VERMONT

Vermont Department of Environmental Conservation
Watershed Management Division
1 National Life Drive, Main 2
Montpelier VT 05620-3522
www.watershedmanagement.vt.gov

Agency of Natural Resources

[phone] 802-828-1535
[fax] 802-828-1544

October 13, 2014

Ms. Lynn DeWald, Environmental Specialist
Entergy Nuclear Vermont Yankee
320 Governor Hunt Road
Vernon, VT 05354

Re: Discharge Permit #3-1199

Dear Ms. DeWald:

Enclosed is your copy of the Discharge Permit No. 3-1199 which has been signed on behalf of the Deputy Commissioner of the Department of Environmental Conservation. This permit authorizes the discharge of effluent from circulating water and service water, boiler blowdown, water treatment process and carbon filter backwash, demineralized trailer rinsedown water, and strainer/traveling screen backwash from eletro-generation and operations at the Vermont Yankee Nuclear Power Station to the Connecticut River.

Please review the permit carefully and make note of the several changes from the previous permit, which are discussed in the enclosed fact sheet. There is a minor change in this permit from the draft that was placed on public notice in July 2014. Specifically, the Permittee is expected to comply within 24 hours if the measured temperature at Station 3 equals or exceeds the specified temperature cap. This and comments received on the draft permit are addressed in the Responsiveness Summary.

If you have questions regarding the permit or you wish to meet with us to discuss it, please contact Julia Butzler at (802) 490-6182.

Sincerely,

Ernest F. Kelley, Manager
Wastewater Management Program

Enclosures (3)

cc:
Michael Twomey, Entergy
Chris Wamser, Entergy
Kelli M. Dowell, Assistant General Counsel, Entergy
Dave DiDomenico, Wastewater Management Program VT DEC

AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
ONE NATIONAL LIFE DRIVE, MAIN-2
MONTPELIER, VT 05620-3522

Permit No. 3-1199
PIN NS75-0006
NPDES No. VT0000264

Name of Applicant: Entergy Nuclear Vermont Yankee
320 Governor Hunt Road
Vernon, Vermont 05354

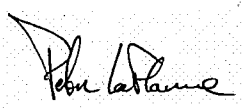
Expiration Date: **December 31, 2015**

DISCHARGE PERMIT

In compliance with the provisions of the Vermont Water Pollution Control Act as amended (10 V.S.A. chapter 47), the Vermont Water Pollution Control Permit Regulations as amended, and the federal Clean Water Act as amended (33 U.S.C. §1251 *et seq.*), Entergy Nuclear Vermont Yankee (hereinafter referred to as the "Permittee") is authorized by the Secretary of Natural Resources (Secretary) to discharge from the facility located in Vernon, Vermont to the Connecticut River in accordance with the following conditions.

This permit shall become effective on the date of signing.

Alyssa Schuren, Deputy Commissioner
Department of Environmental Conservation



By: _____ Date: **October 13, 2014**
Peter LaFlamme, Director
Watershed Management Division

I. SPECIAL CONDITIONS

A. EFFLUENT LIMITS and MONITORING REQUIREMENTS

1. From the date of signing through December 31, 2015, the Permittee is authorized to discharge from outfall serial number **S/N 001, circulating water discharge – main condenser cooling water and service water; and cooling water discharge from the four RHR-service water pumps**, to the Connecticut River. Such discharges shall be limited and monitored by the Permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type
Flow – open/hybrid cycle		543 MGD	Daily	Calculated Flow
Flow – closed cycle		12.1 MGD	Daily	Calculated Flow
Temperature	See Section I.7			
Free Residual Oxidant[1]		0.2 mg/L	[2]	Grab
Total Residual Oxidant[1,3]	Monitor only		[2]	Grab
pH	Between 6.5 and 8.5 Standard Units		Daily	Grab

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

[1] Oxidant 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 with no detectable oxidant being measured at the discharge structure.
[2] Monitoring is required during the period that oxidant treatment is occurring. The duration of the treatment shall be reported for each treatment day on the monthly discharge monitoring report form.
[3] Where "Total Oxidant" is chlorine, chlorine plus bromine, or bromine.

2. From the date of signing through December 31, 2015, the Permittee is authorized to discharge from outfall serial number **S/N 003, plant heating boiler blowdown**, to the Connecticut River. Such discharges shall be limited and monitored by the Permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type
Flow		0.0010 MGD[1]	Each discharge	Estimate
BetzDearborn Cortrol OS7700	[2]		No monitoring required	

[1] Each of the two boilers may be drained of 0.0020 MGD at the end of the heating season.
[2] See Section I.12.

3. From the date of signing through December 31, 2015, the Permittee is authorized to discharge from outfall serial number **S/N 004, water treatment carbon filter backwash**, to the Connecticut River. Such discharges shall be limited and monitored by the Permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type
Flow		0.010 MGD	[1]	Estimate
Total Suspended Solids		8.3 lbs	No monitoring required	

[1] Shall be monitored daily when a discharge occurs.

4. From the date of signing through December 31, 2015, the Permittee is authorized to discharge from outfall serial number **S/N 006, demineralized trailer rinse-down water.**

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

5. From the date of signing through December 31, 2015, the Permittee is authorized to discharge from outfall serial number **S/N 009, strainer and traveling screen backwash**, to the Connecticut River. Such discharges shall be limited and monitored by the Permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type
Flow		0.050 MGD	[1]	Estimate
Bulab 8006	[2]		No monitoring required	

[1] Shall be monitored daily when the discharge occurs
[2] See Section I.12.

6. The effluent from S/N 001, 003, 004, 006, and 009 shall not have concentrations or combinations of contaminants including oil, grease, scum, foam, or floating solids which would cause a violation of the Vermont Water Quality Standards.

7. 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 **Winter Period (November 16 – March 31):**

   i. the temperature at Station 3 shall not exceed 65° F; and

   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; and

   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 **Spring Period (April 1 – June 30)**:

i. 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 at Station 3 shall mean plant induced temperature increase as shown by Equation 1.1. 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).*

and,

ii. the measured hourly temperature at Station 3 shall not exceed 71 °F. When the measured average hourly temperature at Station 3 equals or exceeds 71 ° F, the Permittee shall, as soon as possible but within a period no longer than 24 hours, reduce the thermal output of the discharge to the extent that the measured average hourly temperature does not exceed 71 ° F.

c. during the **Summer Period (July 1 – September 15)**:

i. 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
Below 59° F	5° F

**The increase in temperature above ambient at Station 3 shall mean plant induced temperature increase as shown by Equation 1.1. 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).*

and,

ii. the measured hourly temperature at Station 3 shall not exceed 85 °F. When the measured average hourly temperature at Station 3 equals or exceeds 85 ° F, the Permittee shall, as soon as possible but within a period no longer than 24 hours, reduce the thermal output of the discharge to the extent that the measured average hourly temperature does not exceed 85 ° F.

d. during the **Fall Period I (September 16 – October 15)**

i. 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	3° F
≥ 59° F, ≤ 63° F	4° F
Below 59° F	5° F

**The increase in temperature above ambient at Station 3 shall mean plant induced temperature increase as shown by Equation 1.1. 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).*

and,

ii. the measured hourly temperature at Station 3 shall not exceed 69 °F. When the measured average hourly temperature at Station 3 equals or exceeds 69° F, the Permittee shall, as soon as possible but within a period no longer than 24 hours, reduce the thermal output of the discharge to the extent that the measured average hourly temperature does not exceed 69° F.

e. during the **Fall Period II (October 16 – November 15)**

i. 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 at Station 3 shall mean plant induced temperature increase as shown by Equation 1.1. 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).*

and,

ii. the measured hourly temperature at Station 3 shall not exceed 65 °F. When the measured average hourly temperature at Station 3 equals or exceeds 65° F, the Permittee shall, as soon as possible but within a period no longer than 24 hours, reduce the thermal output of the discharge to the extent that the measured average hourly temperature does not exceed 65 ° F.

f. 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 operations.

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

8. 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 based on a calendar year by May 31 of each year to the Secretary.

9. 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.

10. 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.

11. 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 from the spray pond and disposed of properly in accordance with state and federal statutes and regulations.

12. 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 Secretary 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 Watershed Management Division.

    Bulab 8006: penetrant/biodispersant for use in minimizing and removing fouling within the circulating water and service water systems; maximum concentration 20 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).

    Cortrol OS7700: an oxygen scavenger and pH control agent containing hydroquinone as the oxygen scavenger. Boiler discharges are limited to 15 ppm as hydroquinone.

    Conquor CNQR 3588: an oxygen scavenger and pH control agent containing Diethyl-Hydroxyl-Amine (DEHA). Boiler discharges are limited to 30 ppm as DEHA.

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

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.

Nalco CL-50: a corrosion inhibitor that contains 35% poly phosphonate. The maximum concentration is 15 ppm.

Nalco Cl-103: a non-ionic surfactant for use in the Service Water System. The maximum concentration is 10 ppm.

Nalco H-130: a biocide equivalent to Spectrus NX-1104. For use in the service water system. The use of this chemical must be controlled such that the discharge concentration to the Connecticut River is maintained at less than 2.0 ppm.

Nalco PCL-401: a copolymeric anionic dispersant for use in the Service Water System. The maximum concentration if used as a slug feed 1-2 hours per day is 20 ppm. For continuous feed, the Service Water System maximum is 2 ppm.

Ondeo Nalco H-550 or **Spectrus NX-1104**: a biocide for use in the 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 or either chemical is maintained at less than 2.0 ppm.

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

a. Open/hybrid cycle, treatment of the SWS shall result in 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.

Prosan 24: a fungicide used annually in the spring to treat the wooden portions of the cooling towers to inhibit fungal growth. There is no discharge of this product to surface waters.

Scaletrol PDC 9329: a carbon steel corrosion control inhibitor used during system lay-up; maximum concentration 30 ppm.

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

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

15. Upon application for renewal of this permit, the Permittee shall submit data that characterizes the effluent after the cessation of power production. At a minimum, the submitted information should include effluent flow and temperature, type of waste, an indication of whether the discharge will be intermittent, seasonal or temporary and any treatment systems. All data shall be provided to the Agency in usable digital format (Excel spreadsheet). If the Secretary finds that additional information is necessary to renew the permit, the Permittee shall submit any additional data within 60 days of request.

3 REAPPLICATION

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

Reapply for a Discharge Permit by: **June 30, 2015**

Pursuant to 3 V.S.A. § 814(b), so long as the Permittee reapplies by June 30, 2015, this permit shall not expire until the Secretary makes a final determination about the Permittee's application, or in the case the application is denied or the terms of the new permit limited, until the last day for seeking review of the Agency order or a later date fixed by order of the reviewing court.

4 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.

5 MONITORING AND REPORTING

1. Sampling and Analysis

The sampling, preservation, handling, and analytical methods used shall conform to the test procedures published in 40 C.F.R. Part 136.

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 monthly reports of monitoring results on form DMR 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
Watershed Management Division
One National Life Drive, Main-2
Montpelier VT 05620-3522

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 and the authorization is made in writing and submitted to the Secretary;

b. In the case of a partnership, by a 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.

In addition to the monitoring and reporting requirements given above, daily monitoring of certain parameters for operational control shall be submitted to the Secretary on the DMR WR-43. Operations reports (reporting form WR-43) shall be submitted monthly.

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 or measurements;

b. The individual(s) who performed the sampling or measurements;

c. The dates and times the analyses were performed;

d. The individual(s) who performed the analyses;

e. The analytical techniques and methods used including sample collection handling and preservation techniques;

f. The results of such analyses.

g. The records of monitoring activities and results, including all instrumentation and calibration and maintenance records;

h. 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 DMR 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 Form WR-43. Such increased frequency shall also be indicated.

II. GENERAL CONDITIONS

A. MANAGEMENT REQUIREMENTS

1. Facility Modification / Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant more frequently than, or at a level in excess of, that identified and authorized by this permit shall constitute a violation of the terms and conditions of this permit. Such a violation may result in the imposition of civil and/or criminal penalties pursuant to 10 V.S.A. chapters 47, 201, and/or 211. Any anticipated facility alterations or expansions or process modifications which will result in new, different, or increased discharges of any 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 Secretary of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

2. Noncompliance Notification

The Permittee shall give advance notice to the Secretary of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

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 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;

c. any unanticipated bypass or upset which exceeds any effluent limitation in the permit;

d. violation of a maximum day discharge limitations for any of the pollutants listed by the Secretary in this permit; or

e. other causes such as acts of nature,

the Permittee shall notify the Secretary within 24 hours of becoming aware of such condition and shall provide the Secretary with the following information, in writing, within five 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 and control facilities and systems (and related appurtenances) installed or used by the Permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by the Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

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; and

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.

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

The Permittee shall demonstrate the accuracy of the effluent flow measurement device weekly and report the results on the monthly report forms. The acceptable limit of error is ± 10%.

The Permittee shall analyze any additional samples as may be required by the Secretary to ensure analytical quality control.

5. Bypass

The bypass of facilities is prohibited, except where authorized under the terms and conditions of an Emergency Pollution Permit issued pursuant to 10 V.S.A. § 1268. It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the activity in order to maintain compliance with the conditions of this permit.

6. Duty to Mitigate

The Permittee shall take all reasonable steps to minimize or prevent any discharge which would have a reasonable likelihood of adversely affecting human health or the environment 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, all calibration and maintenance of instrumentation records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit shall be retained for a minimum of three years, and shall be submitted to the Secretary 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 in the course of treatment and control of wastewaters shall be stored, treated and disposed of in accordance with 10 V.S.A. chapter 159 and 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. §1268. The Permittee shall notify the Secretary of the emergency situation by the next working day.

10 V.S.A. § 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 wilful or intended acts or omissions of the applicant.

Application shall be made to the Secretary of Natural Resources, Department of Environmental Conservation, One National Life Drive, Main-2, Montpelier VT 05620-3522.

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 allow the Secretary or authorized representative, upon the presentation of proper credentials:

a. to enter upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

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

c. to inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

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 **at least 30 days in advance of the proposed transfer date**. The notice to the Secretary shall include a written agreement between the existing and new Permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them. The Permittee shall also inform the prospective owner or operator of their responsibility to make an application for transfer of this permit.

This request for transfer application must include as a minimum:

a. A properly completed application form provided by the Secretary and the applicable processing fee.

b. A written statement from the prospective owner or operator certifying:

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

ii. 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.

iii. 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.

c. The date of the sale or transfer.

The Secretary 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 protect 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."

Claims for confidentiality for the following information will be denied:

a. The name and address of any permit applicant or Permittee;

b. Permit applications, permits, and effluent data; and

c. Information required by NPDES application forms, including information submitted on the forms themselves and any attachments used to supply information required by the forms.

4. Permit Modification, Suspensions, and Revocation

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 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 permitted discharge.

The filing of a request by the Permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance shall not stay any permit condition.

The Permittee shall provide to the Secretary, within a reasonable time, any information which the Secretary may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee shall also furnish to the Secretary upon request, copies of records required to be kept by this permit.

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 Clean Water Act for a toxic pollutant which is present in the Permittee's discharge and such standard or prohibition is more stringent than any limitation upon such pollutant in this permit, then this permit shall be modified or revoked and reissued in accordance with the toxic effluent standard or prohibition and the Permittee so notified.

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. §1281.

7. Navigable Waters

This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any navigable waters.

8. Civil and Criminal Liability

Except as provided in, "Bypass" (Section II.A.5.), "Emergency Pollution Permits" (Section II.A.9.) and "Power Failure" (Section II.A.10.), nothing in this permit shall be construed to relieve the Permittee from civil or criminal penalties for noncompliance. Civil and criminal penalties for non-compliance are provided for in 10 V.S.A. Chapters 47, 201, and 211.

9. 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.

10. 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.

11. Other Information

If the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Secretary, it shall promptly submit such facts or information.

12. 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.

13. Authority

This permit is issued under authority of 10 V.S.A. §§1258 and 1259 of the Vermont Water Pollution Control Act, the Vermont Water Pollution Control Permit Regulation, and Section 402 of the Clean Water Act, as amended.

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 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.

Agency – The Vermont Agency of Natural Resources

Annual Average – The highest allowable average of daily discharges calculated as the sum of all daily discharges (mg/L, lbs or gallons) measured during a calendar year divided by the number of daily discharges measured during that year.

Average – The arithmetic means of values taken at the frequency required for each parameter over the specified period.

Bypass – The intentional diversion of waste streams from any portion of a treatment facility.

The Clean Water Act – The federal Clean Water Act, as amended (33 U.S.C. § 1251, *et seq.*).

Composite Sample – A sample consisting of a minimum of one grab sample per hour collected during a 24-hour period (or lesser period as specified in the section on Monitoring and Reporting) and combined proportionally to flow over that same time period.

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.

Discharge of a Pollutant or Discharge – Any addition of any pollutants to navigable waters from any point source.

Daily Maximum (maximum daily discharge limitation) – The highest allowable "daily discharge" (mg/L, lbs or gallons).

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

Incompatible Substance – Any waste being discharged into the treatment works which interferes with, passes through without treatment, or is otherwise incompatible with said works or would have a substantial adverse effect on the works or on water quality. This includes all pollutants required to be regulated under the Clean Water Act.

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

Major Contributing Industry – One that: (1) has a flow of 50,000 gallons or more per average work day; (2) has a flow greater than five percent of the flow carried by the municipal system receiving the waste; (3) has in its wastes a toxic pollutant in toxic amounts as defined in standards issued under Section 307(a) of the Clean Water Act; or (4) has a significant impact, either singly or in combination with other contributing industries,

on a publicly owned treatment works or on the quality of effluent from that treatment works.

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.

Navigable Waters – The waters of the United States, including the territorial seas.

NPDES - The National Pollutant Discharge Elimination System.

Point Source – Any discernable, confined and discrete conveyance, including any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture.

Pollutant – Means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.

Secretary – The Secretary of the Agency of Natural Resources

State Certifying Agency Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
One National Life Drive, Main-2
Montpelier VT 05620-3522

Weekly Average – (Average weekly discharge limitation) - The highest allowable average of daily discharges (mg/L, lbs or gallons) over a calendar week, calculated as the sum of all daily discharges (mg/L, lbs or gallons) measured during a calendar week divided by the number of daily discharges measured during that week.

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. The Permittee shall submit an annual report, based on a calendar year, by **May 31** of each year to the Secretary. This annual report, at a minimum, shall contain the data and analyses described below.

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. These data shall be provided to the Agency in usable digital format (Excel spreadsheet) annually by May 31 of each year, or earlier when requested by the Agency in writing.

Temperature

Frequency/Date: Once per hour - All months
Location: Stations 3 and 7
Water temperature shall be measured to within 0.1°F. These data shall be reported as hourly, daily, monthly means. These data shall be provided to the Agency in usable digital format (Excel spreadsheet) annually by May 31 of each year, or earlier when requested by the Agency in writing.

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. These data shall be provided to the Agency in usable digital format (Excel spreadsheet) annually by May 31 of each year, or earlier when requested by the Agency in writing.

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: (These data shall be provided to the Agency in usable digital format (Excel spreadsheet) annually by May 31 of each year, or earlier when requested by the Agency in writing).

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

** Monitoring required only if the Permittee 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. These data shall be provided to the Agency in usable digital format (Excel spreadsheet) annually by May 31 of each year, or earlier when requested by the Agency in writing.

Larval Fish

Larval fish shall be collected when the circulating 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. These data shall be provided to the Agency in usable digital format (Excel spreadsheet) annually by May 31 of each year, or earlier when requested by the Agency in writing.

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, July, August, 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 **total** length and weight. A representative sample of American Shad and Atlantic Salmon shall be scaled for annuli determination of age. These data shall be provided to the Agency in usable digital format (Excel spreadsheet) annually by May 31 of each year, or earlier when requested by the Agency in writing. 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 **total** length and weight. These data shall be provided to the Agency in usable digital format (Excel spreadsheet) annually by May 31 of each year, or earlier when requested by the Agency in writing. CPUE shall be calculated.

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

Collect 32 beach seine hauls per sampling event. All fish caught shall be identified, enumerated to the lowest distinguishable taxonomic level, and measured for **total** length and weight. These data shall be provided to the Agency in usable digital format (Excel spreadsheet) annually by May 31 of each year, or earlier when requested by the Agency in writing. CPUE 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 **total** 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. These data shall be provided to the Agency in usable digital format (Excel spreadsheet) annually by May 31 of each year, or earlier when requested by the Agency in writing.

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 – All months
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. These data shall be provided to the Agency in usable digital format (Excel spreadsheet) annually by May 31 of each year, or earlier when requested by the Agency in writing.

(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 Section I.A.8. 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.8. 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 the Permittee 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:

$SE_N = 0.58 \times 7000 \times 0.01$ x (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 the Permittee 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 the Agency's concerns raised for fish or other biota.

The Vermont Department of Fish and Wildlife may 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 Secretary and the Permittee

A draft proposal for the following year's studies, if any, would be submitted by the Permittee to the Secretary for review by October 1 of the current year. A progress report on studies conducted during the current year would be submitted by the Permittee to the Secretary by February 1. Proposed changes to the draft proposal would by submitted by March 1.

AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
ONE NATIONAL LIFE DRIVE, MAIN-2
MONTPELIER, VT 05620-3522

FACT SHEET
(October 2014)

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

PERMIT NO: 3-1199
PIN: NS75-0006
NPDES NO: VT0000264

NAME AND ADDRESS OF APPLICANT:

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

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Vermont Yankee Nuclear Power Station
320 Governor Hunt Road
Vernon, Vermont 05354

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. Action, Type of Facility, and Discharge Location

The Vermont Agency of Natural Resources (hereafter referred to as "Agency") received a renewal application for the permit to discharge into the designated receiving water from the above named applicant on September 30, 2005. Entergy Nuclear Vermont Yankee, LLC (ENVY) is engaged in the operation of Vermont Yankee Nuclear Power Station ("Facility"), a nuclear electrical generating station. The discharge is combined effluent from circulating water and service water, boiler blowdown, water treatment process and carbon filter backwash, demineralized trailer rinsedown water, and strainer/traveling screen backwash. The Agency has made a decision to renew the discharge permit.

It is important to note that this permit reflects the fact that on August 27, 2013, ENVY announced its intention to close the Facility by the end of 2014. Closure of the Facility and cessation of

power production will drastically reduce the thermal discharge. While ENVY has not indicated what the post-closure operation regime will be in terms of the thermal discharge, a Clean Water Act (CWA) Section 316(a) (33 U.S.C. §1326(a)) variance may not be required. The permit is for a term ending December 31, 2015 to allow ENVY the opportunity to submit post-closure information to the Agency as soon as it is available; the Agency can then issue a new permit that reflects the post-closure thermal discharge.

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 permit, the monitoring requirements may be found on the following pages of the permit:

Effluent Limitations:	Pages 2 - 8 of 30
Monitoring Requirements:	Pages 2 - 9, 23 - 30 of 30

IV. Permit Basis and Explanation of Effluent Limitation Derivation

Facility Description and Background:
ENVY owns and operates the Facility, 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 Facility. The Facility, which began operation in 1972 under the ownership of Vermont Yankee Nuclear Power Corporation (VYNPC), is classified as a Boiling Water Reactor with a rated core thermal power level of 1912 MW (upgraded in 2006 from the original 1593 MW), providing a gross electrical output of 620 MW. The remainder of the energy, 1292 MW, is removed as heat by circulating water as it passes by the condenser: the heated circulating water is discharged to the Connecticut River (outfall S/N 001), or to the mechanical draft cooling towers to dissipate the heat to the atmosphere. There are several other activities associated with the eletro-generation and facility operations, which may result in a discharge. Typically these discharges are not continuous and may occur infrequently. These include: cooling water from service water pumps (included in S/N 001); plant heating boiler blowdown (S/N 003); water treatment carbon filter backwash (S/N 004); demineralized trailer rinse down water (S/N 006); and strainer and traveling screen backwash water (S/N 009). All these discharges enter the Connecticut River via the discharge structure with the exception of S/N 006 which discharges via the stormdrain system to the north of the Facility's intake structure and S/N 009 which discharges at the intake structure.

Cooling Water Intake Structure – The cooling water intake structure (CWIS) is located in a reinforced concrete bulkhead north of the Facility, drawing water from the Vernon Pool. The CWIS is shared by the Circulating Water (CW) and Service Water (SW) systems, each within separate forebays. The CWIS extend downward about thirty feet below normal river surface elevation. There are two sets of fixed screens (bar racks); one for the CW intake and one for the

SW intake. The design water velocity through the CW screens is about 1.0 fps and the actual velocity through each screen is between 0.0 fps (closed cycle cooling) to 1.0 fps (open cycle cooling). The design water velocity through each SW screen is about 0.1 fps during maximum (i.e. summertime) flow operations. The screen openings for both the CW and SW are 3" by 3/8" rectangular vertical bars.

The CWIS also contains five traveling screens which provide a basic fish and debris handling system. Each of the screens consists of 54 fiberglass basket elements that are chain driven in a continuous loop. Each basket is formed from 0.080" diameter stainless steel wire cloth with 3/8" openings. The maximum cooling water intake flow for the CW system is 360,000 gpm and maximum for the SW system is 13,400 gpm.

CWA Section 316(b) (33 U.S.C. §1326(b)) requires that "the location, design, construction, and capacity of CWIS reflect the best technology available for minimizing adverse environmental impact." Studies to examine the effects of the cooling water intake structures on the aquatic ecosystem would take longer than ENVY's anticipated term of operation. However, the Facility has cooling water infrastructure in place, and the capacity to operate in closed cycle cooling. Accordingly, the Agency finds that to the extent ENVY is required to take action to reduce its thermal discharge to meet effluent limitations during the term of this permit, the use of the existing cooling water infrastructure is the best technology available.

S/N 001 Circulating Water and Service Water Discharge – This discharge is made up of CW and SW. The circulating water removes unused heat energy from the Main Condenser; as a 'non-contact cooling system', plant-related radioactive liquid is not released. In the permit, a minor waste stream from cooling four Residual Heat Removal Service Water Pump (RHRSWP) motors has been incorporated into this discharge. In the previous permit, effluent from cooling the RSRSWP motors was considered a separate outfall (S/N 005); however, this cooling water is supplied by the SW system, and ultimately combines with S/N 001 before being discharged to the river, thereby neither increasing the SW intake, nor total discharge from S/N 001 as modified. No additional effluent limits or monitoring is required for this modification.

The Facility has a cooling water infrastructure which can be operated as open cycle, closed cycle, or a "hybrid" cycle which combines, to various levels, features of the closed and open cycle systems. The cycle of operation determines the volume of water and amount of heat discharged to the river. In order to comply with the thermal criteria for discharge described in Section I.A.7 of the permit, water may be discharged directly to the Connecticut River (i.e., open cycle – or "once through"), or may be directed to the mechanical draft cooling towers; water that is directed to the cooling towers may wholly, or in part, be returned to the river and/or the plant's circulating water system ("hybrid" or closed cycle).

Open/Hybrid cycle flow is permitted at 543 MGD, daily maximum, and closed cycle flow is permitted at 12.1 MGD, daily maximum. These limits, calculated values, are unchanged from the previous permit. The chlorine and oxidant limits as well as pH are unchanged from the previous permit and comply with Vermont Water Quality Standards (VWQS).

As part of the application for a discharge permit, ENVY applied for a variance from the VWQS pursuant to CWA Section 316(a).

Thermal Component: Historical Overview. Under the 1973 Atomic Energy Commission operating license, the Facility was required to use a closed cycle cooling system unless determinations could be made concerning the possible environmental impact from the thermal discharge. Under the provisions of both CWA Section 316(a) and the VWQS, alternative thermal limits may be granted where a demonstration can be made that such alternative limits will be more stringent than necessary to protect a balanced indigenous population of aquatic organisms and wildlife in the receiving waterbody. In order to make this determination, the Facility was allowed to discharge heat in compliance with the VWQS of that time, concurrent with an intensive biological and hydrological study program (so-called "phased studies"). The study program was developed under the direction of the Technical Advisory Committee (later the Environmental Advisory Committee (EAC)) and approved by the Agency.

In 1978, a 316 Demonstration was submitted and then approved by the Agency which allowed a temperature increase during the winter months (October 15 – May 15) beginning with the 1978 permit.

Using the "phased studies" and other pre-operational studies as a basis, a program and study plan were then proposed to make this demonstration during the summer months. The goal of the program (called "Project SAVE") was to investigate if plant operations could be optimized during the period of May 16 through October 14 without adverse environmental impact. The studies included intensive fish and hydrological investigations while the plant operated under alternative (experimental) thermal limits. These studies began in 1982 and were allowed to continue through the life of the 1985 permit.

In 1990, VYNPC submitted 316 Demonstration: Biological, Hydrological & Engineering Information and Environmental Impact Assessment (For the Period May 16 to October 14). The Agency determined that the operations had not altered the distribution, abundance, or diversity of the aquatic biota, including resident and anadromous fish, in the Connecticut River and therefore approved VYNPC's request for eased thermal discharge limits. The approved temperature limitations allowed the Facility to operate in open/hybrid cycle the majority of the time. In order to assess compliance with the effluent limits, an extensive monitoring program was included in the permit (Section IV – Environmental Monitoring Studies, Connecticut River).

In 2003, ENVY – the owner of the Facility as of July 2002 – submitted an amendment application requesting a change to the 2001 permit temperature limitations for the thermal component of their discharge. ENVY requested a one degree increase in the thermal discharge from the Facility, as measured by the increase in the temperature of the Connecticut River above ambient during the summer period of May 16 – October 14. The Agency approved this requested amendment only for the period of June 16 through October 14.

Following issuance of this amended permit, the permit was appealed to the Environmental Court (2008 decision) and then to the Vermont Supreme Court. In December 2009, the 1° increase during the period of June 16 – October 14 was upheld by the Supreme Court.

Thermal Component: Legal and Regulatory Basis for ANR's 2014 Review. The Agency's review of thermal discharges is governed by Section 316(a) of the Clean Water Act and relevant portions of the Vermont Water Quality Standards. CWA Section 316(a) provides for the establishment of alternative thermal effluent limitations. The Environmental Protection Agency (EPA) has adopted regulations pursuant to Section 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 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."

Accordingly, the Permittee is required to demonstrate that the otherwise applicable thermal discharge effluent limit is more stringent than necessary to assure the protection and propagation of the waterbody's balanced, indigenous population of shellfish, fish and wildlife.

Section 3-01 B.1. of the VWQS establishes temperature criteria for all state waters and establishes conditions for the assimilation of thermal wastes. The VWQS also allow that alternative thermal limits may be granted; 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."

Thermal Component: Findings of ANR's Review Process -- The changes to the thermal effluent limitations reflected in the permit are based on the September 30, 2005 application, annual and analytical reports, literature reviews, and information garnered from conversations and technical discussions with Agency staff, the EAC[1], and ENVY and their consultants.

[1] The 2001 discharge permit issued to ENVY, which is in effect today as amended by the Agency in 2006, established an Environmental Advisory Committee (EAC), comprised of representatives of the Vermont, New Hampshire, and Massachusetts environmental and fisheries programs, plus the coordinator of the United States Fish and Wildlife Service's Connecticut River Anadromous Fish Program. The 2001 permit states that the EAC is "advisory in function" and requires the Permittee to meet with the EAC "as often as necessary, but at least annually, to review and evaluate the aquatic environmental monitoring and studies program" established in Part IV of the permit.

In this permit, the Agency has supplemented the temperature limitations as determined by an equation (Equation 1.1), with temperature limits as measured downstream of the Facility. The Agency has concluded that these temperature "caps" are necessary to assure the protection and propagation of aquatic biota, and compliance with the VWQS. The temperature caps were determined based on the life history of species in the Connecticut River and are consistent with peer-reviewed studies and literature.

Equation 1.1 (Eq. 1.1) is a mass-balanced calculation used by the Facility to assess the discharge-induced increase in river temperature; the equation contains a number of factors: including the heat rejection rate of the Facility, water density, the flows of the Connecticut River at the Vernon Dam, and the specific heat of the river. Eq. 1.1 is defined on page 1-8 of Vermont Yankee's 316 Demonstration: Engineering, Hydrological and Biological Information and Environmental Impact Assessment (March 1978.

The Agency has concluded that Eq. 1.1 is not an adequate method of determining the increase in river temperature above ambient. The use of Eq. 1.1 raises a number of concerns including:

- The model was developed in the 1970's and has not been adjusted or recalibrated to reflect current conditions;

- The model only accounts for the Facility's thermal contribution to the river. The Agency does not agree that an applicant for a variance from thermal limitations must only address its contribution, but rather, whether a thermal discharge will add heat to the water that will have an adverse effect on the waterbody's balanced, indigenous population of shellfish, fish and wildlife.

- A model is not necessary to measure the temperature of the river. Once a determination is made about the thermal tolerances of the waterbody's balanced, indigenous population of shellfish, fish and wildlife, actual temperature measurements should be utilized to measure compliance with thermal limits.

In light of the short-term nature of the permit, however, the Agency has considered ENVY's ability to make operational changes to implement a new thermal discharge regime for the remaining months that the Facility will be in full operation. In particular, ENVY has indicated that the Facility operations are specified for the use of Eq. 1.1 to determine the increase in river temperature above ambient as a result of cooling water discharge, and to trigger actions to ensure compliance with the discharge permit. For this reason, the Agency has decided to allow the use of Eq. 1.1 in the permit in determination of the increase in temperature above ambient at Station 3 relative to Station 7.

On November 12, 2013, the EAC issued a final recommendation to the Agency on ENVY's request for a thermal variance. In sum, the EAC concluded: "[I]n consideration of the VANR issuing a new/amended NPDES permit for the VY project, the EAC recommends Entergy be required to operate the project in closed - cycle mode year- round (i.e., reversion to the use of cooling towers) at least until the outstanding concerns regarding the effects of VY's thermal discharge on biota of the River, discussed below, have been satisfactorily assessed and accepted by the VANR and other state and federal fishery agencies with interests in and responsibilities for the wellbeing of resident and anadromous fish populations in the River."

To address these concerns while allowing the Facility to utilize Eq. 1.1 for the operational reasons set forth herein, the permit also utilizes a hybrid approach. It maintains the use of Eq. 1.1 while also imposing temperature caps as concurrent compliance triggers. Compliance with the temperature caps assures that the Facility's thermal discharge will maintain the waterbody's balanced, indigenous population of shellfish, fish and wildlife.

Modified Seasons. The Agency's review found data suggesting the seasonal periods specified under the previous permit had no relevance to the life history stages of the fish of the Connecticut River (including but not limited to American Shad). The previous permit defined three seasons: "winter" (October 15 – May 15), "spring" (May 16 – June 15), and "summer" (June 16 – October 14). The permit contains revised seasonal periods that will support the biological/life history requirements of anadromous and resident fishes inhabiting and/or migrating through portions of the Connecticut River affected by the Facility's thermal discharge. Specifically, the revisions will lengthen the Spring Period (to April 1 – June 30), shorten the Summer Period (to July 1 – September 15), and introduce two Fall Periods (September 16 – October 15 and October 16 – November 15).

Thermal Limitations.
The thermal limitations of the Winter Period remain unchanged from the previous permit.

The Spring Period retains from the previous permit the "spring" period set of temperature criteria that limit the increase of river temperature above ambient temperature (Table 7.b in permit); these limits are specified in Section 3.01 B.1, VWQS. The permit establishes a temperature cap of 71° F – measured temperature at Station 3 – for the Spring Period, beyond which the Facility shall, as soon as possible, reduce the thermal output of the discharge to the extent that a measured average hourly temperature does not exceed 71° F.

The Summer Period retains from the previous permit the June 16 – October 14 temperature criteria that limit the temperature increase above ambient temperature (Table 7.c), as well as the 85° F temperature cap. These variance-based thermal discharge limits for the period of June 16 through October 14 were established in the previous permit, when amended in 2006.

The new Fall Period I is also limited by the variance-based thermal discharge limits for the period of June 16 – October 14 established in the previous permit; these temperature criteria limit the increase above ambient temperature (Table 7.d). Additionally, the permit establishes a temperature cap of 69° F for Fall Period I.

The new Fall Period II has a set of temperature criteria that limit the increase above ambient temperature (Table 7.e), as specified in Section 3.01 B.1, VWQS; Fall Period II is also limited by a temperature cap of 65° F.

S/N 002 Radioactive Liquid – The CWA and its implementing regulations do not apply to radioactive materials that are regulated under the Atomic Energy Act of 1954. Thus, this discharge is subject to NRC regulation and has been deleted from the permit.

S/N 003 Plant Heating Boiler Blowdown – Plant heating boilers discharge relatively small

volumes of blowdown once or twice a day during the heating season. The boilers are treated daily with an oxygen scavenger and pH control agent. This wastestream discharges through the main outlet structure. The flow of 0.0010 MGD and requirement for estimating the daily discharge are unchanged from the previous permit.

S/N 004 Water Filter Carbon Filter Backwash – This system is part of the potable and river water purification system. As in the previous permit, this permit establishes a flow limit of 0.010 MGD and a total suspended solids pounds limit of 8.3 lbs (based on a concentration limit of 100 mg/l for a 'low volume waste source' - 40 CFR §423.12). Also, as in the previous permit, no monitoring is required because past monitoring results indicated that the discharge was consistently well below this limit. The requirement for estimating the discharge is unchanged from the previous permit. This intermittent wastestream (occurring every three to six weeks) discharges through the main outlet structure. This is unchanged from the previous permit.

S/N 005 Cooling Water from the RHR Service Water Pumps – This minor cooling water supply that cools four Residual Heat Removal Service Water Pump motors has been removed as an independent discharge, and incorporated into S/N 001in the permit.

S/N 006 Demineralized Trailer Rinse Down Water – The Facility is not currently utilizing this system. However, ENVY has requested that this provision remain in the permit in case of need. The trailer would consist of a potable water processing facility. Potable water would enter the trailer, be purified by sand/carbon filters followed by reverse osmosis, and that water would ultimately be sent to the facility's demineralized water storage tank. The discharge would be the backwash as a result of washing down the sand and/or carbon filters. This minor discharge would enter the S/N 006 Storm Drain System located to the north of the intake structure. As in the previous permit, the flow limit is 10,000 gpd and there are no effluent limitations or monitoring requirements. Stormwater discharges from S/N 006, 007, 008, 010, and 011 are covered under Multi-Sector General Permit 3-9003 (NOI 3653-9003) and have been deleted from the permit; stormwater discharges from S/N 006, 007, and 010 are covered under General Permit 3-9015 and have been deleted from the permit.

S/N 009 Strainer and Traveling Screen Backwash – River water is utilized to backwash the service water screens and the circulating water traveling screens on the cooling water intake structure. As in the previous permit, the backwash limit is 0.050 MGD and monitoring is required when backwashing occurs (more frequent during high river flows). A small amount of penetrant/biodispersant may be in the discharge as a result of use to reduce biofouling of the facility's piping. Any debris collected as a result of the backwashing is disposed of according to state and federal regulations (i.e. not discharged back into the river).

Other Provisions

The Environmental Advisory Committee. The 2001 NPDES permit issued to ENVY, which is in effect today as amended by the Agency in 2006, established the EAC, comprised of representatives of the Vermont, New Hampshire, and Massachusetts environmental and fisheries programs, plus the coordinator of the United States Fish and Wildlife Service's Connecticut River Anadromous Fish Program. The EAC is "advisory in function" and requires ENVY to meet with the EAC "as often as necessary, but at least annually, to review and evaluate the aquatic environmental monitoring and studies program" established in Part IV of the permit. ENVY's intention to close the facility means that thermal discharge will be greatly diminished in 2015, thereby reducing the necessity of such a committee. While the Agency retains the right to consult with these organizations on matters concerning Facility operations, the EAC condition has been deleted from the permit.

Approved Chemicals. All chemicals have been reviewed by the Agency for negative environmental effects. The approved chemical list in the permit includes several new chemicals:

Conquor CNQR 3588 has a lower toxicity than Cortrol OS7700 and will be used preferentially. Discharges are limited to 30 ppm Diethyl-Hydroxyl-Amine. The Facility will retain use of Cortrol OS7700 as a backup.

Nalco CL-50, Nalco CL103, and Nalco PCL-401will be used in the Service Water System, and are non-toxic for aquatic ecological effects.

Nalco H-130 will be used at a maximum concentration of 2 ppm before dilution, well below thresholds for adverse ecological effects.

Prosan 24 is a fungicide used annually in the spring to treat the wooden portions of the cooling towers to inhibit fungal growth. There is no discharge of this product to surface waters.

The chemical Bulab 7034 has been removed, and Depositrol BL5303 has been renamed Scaletrol PDC 9329 (industry change).

Environmental Monitoring Studies. The permit includes a new requirement that the Permittee shall submit all data collected in Part IV –Environmental Monitoring Studies, Connecticut River in a usable digital format (e.g., Excel). This data shall be submitted annually, by May 31, or earlier if requested by the Agency in writing.

V. Procedures for Formulation of Final Determinations

*The public comment period for receiving comments on the draft permit was from **July 7 through August 27, 2014**.*

RESPONSIVENESS SUMMARY

for

NPDES Discharge Permit No. 3-1199

Entergy Nuclear Vermont Yankee

The above referenced permit was placed on public notice for comment from a period of July 7 through August 27, 2014. A public hearing was held on August 20, 2014 in Vernon, Vermont. This is a renewal permit.

Comments on the draft permit were received during the public notice period. The following is a summary of the comments and the Agency's responses to those comments. Similar comments were grouped together. A copy of any or all comments received can be obtained by contacting the Agency's Watershed Management Division at (802) 828-1535.

Entergy Nuclear Vermont Yankee (ENVY) Comments.

COMMENT 1. ANR (The Agency of Natural Resources) cannot meet the high burden established by both Vermont and federal law for modifications of an issued NPDES (National Pollutant Discharge Elimination System) permit, especially in light of the findings of prior judicial and administrative tribunals.

RESPONSE 1. ENVY states that modifications [during the permit's life] are allowed only in "limited and very specific circumstances"; however, this is not relevant to the NPDES permit ANR is issuing. ANR is not modifying ENVY's permit during the permit's life; rather, ANR is renewing ENVY's NPDES permit after the expiration of the 5 year term of the previous permit issued in 2001 (and last amended in 2006).

The plain language of the applicable Vermont statute specifically provides that NPDES direct discharge renewal permits are subject to the same review criteria as new permits: "A renewal permit shall be issued following all determinations and procedures required for initial permit application" (10 V.S.A. §1263(e)). ANR is thus required to assess and apply state requirements to a renewal permit, including effluent limitations, standards of performance, and any conditions or limitations necessary to meet the Vermont Water Quality Standards (Vermont Water Pollution Control Regulations (VWPCR) 13.4). The regulations state that the reissuance of a discharge permit shall also ensure the following:

(a) That the permittee is in compliance with or has substantially complied with all the terms, conditions, requirements, and schedules of compliance of the expired permit;

(b) That the Secretary has up-to-date information on the permittee's production levels, permittee's waste treatment practices, nature, contents and frequency of permittee's discharge either pursuant to the submission of new forms and applications or pursuant to monitoring records and reports submitted to the Secretary by the permittee; and,

(c) That the discharge is consistent with applicable effluent standards and limitations, water quality standards, and other legally applicable requirements listed in Section 13.4(b) including any additions to, or revisions or modifications of such effluent standards and limitations, water quality standards, or other legally applicable requirements during the term of the permit (VWPCR 13.5(b)).

Additionally, Vermont statutes and regulations relating to the NPDES program are designed to allow for the continual review of the discharge of pollutants to state waters to achieve the goals of the state water quality policy. Title 10 V.S.A. § 1250 and the Vermont Water Quality Standards § 1-102 state that it is the Vermont state water quality policy to:

(1) protect and enhance the quality, character and usefulness of its surface waters and to assure the public health;
(2) maintain the purity of drinking water;
(3) control the discharge of wastes to the waters of the state, prevent degradation of high quality waters and prevent, abate or control all activities harmful to water quality;
(4) assure the maintenance of water quality necessary to sustain existing aquatic communities;
(5) provide clear, consistent and enforceable standards for the permitting and management of discharges;
(6) protect from risk and preserve in their natural state certain high quality waters, including fragile high-altitude waters, and the ecosystems they sustain;
(7) manage the waters of the state to promote a healthy and prosperous agricultural community, to increase the opportunities for use of the state's forest, park and recreational facilities, and to allow beneficial and environmentally sound development. It is further the policy of the state to seek over the long term to upgrade the quality of waters and to reduce existing risks to water quality.

The review of discharges to state waters every five years is conducted to ensure that advances in scientific knowledge and technology are continually applied to existing discharges to surface waters. *In re Entergy Nuclear Vermont Yankee Discharge Permit 3-1199*, 187 Vt. 142, 989 A.2d 563, ¶ 27 (2009) (noting the "policy objective to keep permit holders from degrading a body of water over time, and then using the new degraded ecosystem as a baseline to demonstrate that each renewal permit" meets the applicable standards); *In re Dominion Energy Brayton*

Point, LLC, 12 E.A.D. 490, 553 (Envtl. App. Bd. 2006); *In re Montpelier WWTF Discharge Permit*, No. 22-2-08 Vtec, at 9-10 (Vt Env. Div June 30, 2009).

Furthermore, ENVY's comment is also inconsistent with federal law. Vermont policies echo the goal of the Clean Water Act (CWA) to "'eliminate' the discharge of pollutants by 1985" and emphasize "the importance of making progress on the available data. 33 U.S.C. § 1251(a)(1)." *Upper Blackstone,* 690 F.3d at 22. The CWA clearly requires NPDES direct discharge permits to be renewed every five years. 33 U.S.C. § 1342(a)(3), (b)(1)(B); 40 C.F.R. § 122.46(a), (b); and 10 V.S.A. §1263(d)(4). The Preamble to the CWA §316 explicitly states that the administrating agency has the authority to require a full §316(a) Demonstration for each five year permit application as deemed necessary by changes in circumstances or where a variance may have been improperly granted. 44 Fed.Reg. 32,854 and 32,894 (June 7, 1979). In addition, the EPA 2010 NPDES Permit Writers' Manual requires that the applicant apply for a variance for each permit term (at page 5-43). Federal regulations require that each permit issuance ensure compliance with the applicable CWA requirements. 40 C.F.R. §§ 122.44, 124.7, and 124.8; *see also, Upper Blackstone Water Pollution Abatement Dist. v. United States EPA*, 690 F.3d 9, 22 (1st Cir. 2012) ("The five-year term limit requires the EPA or state permitting authority to re-ensure compliance with the Act whenever a permit expires and is renewed . . . in regular intervals, the Act requires reevaluation of the relevant factors, and allows for the tightening of discharge conditions."). "[P]ermit expiration and reissuance is an important mechanism for providing regular scrutiny of permit compliance and updating of permit conditions. When permits must be reissued periodically, there is greater assurance that the existing conditions of the permit will be scrutinized to determine whether any of them must be modified or updated." EPA, Consolidated Permit Procedures, 45 Fed. Reg. 33,280, 33,308 (May 19, 1980) (cited by Karl S. Coplan, Of Zombie Permits and Greenwash Renewal Strategies: Ten Years of New York's So-Called Environmental Benefit Permitting Strategy, 22 PACE ENVTL. L. REV. 1, 7 n.42 (2005)).

ENVY incorrectly asserts that ANR has the burden to prove that altering the thermal limits from the previous NPDES permits issued to ENVY are necessary to meet Vermont Water Quality Standards. Federal statute clearly places the burden of proof on the applicant, not on the permitting authority (33 U.S.C. § 1326(a)): in order to qualify for a variance, a permit applicant must demonstrate, among other things, that a proposed effluent limitation will be more stringent than necessary to assure the protection and propagation of a balanced and indigenous fish population (BIP) and that an alternative, less stringent limitation will nevertheless assure such protection and propagation.

Vermont law is also clear that the burden is on the permit applicant to prove that all applicable laws and regulations are met. *In re Entergy Nuclear Vermont Yankee Thermal Discharge Permit Amendment*, 187 Vt. 142, 989 A.2d. 563, (Vt. 2009) at 11-12. The Vermont Supreme Court held in *Entergy*:

> The burden of making the necessary showing under § 316(a) is necessarily on the applicant. See Brayton Point, 12 E.A.D. at 552 (noting that § 1326(a) and the regulations "clearly impose the burden of proving that the ... thermal effluent limitations are too stringent on the discharger seeking the variance, not on the Agency"). Though federal decisions applying § 316(a) have determined that the burden is "stringent," the "EPA has not ... interpreted [the statute] to require absolute certainty before a variance [can] be granted" (Mirant Kendall, at 34).

Id. at 12. Accordingly, it is clear that Entergy has the burden of proof in this matter.

ENVY also mischaracterizes the legal effect of prior decisions of the Environmental Division of the Vermont Superior Court (Environmental Court) and the Vermont Public Service Board (PSB). The litigation before the Environmental Court and the Vermont Supreme Court referenced by ENVY involved the review of an *amendment* to a NPDES thermal discharge permit issued under the CWA, and the scope of review by the Court was confined to the *amendment* request. As noted above, this permit being issued by ANR is a renewal of ENVY's NPDES permit following the expiration of the previous permit, not an amendment during the life of the permit.

As the Environmental Court observed:

> The Court only has before it the issue of the additional thermal discharge proposed by the amendment application. As discussed in the pretrial proceedings and at trial, it is beyond the scope of the present proceeding for the Court to consider any amendment of the summer thermal discharge already allowed to be discharged by the unappealed existing expired permit, or whether any other aspects of the Vermont Yankee thermal regime are working well or should be changed — such issues will be for the ANR to consider in the first instance in its work on the pending renewal permit application. (*In re Entergy Nuclear Vermont Yankee Thermal Discharge Permit Amendment*, Vtec 89-4-06, page 6 (Vt Env Div. May 22, 2008)).

Given the narrow scope of the Environmental Court's review of ENVY's proposed NPDES amendment, none of the parties had the opportunity to litigate the entire range of impacts related to thermal discharge in the proceedings before the Environmental Court. The Environmental Court inquiry focused only on the request for a 1° F increase during the period of May 16 to October 14. The Court affirmed ANR's denial of the request from May 16 to June 15. The entire focus of the litigation before the Court was on whether the thermal discharge was sufficiently protective of the BIP of fish and wildlife under the CWA § 316(a). ANR and the Court did not reexamine the thermal formula as it was applicable to the entire thermal regime all year long and beyond the scope of the amendment. In addition, the previous litigation did not focus on whether the cooling water intake structure meets the best available technology under CWA § 316(b). Accordingly, the prior decision from the Environmental Court only addressed the one degree amendment request and did not adjudicate the issues addressed by ANR in the renewal permit.

With regard to the recent decision of the PSB referenced by ENVY, ENVY submits that the PSB found no evidence of actual harm to the Connecticut River from the thermal discharge and the thermal discharge has not impaired the

river. ENVY points to these findings as evidence that ANR should not alter the existing thermal discharge limits in its previous thermal discharge permit. ENVY mischaracterizes the findings and conclusions of the PSB related to the thermal discharge by failing to presenting the full context of the PSB decision.

In the PSB Order cited by ENVY, the PSB held:

> The evidence in this proceeding raises questions about the effect of the discharge from the VY Station on the Connecticut River. On the one hand, Entergy VY has complied with the limits in its NPDES permit. That permit was developed based upon the applicable legal requirements, including a variance under Section 316 of the federal Clean Water Act, which requires certain showings about the effect of the discharge on indigenous species.
>
> Countering this information are various analyses suggesting that the increase in river temperature resulting from the discharge is such that various fish species are affected. These witnesses report smaller number of shad in many of the past years. They also question various assumptions about whether the actual thermal impact is being accurately measured and whether the actual stream impacts are fully known. ANR itself, the entity that issued the prior NPDES permit, questions whether it is adequately protective at the present time. Other scientific analyses, such as by state and federal governmental scientists on the EAC, are similar. If the VY Station were going to operate for an additional eighteen years, this evidence might cause us to conclude that Entergy VY had not met its obligation to demonstrate that the discharge would not adversely affect the water quality. However, under the Second Amended Petition and the MOU, the VY Station will cease operations at the end of this calendar year. This means that the thermal discharge will occur for at most one spring spawning season, the period that all witnesses agree is the most sensitive for the various fish species in the river. Through the MOU, the Department, ANR and Entergy VY have provided a mechanism to address these short-term concerns. Specifically, these parties have agreed that they will work through the thermal discharge issues as part of the NPDES permit renewal. But more importantly, as an Entergy VY witness testified, the process could allow ANR to address thermal discharges more quickly than through the permit, using other mechanisms.
>
> We find the MOU's treatment of the water quality issues to be an acceptable result. This resolution contemplates that significant judgment will be brought to bear on this matter by the agency with the expertise and primary state responsibility over water quality. We also find it noteworthy that ANR, which had previously asked that we deny Entergy VY's petition on water quality grounds, is now persuaded that the administrative process set out in the MOU is workable and adequately protective of the environment. And we must stress, although there are concerns about the water quality impacts, ***the evidence does not support a finding that there is impairment of the Connecticut River***. This is not to suggest that opponents had the burden of demonstrating such impairment; quite clearly, Entergy VY must show the absence of undue water quality impacts. For the short remaining operational period for the VY Station, we conclude that the have met this showing, subject to the conditions in the MOU that establish a process whereby any issues can be addressed. (Docket 7862, Order of 3/28/14 (Vt. Pub. Serv. Bd.) at 66-68).

The text quoted by ENVY is emphasized in bold and italics above. When read in context, however, it is clear that the PSB found there are concerns about the impact of ENVY's thermal discharge. As noted above, the PSB stated that if the Vermont Yankee (VY) facility were going to operate beyond 2014, the PSB may have found that the discharge would have an adverse effect on water quality. The short term operation of the VY facility combined with ENVY's commitment to address the issues related to the thermal discharge raised before the PSB through the NPDES process, persuaded the PSB to make a positive finding under the applicable Title 30, Section 28 criteria.

What ANR has done through the issuance of this NPDES permit is to address the issues related to the thermal discharge as contemplated in the PSB Order cited by ENVY.

For the reasons sets forth above, ENVY's comment that ANR is legally precluded from altering the thermal discharge limits in ENVY's previous NPDES permit is rejected by ANR. As previously noted, the Environmental Court's decision, and subsequent Vermont Supreme Court decision, was limited to ENVY's proposed 1° F temperature increase. The decisions did not address the full renewal of ENVY's NPDES permit, including the use of Equation 1.1 to determine the thermal discharge limits. In fact, the use of Equation 1.1 is not even referenced anywhere in the Environmental Court decision cited by ENVY. Moreover, ANR's NPDES permit is entirely consistent with Docket 7862, Order of 3/28/14 (Vt. Pub. Serv. Bd.).

COMMENT 2. There is no rational scientific or evidentiary basis for modifying the current permit's existing thermal limitations for the remaining period of VY's operations

Comment 2.1. There is clear proof that VY's historical thermal discharges have caused no prior appreciable harm to, and its current permit is fully protective of, the Connecticut River aquatic community.

Response 2.1. ENVY relies on outdated information and studies which do not definitively demonstrate that there is no prior appreciable harm. The most recent Demonstration compiled by ENVY was based on studies conducted between 1991 and 2001. In addition, many of the prior studies conducted by ENVY's consultants did not adequately investigate the impact of the thermal discharge on the BIP of fish and wildlife in the Connecticut River. For example, juvenile shad outmigration energetics and the effect of VY's thermal discharge into the Vernon dam forebay on juvenile dam passage and survival have never been investigated. Although adult shad energetics was last studied by ENVY in the mid- to late-1990's, the conclusions are inconsistent with a similar peer-reviewed study published by Leonard and McCormick (1999). Note that the ENVY study was not peer-reviewed.

While the compendium of studies has contributed much to our understanding of the biology of the river community and shad biology within a limited portion of the river subject to thermal discharge influence, there are still significant gaps in the studies and information provided by ENVY. As such, ANR continues to have concerns regarding the effects of the thermal discharge on all life that must exist within and/or pass through the thermal discharge.

The Connecticut River is a complex social-ecological system and certainly is not static. Studies conducted twenty, ten or even five years ago are not always consistent with current acceptable scientific methodology and may not reflect conditions of the present time. In 2006, ANR amended ENVY's 2001 discharge permit granting the request for a 1° F increase during the June 16 – October 14 time period. Since that amendment, structural and operational alterations have been made to Vernon, Turners Falls, and Holyoke power stations; additionally, changes to fishways have improved shad passage at those facilities and -- in the case of Vernon power station -- may affect characteristics of the thermal plume discharged from VY.

Comment 2.2. The highest level of shad running since Vernon fish ladders were installed indicates thermal discharge is not a problem.

Response 2.2. Even though improvements made to the Vernon ladder have greatly increased shad passage during the 2012-14 seasons compared to the preceding 15 years (1997 – 2011), passage counts continue to be below the restoration goal. Furthermore, the daily fish ladder count data provides no reliable scientific information about the potential impacts of temperature effects on migrating fish. In fact, this data potentially under-represents the duration and magnitude of temperature conditions and impacts on fish.

The best available information (Castro-Santos, undated draft) strongly suggests fish quickly move upriver from Turners Falls and are delayed before passing Vernon Dam. Temperatures in the Vernon Tailwater and the Lower Vernon Pool could be physiologically disadvantageous to adult shad, especially female fish. Glebe and Leggett's (1981) study of shad migration and bioenergetics demonstrated metabolic energy costs increase with increasing water temperature, stating overall adult mortality is "positively correlated to the thermal regime of the river during migration, being higher in years when the water temperature during migration is higher than average." Likewise, Castro-Santos and Letcher's (2010) dynamic stage model for Connecticut River shad suggests thermal alterations may be partly responsible for reduction in repeat spawners, with thermal environment being one characteristic that affected all three of their model performance variables. Leggett et al. (2004) state the levels of mortality for shad migrating upstream of Holyoke Dam would be elevated at higher temperatures and/or flows due to energetic costs. From the time that adult shad enter the River and migrate upriver to Vernon Dam, they have swum a distance of 142 miles and passed two dams (Holyoke and Turners Falls) and negotiated three fishways. The effects of swimming distance and migration delays are discussed in Castro-Santos and Letcher (2010).

An energetics study of upstream migrating adult shad in the Connecticut river conducted by Leonard and McCormick (1999) found female shad use more energy when migrating between Cabot Station (Turners Falls) and Vernon Dam than when traversing the lower river (Holyoke Dam to Cabot Station).

Disproportionate energy consumption may be influenced by the temperature components of VY's thermal discharge, in addition to the fish ladder and/or power canal. ENVY has not specifically assessed this issue through empirical studies. In their paper on modeling migratory energetics of Connecticut River shad, Castro-Santos and Letcher (2010) state thermal effects on energetics is in need of further study. There are also temperature challenges: natural seasonal increasing water temperatures and heat from anthropogenic sources including thermal discharges and impoundments all which also tax fish energetically and physiologically. Sprankle (2013) states, "Timing, magnitude, duration of thermal exposure(s), and other related effects (e.g., energetic, physiology, movement, passage performance, rates of gonad development) of the VY thermal discharge in species such as American shad have yet to be scientifically examined in the context of current conditions for both Vermont Yankee and its most recent thermal increase, and the Vernon Dam since structural and operational improvements."

Comment 2.3. There is no rational reason for the 71° F measured temperature cap during the Spring Period in order to protect the nonexistent Atlantic salmon smolt. Nor for the 69° F cap in the Fall Period to protect the American shad.

Response 2.3. The Spring Period (April 1-June 30) temperature cap of 71° F was established primarily to protect the spawning of American shad.

Optimum American shad spawning temperature range is reported to be 57.2-71.6° F (Walburg and Nichols 1967; Hightower et al. 2012). As reviewed in Green et al. (2009), most spawning occurs at temperatures between 53.6 and 69.8° F. Leggett and Whitney (1972) report peak spawning movements into rivers occurs at 65.3° F. Walburg and Nichols (1967) report the spawning run peaks at 65° F with a range of 56 to 68° F. Shad spawning runs for populations on both Atlantic and Pacific coasts peak at water temperatures in the range of 60.8 to 67.1° F (Leggett and Whitney 1972). Peak spawning in the Connecticut River was 71.6° F in 1968 (Marcy 1976).

The upper limit of spawning migration temperatures for shad is 67.8° F in North Carolina (Leggett and Whitney 1972) and 73.4° F throughout their range (Walburg and Nichols 1967). The water temperature associated with the end of the spawning migration is 71.6° F (Leggett and Whitney 1972). In the Connecticut River, shad normally discontinue spawning when water temperatures exceed 68° F (Kuzmeskus 1977).

The Fall Period I (September 16 – October 15) temperature cap of 69° F and the Fall Period II (October 16 – November 15) temperature cap of 65°F were established to protect the outmigration of juvenile American

shad by setting up a falling seasonal temperature regime that is reported to have a significant influence on their timely outmigration (Marcy 1976; Weiss-Glanz et al. 1986; Stokesbury and Dadswell 1989).

ENVY presents evidence that juvenile shad demonstrate a wide tolerance to river water temperatures in the range of 50 to 86° F. However, *tolerance* does not imply optimal conditions most favorable to juvenile shad during outmigration.

The onset of juvenile outmigration in the Connecticut River has been reported variously to be 66.2°F (Leggett 1976; O'Leary and Kynard 1986), 73.4-78.8°F (Marcy 1976), and 64.9°F (Watson 1970) (reviewed in Green et al. 2009). *Generally peak migration occurs when temperature drops to between 60.8 and 48.2° F (Leggett and Whitney 1972 and O'Leary and Kynard 1986).* Peak outmigration in the Connecticut River is reported to occur at 60.8°F (Leggett and Whitney 1972; O'Leary and Kynard 1986). Peak periods of outmigration in the Connecticut River ranged from 55.4 and 50.0° F in 1981 and 57.2 and 50.0° F in 1982 (O'Leary and Kynard 1986).

In the Delaware River, it was reported that juveniles only move downstream when the temperature falls below 69.8° F (Sykes and Lehman 1957 in Marcy 2004) and movement peaks at 60° F (Sykes and Lehman 1957 in Weiss-Glanz et al. 1986).

Comment 2.4. ENVY presents scientific literature that demonstrates juvenile shad outmigration is not influenced by temperature at all, but rather is a function of the age and maturity of the juveniles.

Response 2.4. The scientific literature also indicates that there are potential temperature impacts on juvenile shad.

Although O'Donnell and Letcher (2008) and Limburg (1996) lend support to ENVY's case that juvenile shad emigration is "strongly influenced by age and size rather than being driven by temperature cues," these peer-reviewed publications do not argue that age and size operate in exclusion of temperature to influence juvenile shad outmigration behavior and physiology. In fact, there are published papers that show temperature is an important factor (see O'Leary and Kynard 1986; Zudlewski and McCormick 1997; Zydlewski et al. 2003). Several migration theories have been advanced in the peer-reviewed literature: temperature/moon phase (O'Leary and Kynard 1986; Stokesbury and Dadswell (1989), age/growth (Limburg 1996; O'Donnell 2000), and river flow. Sykes and Lehman (1957) described fall downstream migration of juvenile shad from the Delaware River as being dependent on the lowering of the water temperature, or an increase in water flow, or both of these factors. Green et al. (2009) submit that "the

combination of factors that trigger juvenile American shad emigration is uncertain..." Even though ENVY advances an argument that discounts temperature as being a factor influencing juvenile outmigration, the body of other scientific work strongly suggests this may be an over-simplification of the dynamics involved.

Furthermore, the vast majority of juvenile shad produced from spawning and nursery habitats located upriver of Vernon Dam are not exposed to VY's thermal discharge throughout most of their pre-migrant residency. Once outmigrant shad arrive to the forebay, water temperatures may very well influence their behavior. Much about juvenile fish outmigration remains unknown. It is not well understood how fish respond to *in situ* situations, e.g., the effects that VY's thermal discharge has on juvenile shad behavior, physiology, and passage success and survival.

The Fall Period I temperature cap was established with respect not only to the outmigration cue, but also to the behavior and physiology *during* outmigration. Outmigrating juvenile shad are provided with one or more alternative routes past the dam with fishways; downstream fish passage facilities mitigate the high morality resulting from passage through the turbines. However, juvenile shad may avoid these fishways due to VY-heated surface waters in the Vernon Dam forebay, and thereby delaying or avoiding downstream passage. Juvenile fish that are held back or denied expeditious passage may experience potential physiological costs, forced to emigrate via turbine units and/or suffer increased exposure to predators. These unknowns have not been sufficiently addressed by ENVY to assure that no long- or short-term adverse harm is occurring to outmigrating juvenile shad.

COMMENT 3. Modifying ENVY's thermal discharge permit for only the final four months of operations is inconsistent with the customary five-year permitting scheme, and renders the permit operating fee excessive

RESPONSE 3. ENVY argues that it makes no sense for ANR to modify VY's thermal discharge limits because (1) the facility will cease operations by December 31, 2014, and (2) the truncated timeframe of the permit would render the permit operating fee as both unreasonable and excessive. Any industrial facility discharging wastewater directly to surface waters is required to hold a NPDES permit. VY is currently operating under an administrative extension of the expired discharge permit issued in July 2001. ANR has the authority and responsibility to renew permits that have been administratively extended. It should be noted that although ENVY's intention to close the facility means that the thermal discharge will be greatly diminished, and the indications are that a CWA § 316(a) variance will not be required once power production operations have ceased, there will likely continue to be a discharge requiring a NPDES permit.

Despite several requests from ANR, ENVY has not submitted a revised NPDES renewal application indicating what the operating regime will be in terms of the thermal discharge post-operations; therefore, ANR is issuing this permit based on the most recent application on file (received September 29, 2005) that requests a variance from the Vermont Water Quality Standards in accordance with state and federal law. ANR is issuing this permit with a term ending December 31, 2015. ENVY will be required to submit a renewal application detailing the post-closure discharge 180 days before this permit expires.

All discharge permits issued under 10 V.S.A. Chapter 47 are subject to an administrative processing fee of $120.00 at the time of application, any application review fee, and an annual operating fee. The annual operating fee rate for industrial, noncontact cooling water and thermal discharges is $0.001 per gallon design capacity, with a maximum fee of $210,000 (3 V.S.A. § 2822(j)(2)(B)(i)).

CRWC/VNRC Comments.

COMMENT 4. The Vermont Department of Environmental Conservation (DEC) has the authority and responsibility to issue a permit that assures compliance with the CWA, and scientific studies and information supports DEC's conclusion that ENVY's expired permit must be altered to protect aquatic populations of the Connecticut River.

RESPONSE 4. ANR agrees with this comment. See ANR's response to ENVY's comments generally that existing thermal limitations are sufficient to meet applicable standards.

COMMENT 5. ENVY has not met its burden to qualify for a variance from the Vermont Water Quality Standards as set forth in the permit.

RESPONSE 5. ANR has evaluated ENVY's studies, the information submitted by other entities, including the CRWC and VNRC, and relevant peer reviewed scientific studies on thermal impacts on fisheries. ANR's decision is based on all of this information, and the professional judgment of ANR's scientists. ANR denied the variance requested by ENVY in its permit application. However, the information provided by ENVY, combined with the other information ANR considered described herein, supports the thermal limits included in the permit.

COMMENT 6. DEC does not explain how allowing a temperature increase of 13.4° F above ambient (Winter Period) will protect fish against the risks of thermal shock. DEC does not explain how the Winter limits will ensure adequate habitat for yellow perch and walleye.

RESPONSE 6. Fish may experience thermal shock (i.e. heat and/or cold shock) whenever water temperature rapidly increases or decreases outside a particular range of temperatures to which it has been previously acclimated. Thermal shock results in physiological and behavioral responses on the part of the exposed fish and, in some cases, may result in death. The permit retains winter temperature limits ascribed under previously issued permits. The limits are such that temperature increases occur incrementally and gradually, rather than rapidly, enabling fish to acclimate or exercise avoidance behavior should it be necessary. Specifically, the permit includes the following conditions: (1) the temperature at Station 3 shall not exceed 65° F; (2) the rate of temperature change at Station 3 shall not exceed 5° F per hour; and (3) the increase in temperature above ambient at Station 3 shall not exceed 13.4° F. Furthermore, a temperature cap of 65° F is within the tolerance range of most fishes occurring within the vicinity of VY's zone of thermal influence. Nonetheless, ANR has concerns about the effects of added heat to the river during the winter period on certain percid fishes, namely yellow perch and walleye, and possible disruption of their reproductive development (gametogenesis) and subsequent weak or failed year classes. Population abundance trend analyses conducted by Normandeau Associates for years 1991 – 2013 have detected statistically significant increasing trends for yellow perch in both lower Vernon Pool and Vernon Dam tailwater. Correspondingly abundance trends for walleye represent decreasing trends both above and below the dam, but in neither case are the trends statistically significant. These observations do not indicate a problem with either species at the population level, but if VY were to continue power generation and discharging heated water to the river, ANR would require ENVY to undertake studies looking into the reproductive condition and recruitment of both species into their respective populations.

COMMENT 7. CRWC is concerned about what seems to be a serious mismatch between thermal tolerance levels of BIP species and the ambient caps of all seasons.

RESPONSE 7. The upper thermal tolerance levels for each season are not that well known or lack consensus on which reported temperatures are most appropriate for each situation. Nevertheless, the seasonal temperature caps in this permit are protective of the species according to the compiled temperature requirements for a large array of fish species occurring in the Great Lakes many of which occur within the vicinity of VY (including data for 7 of the 9 RIS) (Wismer and Christie 1987), and offer more protection than past limits.

COMMENT 8. DEC has not considered the effects that climate change may have on the outmigration timing for fish in the river.

RESPONSE 8. While climate change is of great concern and the fisheries science community agrees that it poses serious ramifications affecting aquatic environments, fish communities and fisheries into the future, with VY ceasing generation at the end of the current year, it is reasonable to conclude their contribution to warming the Connecticut River will be greatly reduced if not inconsequential within the scope of the greater climate change issue.

COMMENT 9. CRWC supports provisions in the permit that make it more protective of the Connecticut River than the current expired permit. Specifically the provisions related to the use of Equation 1.1 and that take into account life stages of migratory fish.

RESPONSE 9. ANR has not altered the provisions supported by CRWC in the final permit.

COMMENT 10. There should be temperature probes and ambient cap limits in Vernon Pool, the fish passages, and downstream at least as far as Station 3. Station 3 should not be the sole point at which temperatures are monitored in order to determine compliance with ENVY's NPDES permit.

RESPONSE 10. ANR essentially agrees with these recommendations. Currently ambient river temperature is measured at Station 7 located 3.5 miles upstream of VY and temperature due to VY's discharge is measured at Station 3, located 0.65 miles down from Vernon Dam and 1.4 miles down from VY. Additionally, water temperatures at the approximate midpoint within Vernon Fish Ladder are being measured during periods of fishway operation. ANR would consider establishing a fourth compliance point measuring river temperature in the forebay, if VY was to continue generation beyond 2014. Temperatures in the forebay are critical to fish outmigrating from the river upstream of Vernon Dam. Hence establishing a suitable temperature cap during the applicable migration periods, such as apply to shad, would have merit if not for VY not terminating generation at the end of this year

COMMENT 11. The unit of measure for ambient caps should be more frequent than hourly average. Because of the wide temperature fluctuations in the Connecticut River near the VY station, an hourly average ambient temperature cap may not be protective of fish species.

RESPONSE 11. ANR recognizes and accepts that the river is a complex and dynamic system, with variability on both a temporal and spatial scale. However, while increasing the frequency of temperature measurements may serve to illuminate the variability that is inherent in this section of the river, it will not succeed in determining the effect of VY's thermal discharge on the biota. The measured average hourly temperature at Station 3 is the mechanism used to gauge compliance with the temperature caps in the permit; but it is the ongoing biological monitoring that ultimately determines if there is an effect of VY's thermal discharge on the river ecosystem. By its very nature, the biological monitoring assesses the effect of the variability, as well as the average, of the temperature on the BIP.

COMMENT 12. The EAC should not be eliminated.

RESPONSE 12. ANR recognizes and greatly appreciates the extremely valuable role that the EAC has served. However, as ENVY phases out the operation of the VY facility, ANR believes it no longer makes sense, nor is it a an efficient use of limited public resources, to maintain the formal role of the EAC as established in previous NPDES permits issued for the VY facility.

COMMENT 13. CRWC raises several issues related to the monitoring provisions of the permit.

Comment 13.1. The time period for larval fish monitoring (in Part IV) may not be sufficient to cover the larval stages of all fishes in the vicinity of the plant

Response 13.1. ANR has had serious concerns regarding VY's entrainment/impingement of aquatic biota and in particular larval and juvenile fishes. Once VY ceases generation at the end of the current year the volume of water diverted from the Connecticut River should be a small fraction of what it has been thereby substantially reducing the entrainment /impingement of aquatic organisms. Nonetheless, the NPDES permit retains conditions for ENVY continuing larval fish and fish impingement monitoring and reporting. While it is true that the required time period for larval fish monitoring (May through July 15) may not overlap with the earliest presence in the river of certain larval fishes (e.g. white sucker, yellow perch, walleye), ANR is comfortable that there is adequate coverage to assess inter-annual changes in larval fish abundance.

Comment 13.2. The Standard Operating Procedures for field sampling should be made available for public notice and comment prior to their approval

Response 13.2. All field sampling is performed according to approved Standard Operating Procedures (SOPs). These SOPs are reviewed and approved by ANR staff according to commonly accepted field sampling principles. ANR is not required to post the SOPs for public comment and such a practice would impact on staff resources and potentially delay sampling.

COMMENT 14. DEC has not explained how VY's continued use of Eq. 1.1 will assure the protection of the BIP. Also, VY's [in]ability to make operational changes is not a sufficient reason to allow the plant to continue using a compliance formula that does not satisfy Vermont Water Quality Standards or 316(a).

RESPONSE 14. ANR believes the imposition of temperature caps based on actual temperature measurements for the seasons deemed appropriate by ANR will assure the protection of the BIP.

COMMENT 15. The permit provides no indication of how long it takes for the VY plant to reduce thermal output of the discharge as necessary to comply with the ambient caps. The lag time between exceedance of the ambient cap and reduction of thermal discharge means that harm to fishes can occur while the plant is adjusting to reach temperatures.

RESPONSE 15. ANR agrees with the request, and has included language accordingly. If the measured average hourly temperature at Station 3 equals or exceeds the specified temperature cap, the Permittee shall, as soon as possible *but within a period no longer than 24 hours*, reduce the thermal output of the discharge to the extent that the measured hourly temperature does not exceed the temperature cap.

COMMENT 16. DEC has not explained how the permit meets the CWA's baseline requirement that facilities use the best technology available to reduce impingement and entrainment. Unless and until DEC is able to determine that technology other than closed-cycle cooling is the best available for minimizing adverse environmental impact, DEC should require VY to operate its already existing closed-cycle towers.

RESPONSE 16. The permit requires ENVY to meet ambient temperature caps for the seasons deemed appropriate by ANR. While the permit does not prescribe how ENVY will reduce its temperature output if the caps are exceeded, ENVY has existing functional cooling towers that it would use to address instances where the cap is exceeded. Accordingly, ANR finds that to the extent ENVY is required to take action to reduce its thermal

discharge to meet effluent limitations during the term of this permit, the use of the existing cooling water infrastructure is the best technology available.

Public Comments.

COMMENTS 17.

- The permit does not require closed cycle cooling so there is still a thermal discharge to the river.
- Please make sure ENVY uses their cooling towers for at least 6 months. Protect our river.
- Closed cycle cooling is the answer-plain and simple.
- I ask you to require ENVY to use their closed loop cooling towers in their reactor process.
- ENVY is discharging water that is increasing the temperature of the Connecticut River more than is allowed by regulations. They have cooling towers to be used in this case. Why is the ANR refusing to enforce such a simple and straight-forward operation as is called for?
- I ask you to require ENVY to stop discharge of thermally heated water into the Connecticut River.
- Why are you allowing VY to continue to pollute the Connecticut [R]iver for another six months?
- I ask you to protect the environs of the [Connecticut] River and protect a naturally flowing river and its occupants.

RESPONSE 17. ANR is obligated to make a determination on a NPDES permit renewal in accordance with all applicable state and federal requirements. During the permitting process, ANR assessed whether the thermal component of the discharge and the cooling water intake structures met the requirements of both the CWA and the Vermont Water Quality Standards.

ANR has concluded that VY qualifies for a variance from the temperature criteria established in Section 3-01 B.1. of the Vermont Water Quality Standards, but has revised from the previous permit the thermal discharge effluent limitations and conditions to assure the protection and propagation of aquatic biota, as well as compliance with the Vermont Water Quality Standards.

The Facility has cooling water infrastructure in place, and the capacity to operate in closed cycle cooling. Accordingly, ANR finds that to the extent ENVY is required to take action to reduce its thermal discharge to meet effluent limitations during the term of this permit, the use of the existing cooling water infrastructure is the best technology available.

COMMENT 18. The highest temperature limit is still set at 85° F, way above a fish-friendly level.

RESPONSE 18. In this permit, several additional periods have been designated to better mirror the seasonal biology of the species in the Connecticut River. The Spring Period, previously ending June 15, was extended through June 30; and two new periods were introduced: Fall I (September 16-October 15) and Fall II (October 16-November 15). These revised seasonal periods correspond to the biological/life history requirements of anadromous and resident fishes inhabiting and/or migrating through portions of the Connecticut River affected by the Facility's thermal discharge. The upper temperature limit within each period has been established based on the specific stage of these inhabiting and/or migrating anadromous and resident fishes.

While the Summer Period temperature cap of 85° F is retained from the previous permit, the time frame is significantly shorter: it was June 16-October 14 in the previous permit (120 days), and is July 1-September 15 (76 days) in this permit. The Summer Period temperature cap of 85° F approximates the avoidance temperature of most representative important species (RIS) and is below the upper incipient lethal temperature for all species (except Atlantic salmon) during this seasonal time frame; Atlantic salmon are highly unlikely to be migrating through this area during this defined period.

COMMENT 19. The permit does not lower the winter temperature at all leaving the present harmful levels in place.

RESPONSE 19. Under the provisions of both §316 of the CWA and the Vermont Water Quality Standards, alternative thermal limits may be granted where a demonstration can be made that such alternative limits will not result in an adverse effect on biota. In 1978, a 316 Demonstration was submitted and then approved by ANR which allowed a temperature increase during the winter months (October 15 – May 15) beginning with the 1978 permit.

ANR has determined that the discharge, under the thermal effluent limitations of previously issued permits, has resulted in no appreciable harm to the aquatic biota of the Connecticut River within the area influenced by the thermal discharge during the Winter Period. Therefore, the thermal limitations for the Winter Period will be retained from the previous permit. The limits are such that temperature increases occur incrementally and gradually, rather than rapidly, enabling fish to acclimate or exercise avoidance behavior should it be necessary. Specifically, the permit includes the following conditions: (1) the temperature at Station 3 shall not exceed 65° F; (2) the rate of temperature change at Station 3 shall not exceed 5° F per hour; and (3) the increase in temperature above ambient at Station 3 shall not exceed 13.4° F. Furthermore, a temperature cap of 65° F is within the tolerance range of most fishes occurring within the vicinity of VY's zone of thermal influence.

COMMENT 20. The continued use of the river for cooling means larval fish will continue to be killed when they are pulled into the cooling water intake at unacceptable rates.

RESPONSE 20. ANR has had serious concerns regarding VY's entrainment/impingement of aquatic biota and in particular larval and juvenile fishes. Once VY ceases generation at the end of the current year the volume of water diverted from the Connecticut River should be a small fraction of what it has been thereby substantially reducing the entrainment /impingement of aquatic organisms. Nonetheless, the NPDES permit retains conditions for ENVY continuing larval fish and fish impingement monitoring and reporting.

COMMENT 21. There are reports of the production of Strontium 89 and 90 by VY. Strontium is produced in particulate form, and goes out as dust from the stacks and winds up in the river. In 2010, the Brattleboro Reformer reported that Strontium 90 was found in a fish near VY. Strontium 90 has a half-life of 27.9 years and causes Leukemia.

RESPONSE 21. Although Section 502(6) of the CWA defines the term pollutant to include radioactive materials, EPA has refined the definition of pollutant in its implementing regulations (e.g., 40 C.F.R. Part 122) to exclude radioactive materials regulated under the Atomic Energy Act of 1954, as amended. Thus, source, byproduct, and special nuclear material – such as Strontium – are subject to regulation under the Atomic Energy Act, *not* the CWA (or the NPDES discharge permit).

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