



**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,

A handwritten signature in black ink, appearing to read "Ernest F. Kelley".

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

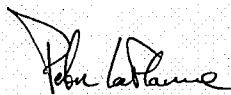
Expiration Date: **December 31, 2015**

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



Digitally signed by Pete  
LaFlamme  
DN: cn=Pete LaFlamme  
Date: 2014.10.13 09:06:46  
-04'00'

By: \_\_\_\_\_

Peter LaFlamme, Director  
Watershed Management Division

Date: **October 13, 2014**

**I. SPECIAL CONDITIONS**

**A. EFFLUENT LIMITS and MONITORING REQUIREMENTS**

- 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 <sup>1</sup>    |                                    | 0.2 mg/L | <sup>2</sup> | Grab            |
| Total Residual Oxidant <sup>1,3</sup> | Monitor only                       |          | <sup>2</sup> | 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.*

<sup>1</sup> 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.

<sup>2</sup> 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.

<sup>3</sup> 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 <sup>1</sup> | Each discharge          | Estimate    |
| BetzDearborn Control OS7700 | 2                     |                         | 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.

<sup>2</sup> 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  |             |

<sup>1</sup> 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     | <sup>1</sup>            | Estimate    |
| Bulab 8006               | <sup>2</sup>          |               | No monitoring required  |             |

<sup>1</sup> Shall be monitored daily when the discharge occurs

<sup>2</sup> 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 CI-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  $\pm 10\%$ .

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 =  $0.001 \times (\text{smolt equivalents})$

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:

$$SE_F = 0.0675 \times (\text{two year previous fry})$$

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:

$$SE_P = [(0.25 \times (\text{yearling parr})) + (0.11 \times (\text{two-year previous under yearling}))]$$

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:

$$SE_S = 1 \times (\text{smolts stocked})$$

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

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

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

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 be submitted by March 1.