

AGENCY OF NATURAL RESOURCES  
DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
WATERSHED MANAGEMENT DIVISION  
ONE NATIONAL LIFE DRIVE, MAIN BUILDING, 2<sup>ND</sup> FLOOR  
MONTPELIER, VT 05620-3522

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

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  
320 Governor Hunt Road  
Vernon, VT 05354

(hereinafter referred to as the “Permittee”) is authorized by the Secretary of Natural Resources (Secretary) to discharge from a facility located at:


320 Governor Hunt Road  
Vernon, Vermont

to Connecticut River, Class B at the point of discharge in accordance with the following conditions.

This permit shall become effective on the date of signing.

This permit and the authorization to discharge shall expire on March 31, 2022.

Emily Boedecker, Commissioner  
Department of Environmental Conservation

By:   
Jessica Bulova, Wastewater Section Supervisor  
Watershed Management Division

Date: May 18, 2017

I.

**A. EFFLUENT LIMITS and MONITORING REQUIREMENTS**

1. Until **March 31, 2022**, the Permittee is authorized to discharge from outfall serial number S/N 001: non-contact cooling service water 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	Maximum Day	Measurement Frequency	Sample Type
Flow		4.3 MGD	Daily	Calculated
Temperature		See Special Condition I.A.1.a		
Bulab 8031	See Section I.A.6		No monitoring required	
Spectrus NX-1104	See Section I.A.6		No monitoring required	
Copper <sup>1</sup>		Monitor only	1 × month	Grab
Iron <sup>1</sup>		Monitor only	1 × month	Grab
Zinc <sup>1</sup>		Monitor only	1 × month	Grab
pH	Between 6.5 and 8.5 Standard Units		Weekly	Grab

Samples collected in compliance with the **temperature, copper, iron, and zinc** monitoring requirements specified above shall be collected at the following locations:

- a. At the intake structure;
- b. At the outfall, prior to discharge into the Connecticut River.

Samples collected in compliance with the **pH** monitoring requirements specified above shall be collected at the following location: at the outfall, prior to discharge into the Connecticut River.

<sup>1</sup> The heavy metal concentration of copper, iron, and zinc shall be determined in both the dissolved and total fractions.

**Special Conditions**

- a. Per Section 2-04(A) of the Vermont Water Quality Standards (effective October 30, 2014), this permit establishes a mixing zone in the Connecticut River for temperature extending downstream 200 feet from the outfall of this discharge. Within this mixing zone, the requirements of Section 3-01(B)(1)(b) of the Vermont Water Quality Standards are waived in accordance with Section 2-04(A). **At the end of this 200-foot mixing zone, the discharge shall not increase the temperature of the Connecticut River by more than 1°F.**

To ensure compliance with Section 2-04(A) of the Vermont Water Quality Standards, the measured average hourly temperature of the process wastewater at the outfall shall be **no more than 11.7°F above ambient river temperature**. Temperature measurements shall be taken at the intake structure and at the discharge structure prior to discharge to the Connecticut River. Both results shall be reported on the monthly Discharge Monitoring Report form WR-43.

- b. Except for temperature within the mixing zone, as specified in Special Condition I.A.1.a above, this discharge shall not cause a violation of the Vermont Water Quality Standards in the receiving water.

2. Until **March 31, 2022**, 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	Maximum Day	Measurement Frequency	Sample Type
Flow		0.0010 MGD <sup>1</sup>	Daily	Estimate
Control OS7700	See Section I.A.6		No monitoring required	

<sup>1</sup> Each of the two boilers may be drained of 0.0020 MGD at the end of the heating season.

3. Until **March 31, 2022**, 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	Maximum Day	Measurement Frequency	Sample Type
Flow		0.0020 MGD	Daily <sup>1</sup>	Estimate
Bulab 8031	See Section I.A.6		No monitoring required	

<sup>1</sup> Monitoring is not required when discharge is not occurring.

4. The effluent from S/N 001, 003, 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.
5. The Permittee is authorized to pump river sediment/silt, as necessary, that has deposited in the 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 0.50 MGD or 350 gpm. River sediment/silt shall be pumped from the West Cooling Tower into the existing spray pond where it shall be passively filtered to reduce turbidity before the water portion is routed to the discharge structure. The remaining sediment shall be removed from the spray pond and disposed of properly in accordance with state and federal statutes and regulations.
6. 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 substantial change in the chemicals

identified must be reviewed and approved by the Secretary to ensure 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 below. A change of chemical vendors will require, as a minimum, a submittal of the appropriate SDS, prior to use of the chemical, to the Watershed Management Division.

Bulab 8031: penetrant/biodispersant for use in minimizing and removing fouling within the service water systems; maximum concentration in effluent shall be limited to 20 ppm.

Cortrol OS7700: an oxygen scavenger and pH control agent containing hydroquinone as the oxygen scavenger; maximum concentration in effluent shall be limited to 15 ppm as hydroquinone.

Spectrus NX-1104: a biocide for use in the service waters; maximum concentration in effluent shall be limited to 2.0 ppm.

7. There shall be no discharge of polychlorinated biphenyl compounds, such as those commonly used for transformer fluids.
8. There shall be no discharges of metal cleaning waste, including wastewater from chemical cleaning of boiler tubes, air preheater washwater, and boiler fireside washwater.

## **B. REAPPLICATION**

If the Permittee desires to continue to discharge after the expiration 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: **September 30, 2021**

## **C. OPERATING FEES**

This discharge is subject to operating fees as required by 3 V.S.A. § 2822.

## **D. 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.

The permittee shall use sufficiently sensitive test procedures (i.e., methods) approved under the Code of Federal Regulations, Title 40, Part 136 for the analysis of the pollutants or pollutant parameters specified in Section I.A. above.

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 Discharge Monitoring Report (DMR) form WR-43. Reports are due on the 15th day of each month, beginning with the month following the effective date of this permit. When the Permittee submits DMRs using an electronic system designated by the Agency, it is not required to submit hard copies of DMRs.

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 Building, 2<sup>nd</sup> Floor  
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 Agency;
- b. In the case of a partnership, by a general partner;
- c. In the case of a sole proprietorship, by the proprietor; or
- d. In the case of a municipal, state, or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

## 3. Recording of Results

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

- a. The exact place, date, and time of sampling 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 analysis;

- 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; and
- 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 DMR WR-43 or other forms approved by the Agency.

#### **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 DMR 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 Agency of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

#### **2. Noncompliance Notification**

- a. The Permittee shall give advance notice to the Agency of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
- b. In the event the Permittee is unable to comply with any of the conditions of this permit due, among other reasons, to:

- i. 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);
- ii. Accidents caused by human error or negligence;
- iii. Any unanticipated bypass or upset which exceeds any effluent limitation in the permit;
- iv. Violation of a maximum day discharge limitation for any of the pollutants listed by the Agency in this permit; or
- v. Other causes such as acts of nature,

the Permittee shall provide notice as specified in subdivisions (c) and (d) of this subsection.

- c. Pursuant to 10 V.S.A. § 1295, notice for “untreated discharges.” For purposes of this permit “untreated discharge” means a discharge of wastewater that has not been fully treated.
  - i. Public notice. For “untreated discharges” the Permittee or the Permittee’s delegate shall as soon as possible, but no longer than one hour from discovery of an untreated discharge from the facility, post on a publicly accessible electronic network, mobile application, or other electronic media designated by the Secretary an alert informing the public of the untreated discharge and its location, except that if the Permittee or his or her delegate does not have telephone or Internet service at the location where he or she is working to control or stop the untreated discharge, the Permittee or his or her delegate may delay posting the alert until the time that the untreated discharge is controlled or stopped, provided that the alert shall be posted no later than four hours from discovery of the untreated discharge.
  - ii. Agency notification. For “untreated discharges” the Permittee shall within 12 hours from discovery of an untreated discharge from the facility notify the Secretary and the local health officer of the municipality where the facility is located of the untreated discharge. The operator shall notify the Secretary through use of the Department of Environmental Conservation’s online event reporting system. If, for any reason, the online event reporting system is not operable, the operator shall notify the Secretary via telephone or e-mail. The notification shall include:
    - (1) The specific location of each untreated discharge, including the body of water affected.
    - (2) Except for discharges from the facility to a separate storm sewer system, the date and approximate time the untreated discharge began.

- (3) The date and approximate time the untreated discharge ended. If the untreated discharge is still ongoing at the time of reporting, the entity reporting the untreated discharge shall amend the report with the date and approximate time the untreated discharge ended within three business days of the untreated discharge ending.
  - (4) Except for discharges from the facility to a separate storm sewer system, the approximate total volume of sewage and, if applicable, stormwater that was released. If the approximate total volume is unknown at the time of reporting, the entity reporting the untreated discharge shall amend the report with the approximate total volume within three business days.
  - (5) The cause of the untreated discharge and a brief description of the noncompliance, including the type of event and the type of structure involved.
  - (6) The person reporting the untreated discharge.
- d. For any non-compliance not covered under Section II.A.2.c. of this permit, the Permittee or the Permittee's delegate shall notify the Agency within 24 hours of becoming aware of such condition and shall provide the Agency 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
    - i. 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 ensure compliance with the conditions of this permit.

#### **4. Quality Control**

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

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

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

#### **5. Bypass**

The bypass of facilities (including pump stations) 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 adverse impact to waters of the State resulting from non-compliance with any condition specified in this permit, including accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.

#### **7. Records Retention**

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed, all calibration and maintenance of instrumentation records and all original 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 Agency upon request. This period shall be extended during the course of unresolved litigation regarding the discharge of pollutants or when requested by the Agency.

## **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 Agency 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 at the following address: Agency of Natural Resources, Department of Environmental Conservation, One National Life Drive, Main Building, 2<sup>nd</sup> Floor, 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 Agency 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 or monitor, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the federal Clean Water Act, any substances or parameters at any location.

### 2. Transfer of Ownership or Control

This permit is not transferable without prior written approval of the Agency. 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 Agency **at least 30 days in advance of the proposed transfer date**. The notice to the Agency 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 Agency 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; and
  - 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 Agency 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.
- c. Information required by application forms, including information submitted on the forms themselves and any attachments used to supply information required by the forms.

### **4. Permit Modification, Suspension, 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 Agency, within a reasonable time, any information which the Agency 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 Agency 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. 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.

## **8. State Laws**

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

## **9. Property Rights**

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

## **10. 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 Agency, it shall promptly submit such facts or information.

## **11. 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.

## **12. 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 the 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** – Any wastes, directly or indirectly, that are placed, deposited or emitted into waters of the state.

**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 these 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.

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

**Mean** – The mean value is the arithmetic mean.

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

**NPDES** – The National Pollutant Discharge Elimination System.

**Secretary** – The Secretary of the Agency of Natural Resources

**State Certifying Agency**            Agency of Natural Resources  
   Department of Environmental Conservation  
   Watershed Management Division  
   One National Life Drive, Main Building, 2<sup>nd</sup> Floor  
   Montpelier VT 05620-3522

**Waste** -- Effluent, sewage or any substance or material, liquid, gaseous, solid or radioactive, including heated liquids, whether or not harmful or deleterious to waters.

**Waste Management Zone** – A specific reach of Class B waters designated by a permit to accept the discharge of properly treated wastes that prior to treatment contained organisms pathogenic to human beings. Throughout the receiving waters, water quality criteria must be achieved but increased health risks exist due to the authorized discharge.

**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.



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

FACT SHEET  
(March 2017)

**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 swimming and other forms of water-based recreation; irrigation of crops and other agricultural uses; good aesthetic value; aquatic biota and aquatic habitat; boating, fishing, and other recreational uses; public water source with filtration and disinfection or other required treatment.

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 June 30, 2015. Entergy Nuclear Vermont Yankee, LLC (ENVY) is engaged in the operation of Vermont Yankee Nuclear Power Station (“Facility”), a nuclear electrical generating station that ceased power production in December 2014. The continuing discharge from the Facility to the Connecticut River is effluent from service water, boiler blowdown, and strainer/traveling screen backwash. The Agency has made a decision to renew the discharge permit.

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

Effluent Limitations:           Pages 2 – 4 of 18

Monitoring Requirements:   Pages 2 – 4 of 18

## IV. Facility Description and Background

ENVY owns and operates the Facility, a former 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, ceased all electric generating activities in December of 2014 and has now permanently defueled.

The cessation of electric generating activities has drastically changed the Facility's surface-water intake and use. The Facility's discharges were historically dominated by non-contact circulating water drawn from the river which resulted in a large heat load discharged into the river.

The Permittee's current National Pollutant Discharge Elimination System (NPDES) permit was issued in 2014 and regulates the Facility's withdrawal of water from the Vernon Pool in the Connecticut River for cooling purposes, as well as the discharge of pollutants to the Connecticut River. The current permit contains conditions regarding the water withdrawal from the Connecticut River by the Facility's Service Water intake structure as well as effluent limitations and conditions for each of the outfalls.

However, since the cessation of electricity generation activities, the discharge volume is less than 99% of historical discharge volume levels. The only remaining thermal load to the river is associated with the Service Water system, which primarily performs the necessary nuclear safety function of feeding the spent fuel pool cooling system, and because of radioactive decay, the thermal load will continue to decline at an exponential rate. Thus, this draft permit differs significantly from the current permit because it reflects the modified operations of the closed Facility.

The draft permit retains effluent limitations for the service water discharge (S/N 001); plant heating boiler blowdown (S/N 003); 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 009 which discharges at the intake structure.

## V. Permit Basis and Explanation of Effluent Limitation Derivation

**Service Water Intake Structure:** The Service Water intake structure is located in a reinforced concrete bulkhead north of the Facility that extends downward about 30 feet below normal river surface elevation. The bulkhead was designed with two separate forebays to serve each the Circulating Water (CW) and Service Water (SW) systems. The entrance to each bay is protected from debris intrusion by fixed screens (bar racks). The screen openings are 3" by 3/8" rectangular vertical bars. A traveling water screen system provides basic fish and debris handling at the Facility's water intake structure. A traveling screen 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.

After shutdown of electricity generation activities at the Facility, the CW system (design intake flow of 518.4 million gallons per day (MGD)) was no longer necessary and there was a sharp reduction in the volume of water withdrawn from the river.

Historically, the SW system had a maximum design intake capacity of 17.3 MGD (four pumps each with a capacity of 4.3 MGD). The SW system has been modified for shutdown conditions, so that a single SW pump is supplying the safety-related needs of the Facility. Therefore, the total intake flow has been reduced from a maximum design intake capacity of 17.3 MGD to 4.3 MGD, only 21% of which will be used to cool the spent fuel storage pool. This reduced intake flow is calculated to have a maximum through-screen velocity of 0.04 fps. A second pump is maintained as a backup pump.

The Final 316(b) Rule for Existing Facilities (79 Fed. Reg. 48300-01, August 15, 2014) establishes standards for minimizing adverse impacts from cooling water intake structures. For existing facilities, the Final Rule applies to point sources (1) with a design intake flow (equal to the cumulative rated pump capacity) greater than 2 MGD *and* (2) that use 25% or more of the water withdrawn on an actual flow basis exclusively for cooling (40 C.F.R. § 125.91(a)). Actual flow is the average annual volume of water withdrawn over the past three years (40 C.F.R. § 125.92(a)). The design intake flow at the Facility is 4.3 MGD, but less than 25% of the actual intake flow at the Facility will be used exclusively for cooling (as stated above, only 21% of the 4.3 MGD will be used to cool the spent fuel storage pool). Therefore, the Final Rule does not apply, and the Facility is subject to a case-by-case determination of Best Technology Available (BTA) (40 C.F.R. § 125.90(b)).

Under 40 C.F.R. § 125.90(b) "Cooling water intake structures not subject to requirements under Sections 125.94 through 125.99 or subparts I or N of this part must meet requirements under section 316(b) of the CWA established by the Director on a case-by-case, best professional judgment basis."

**Entrainment:** With the cessation of electricity generation operations, the Facility has achieved BTA by effectively reducing its river water intake by 99%. On a case-by-case, best professional judgement basis, a reduction in intake volume greater than 99% compared to the design flow during operations is even greater than the flow reduction that would have been achieved had the Facility operated entirely in closed-cycle cooling (typically 97.5% for a freshwater facility, and likely less at this Facility because they would not have reduced the SW

cooling needs) (79 Fed. Reg. 48333). In addition, cooling water is only anticipated to be needed until the spent fuel rods are ready for dry-cask, which is a limited period.

**Impingement:** Under the Final Rule at 40 C.F.R. § 125.94(c)(3), achieving an actual intake velocity of 0.5 fps is one option to comply with BTA standards for impingement mortality. Calculated through-screen velocity of the Facility under current operating conditions is less than 0.05 fps at maximum intake, well below the 0.5 fps limit.

**S/N 001 Service Water Discharge:** This discharge is currently made up of SW that is used to provide cooling water to plant equipment loads (such as the spent fuel pool, diesel generators, and various pumps and heat exchangers). As stated previously, the CW system – used to remove unused heat energy from the Main Condenser through ‘non-contact cooling’ – stopped operations when the Facility ceased power generation.

*Thermal Discharge: Modelling and Empirical Verification.* Section 3-01(B)(1) of the Vermont Water Quality Standards (VWQS) establishes temperature criteria for all state waters: the increase in the temperature of the receiving water, due to the discharge, may not exceed 1.0°F above ambient. Section 2-04(A) also establishes the conditions for the assimilation of these thermal wastes by allowing for a mixing zone to accommodate for temperature increases, provided that the mixing zone does not exceed 200 feet in length, and the temperature criteria are achieved at the end of this zone. The Permittee has required a variance from these criteria in past permits. As the thermal discharge will now meet the requirements of 3-01(B)(1)(b), the Permittee no longer requires a variance and shall meet the criteria set forth in the VWQS.

The heat loads being cooled with the SW system are generated by spent fuel stored in the spent fuel pool, and from various pumps and air conditioning units that remain in operation. The expected change in the temperature of the SW from the intake to the outfall ( $\Delta T_d$ ) can be calculated using the following equation:

$$\Delta T_d = \frac{Q}{\dot{m} \times C_p}$$

where,

$Q$  = total heat rejected to SWS  
=  $4.9 \times 10^6$  Btu/hr (December 2015)

$\dot{m}$  = mass flowrate of the SWS (one pump)  
= 3,000 gpm  
=  $1.5015 \times 10^6$  lb<sub>m</sub>/hr

$C_p$  = specific heat of water  
= 1.0 Btu/(lb<sub>m</sub>°F)

The change in SW temperature from intake to outfall is calculated to be 3.30°F. This value represents the upper limit of  $\Delta T_d$  during the term of the permit because of the exponential decline of the heat load due to radioactive decay. Specifically, the spent fuel pool – the major component

of the total heat load – will decrease from 4.2 MBtu/hr in December 2015 to an estimated 2.0 MBtu/hr in December 2020.

Short-term temperature monitoring studies were conducted to evaluate the accuracy of this model. Temperature data collected from the intake and from the outfall showed that  $\Delta T_d$  consistently ranged from 2°F to 3°F, validating the calculated  $\Delta T_d$  of 3.3°F.

The Permittee provided further analyses to determine the effect of the discharged SW on the temperature of the river. The expected increase in river temperature above ambient at the end of the 200-foot mixing zone ( $\Delta T_x$ ) can be determined using a thermal mixing model developed by EPA:

$$\Delta T_x = \frac{\Delta T_d \times Q_d \times W}{Q_r \times \left( \pi \times D_y \times \frac{X}{\mu} \right)^{\frac{1}{2}}}$$

where,

$\Delta T_d$  = change in SW temperature from intake to outfall  
= 3.3°F, maximum

$Q_d$  = discharge volume  
= 3,000 gpm  
= 6.68 cfs

$W$  = width of river  
 $\approx$  1,500 ft, immediately downstream of discharge

$Q_r$  = river flow  
= 1,250 cfs, at minimum flow

$D_y$  = lateral dispersion coefficient  
=  $0.6 \times d \times u^* \pm 50\%$

$d$  = effective mixing depth for a thermal discharge  
 $\approx$  5 ft

$$u^* = (g \times d \times s)^{1/2}$$

$g$  = acceleration due to gravity  
= 32.2 ft/s<sup>2</sup>

$s$  = slope of the river  
 $\approx$  0.0001 ft/ft

$X$  = distance downstream from discharge  
= 200 ft

$\mu$  = river flow velocity  
= 0.0125 ft/ft, at minimum flow

The river temperature at the end of the 200-foot mixing zone is calculated to be 0.19°F higher than ambient river temperature, well beneath the VWQS limitation of 1°F. Recognizing that the actual lateral dispersion coefficient,  $D_y$ , could vary with river depth and flow, calculated  $\Delta T_x$  varied from 0.16°F to 0.27°F.

Short-term temperature monitoring studies were conducted to evaluate the accuracy of this model. Instream temperature monitoring confirmed that the effect of this thermal discharge on the temperature of the river at the edge of the 200-foot mixing zone was minimal: during time periods when solar insolation was low or absent, the temperature of the river at the end of the 200-foot mixing zone consistently measured 0.0 to 0.2°F above ambient river temperature.

The Permittee has contended that the effect of the Facility's thermal discharge on the temperature of the river cannot be accurately measured because of the confounding effects of temporally- and spatially-variable solar input on the temperature of the surface waters of the Vernon Pool. Given the verification of the models with field measurements, the Agency has concluded that, these models can be used to sufficiently ensure compliance. Using the thermal mixing model, it can thus be determined that the effluent may not exceed a  $\Delta T_a$  of 12.2°F. Because the Permittee indicated the use of thermistors with the accuracy of  $\pm 0.5$  °F, the proposed  $\Delta T_a$  permit limit is 11.7°F.

*pH.* The pH limitation remains at 6.5-8.5 Standard Units as specified in Section 3-01(B)(9) in the Vermont Water Quality Standards. This facility has demonstrated an excellent historical performance of compliance with the pH limitations set in the current permit. Daily monitoring has provided evidence of a pH level of the discharge at levels within the permit limitations. Thus, the monitoring schedule has been reduced from daily to weekly in the draft permit.

*Chemicals.* The SW system is treated four times per week to reduce biofouling of the Facility's piping; treatment consists of two hours with Bulab 8031 and one hour with Spectrus NX-1104. Oxidizing biocides are no longer used for treatment, and the monitoring requirement for residuals has been eliminated in the draft permit.

*Metals.* The draft permit maintains the monthly monitoring conditions for copper, iron, and zinc. The sampling site for metals analyses has been relocated to better isolate the source of any metals in the discharge: the samples shall be collected at the intake structure and at the outfall. The metals shall be analyzed for both total and dissolved phases to determine the source of any elevated metal concentrations.

**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 (Cortrol OS7700). This wastestream discharges through the main outlet structure. The permitted flow of 0.0010 MGD and requirement for estimating the daily discharge are unchanged from the current permit.

**S/N 004 Water Filter Carbon Filter Backwash:** This discharge was eliminated and has been removed from the draft permit.

**S/N 006 Demineralized Trailer Rinse Down Water:** This discharge was eliminated and has been removed from the draft permit.

**S/N 009 Strainer and Traveling Screen Backwash:** River water is utilized to backwash the service water traveling screens in the Service Water intake structure. Backwashing now occurs only once per shift, and the flow limit has been reduced from 0.050 MGD to 0.0020 MGD in the draft permit. Entergy is required to provide a daily estimate of the flow from S/N 009 when a discharge from that outfall is occurring. 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:**

*Approved Chemicals.* All chemicals have been reviewed by the Agency for negative environmental effects. The need for several chemicals has been eliminated with the shutdown of electricity generation activities at the Facility, and have been removed from the draft permit. Bulab 8006 was replaced by Bulab 8031, a penetrant/biodispersant for use in minimizing and removing fouling within the service water systems; maximum concentration remains 20 ppm.

*Environmental Monitoring Studies.* When the Facility was operating as an electric generating station, the Permittee was granted a variance from the temperature criteria in the VWQS. To ensure the protection and propagation of a balanced and indigenous population of shellfish, fish, and other wildlife, including their respective habitats, under the conditions allowed by the variance, previous permits included a biological monitoring program, and additional objective specific studies. The Permittee no longer requires a variance from the VWQS, eliminating the necessity of such a monitoring program.

VI. Procedures for Formulation of Final Determinations

*The public comment period for receiving comments on the draft permit was from **March 14 through April 14, 2017.***

**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 March 14 through April 14, 2017. This is a renewal permit.

Comments on the draft permit were received from Entergy Nuclear Vermont Yankee (ENVY) during the public notice period. The following is a summary of the comments and the Agency's responses to those comments. A copy of the 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.** The application of 0.8°F as the allowed temperature change at the end of the end of the 200-foot mixing zone, rather than application of a 1.0°F allowed temperature change as provided for in the Vermont Water Quality Standards (VWQS), is not warranted when calculating the allowed change in temperature between the cooling water entering the facility and the cooling water effluent discharged from the facility.

**RESPONSE 1.**

ENVY's draft NPDES permit establishes a 200-foot mixing zone in which the requirements of VWQS § 3-01(B)(1)(b) are waived. VWQS § 2-04(A). As stated in the Section I.A.1.a of the draft and final permits, "At the end of this 200-foot mixing zone, the discharge shall not increase the temperature of the Connecticut River by more than 1°F."

The Agency acknowledges the conservatism presented in Normandeau Associates Inc.'s thermal mixing model calculations, which incorporates a  $\pm 50\%$  lateral dispersion coefficient. Thus, the Agency recognizes the low calculated thermal contribution presented by the model, demonstrating exceptional compliance with the VWQS; at no time is the discharge temperature expected to result in more than a 0.27°F change in temperature at the end of the mixing zone. In addition, with the cessation of electrical generating activities, the Agency recognizes that the thermal output of the facility due to radioactive decay shall continue to exponentially decline, with the expected removal of all spent nuclear fuel to dry-cask storage in an independent spent fuel storage installation within the next 5 years.



As such, the Agency has recalculated the allowed change in temperature between the cooling water entering the facility and the cooling water effluent discharged from the facility based upon application of a 1.0°F allowed temperature change at the end of the 200-foot mixing zone as provided for in the VWQS §§ 2-04(A) and 3-01(B)(1)(b), and has derived an outfall allowed temperature increase of 12.2°F. Because ENVY employs the use of thermistors with the accuracy of  $\pm 0.5^\circ\text{F}$ , the appropriate outfall limit shall be 11.7°F.

**COMMENT 2.** References throughout the Fact Sheet to the “nuclear power station” should be revised to read “former nuclear power station,” as electric generation activities have ceased.

**RESPONSE 2.**

The Agency acknowledges that electric generation activities at the Vermont Yankee Nuclear Power Station have ceased. At the request of ENVY, the Agency has elected to amend all references to “nuclear power station” throughout the Fact Sheet, to more appropriately read “former nuclear power station.”

**COMMENT 3.** References throughout the Fact Sheet to the “cooling water intake structure” should be revised to read “Service Water intake structure.”

**RESPONSE 3.**

The Agency acknowledges that since the cessation of electric generating activities on December 29, 2014, the cooling water intake structure is no longer in use. ENVY currently utilizes only the Service Water intake structure to provide a necessary nuclear safety function at the facility. At the request of ENVY, the Agency has elected to amend all references to “cooling water intake structure” throughout the Fact Sheet to appropriately read “Service Water intake structure.”

**COMMENT 4.** The Fact Sheet erroneously claims that the effluent from outfall serial number S/N 009 is discharged via the discharge structure.

**RESPONSE 4.**

The Agency acknowledges that the strainer and traveling screen backwash effluent discharges via outfall S/N 009 to the Connecticut River, adjacent to the intake structure. At the request of ENVY, the Agency has corrected this reference throughout the Fact Sheet.

**COMMENT 5.** The Fact Sheet states that monitoring of backwash from S/N 009 is required, but not reflected in the draft NPDES permit. Because backwash is Connecticut River water, ENVY cannot determine or assess what monitoring of backwash could accomplish with respect to the VWQS or otherwise. As such, ENVY requests that references to backwash monitoring be stricken in the final NPDES permit.

**RESPONSE 5.**

The draft NPDES permit requires ENVY to monitor flow by providing a daily estimate of the flow from outfall serial number S/N 009 when a discharge is occurring. Monitoring of Bulab 8031 is not required. The requirement for Entergy to estimate flows from S/N 009 is to ensure compliance with the flow effluent limitation on the backwash water discharged from that outfall, which may contain a small amount of penetrant/biodispersant used to reduce biofouling of Vermont Yankee's piping.

Flow monitoring will not be removed from the final NPDES permit. To clarify the permit requirements in the Fact Sheet, the Agency has removed the sentence in the Fact Sheet stating, "Monitoring is required when backwashing occurs," and replaced it with "Entergy is required to provide a daily estimate of the flow from S/N 009 when a discharge from that outfall is occurring."