seeks to move power plants, especially new construction, away from once-through cooling and toward best practices, based on least impact. Entergy has made significant modifications to the facility and it is therefore, in a sense, all new and should be approached for purposes of discharge regulation as a rebuilt or new facility.

    Response: The permittee has indicated that their request for a 1° F increase in thermal limits is requested regardless of the outcome of the uprate request from the Public Service Board. The increase will allow decreased use of the cooling towers during the period of time June 16 through October 14. The 316(a) regulation including §40 CFR Part 125, Subpart H does not include language that "seeks to move power plants, especially new construction, away from once-through cooling and toward best practices, based on least impact". (Because the commenter does not specifically cite a regulation the Agency can only assume the commenter is referring to Section 316(a) of the Clean Water Act and its supporting regulation at §40 CFR Part 125, Subpart H which does not differentiate between 'new' and 'existing' facilities.)

27. **Comment:** Increase of once-through cooling will increase the discharge volume of chemical and radiological pollutants without: 1) investigation and assessment of concentrations at the point of discharge and across the mixing zone; 2) investigation and assessment of bio-accumulation in the river environment; and 3) demonstration or exploration of alternatives and competing cost-benefit analyses.

Response: The permit identifies the chemicals that the facility may discharge and their maximum concentrations (see Discharge Permit 3-1199, Part I.A.15.). Any proposed increase in dosage rate or a substantial change in the chemicals identified must be reviewed and approved by the Agency to assure that no adverse impact will occur. There is no proposed change in chemicals or the amounts to be used with this permit amendment.

28. **Comment**: Vermont Water Quality Standards, as established in policy under Section 1-03.B. have not been met. The monitoring station is 0.65 miles below the dam. Migrating fish are likely to encounter less homogenized water flow at the dam and fish ladder where water is not thoroughly temperature blended. This water is apt to pour over the dam as a warm water lens and upset spawning behaviors or stop migration altogether.

    Response: It has been Entergy's contention, based on their professional judgment, that complete thermal mixing occurs in the Vernon Dam tailrace waters; however, the 316a Demonstration Report provides no data to substantiate this conclusion. At the insistence of the fishery agencies, Entergy submitted, for Vermont Fish and Wildlife Department review, water temperature data for the period of May 16-October 14, 2004 collected from the Vernon tailwater (under memorandum to VFWD, March 31, 2005). The dataset consisted of measurements recorded at 7 out of the 12 monitoring sites distributed among four transects located within a 1.5 mile reach situated immediately downstream of the dam. Because the loss of specific sampling stations in part or entirety, especially sites nearest the dam, the dataset does not provide a complete representation of conditions throughout the tailwater. Nonetheless, review of the available data (over 300,000 individual measurements) did not reveal any significant temperature variations outside the accuracy limits of the thermistors and fell within the range of natural variation. The available data indicate fairly uniform mixing of water column temperatures from top to bottom. The magnitude of elevated river temperature changes and extent to which the thermal plume continues downriver below Station 3 is of interest to the fishery agencies because of the possible influence it may have on anadromous fishes. This will be an information need the fishery agencies will likely consider as part of a study protocol in the future.

29. **Comment**: It has not been demonstrated that High Quality Waters, as assumed for the Connecticut River, will not be degraded in violation of the Water Quality Standards, Section 1-03.C. The Agency claims that "The possible additive or synergistic effects of the pollutants associated with the activity...are insignificant." This is not supported by sampling, laboratory, or theoretical data. An analysis of the discharge of chlorinated or bromated organic matter has not been provided.

    Response: The Agency's finding that the Anti-Degradation provisions of the Vermont Water Quality Standards have been met is supported by the Anti-Degradation Policy Analysis submitted by Entergy which in turn is supported by the 2004 Demonstration Study and the 2003 Hydrothermal Modeling Study. Additionally the analysis of biocide (bromine and chlorine) concentration discharged from the Vermont Yankee facility has been a permit requirement for many years and is conducted on a daily basis during periods of use. Likewise standards establishing discharge limitations on these chemicals have been included in the permit for many years. No increases in these effluent limitations have been proposed as a result of Entergy's request to increase its thermal discharge.

30. **Comment**: Consideration of the impact of the cooling water intake structure (CWIS) is required by EPA regulation in considering a power plant discharge application. No documents recording authorization of the CWIS are available thus concerned citizens as well as regulators are denied the means to assess the impact of the CWIS and operation as it pertains to this permit.

Comment: The amendment does not appear to quantify acceptable levels or anticipated levels of entrainment or river biota. Therefore, it cannot claim that no harm will result from the amended discharge.

Comment: The amendment does not appear to quantify acceptable levels or anticipated levels of impingement or river biota; nor does it make any claims as to effects of the projected increase of water temperature and the presence of biocides and other discharged chemicals on biota at the screens. Therefore, it cannot claim that no harm will result from the amended discharge.

Response: The impact of entrainment and impingement by the Vermont Yankee facility on the biological community is demonstrated by the historical and on-going biological monitoring in the Connecticut River and by historical and on-going monitoring specifically targeting impingement and entrainment. As stated in the Agency's response to Comment 2., monitoring of the biological community by its very nature reflects the cumulative impacts of all environmental stressors, including impingement and entrainment. Based on that monitoring record and the information provided in the 2004 Demonstration Study the Agency has concluded there is a balanced indigenous population present in the area of the discharge.

Specific monitoring of the Vermont Yankee intake structure targeting entrainment and impingement of all trophic levels of the biological community has been a requirement of the discharge permit since 1978. That data does not support the conclusion that either entrainment or impingement has a measurable adverse impact on the biological community. In fact entrainment monitoring of planktonic organisms was discontinued in 1995 because historical monitoring had demonstrated impacts were not sufficient to warrant additional monitoring. Pursuant to recently adopted EPA 316(b) regulations, Entergy will be required to complete a comprehensive demonstration study on the cooling water intake structure with respect to impingement and entrainment as part of its permit renewal.

With respect to the discharge of biocides as stated previously the permit contains effluent limitations and requirements which regulate the discharge of biocides and other chemicals and which have proven effective in maintaining a balanced indigenous population. These limitations and requirements remain in effect and have not been increased or changed as a result of Entergy's permit amendment request.

31. **Comment**: We question the extent to which the Vermont Water Quality Standards apply to the Connecticut River which is not solely a water of the State of Vermont. The discharge affects New Hampshire's waters and so the NH Water Quality Standards also apply.

    Response: During the multi-year application review process, staff from the state of New Hampshire's Fish and Game Department and, to a lesser degree, staff from the Department of Environmental Services were involved in the process. The New Hampshire staff were relied upon by this Agency to represent their respective departments with any concerns regarding state (and federal via the Fish and Wildlife Service) regulations pertaining to NH waters. (Vermont has no authority to enforce other states' regulations). In addition, Versar, Inc., the Agency's independent consultant who was hired to review the 316a Demonstration, also evaluated the Demonstration for compliance with the applicable regulations.