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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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

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.

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				MONITORING REQUIREMENTS	
	lbs/day		Other units			
	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	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 I.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.

4. 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;

iii. 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

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.C.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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USGS **2 km SW of Hinsdale, New Hampshire, United States** 13 Apr 1998