

AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
ONE NATIONAL LIFE DRIVE, DAVIS BUILDING, 3RD FLOOR
MONTPELIER, VT 05620-3522

Permit No.: 3-1219
PIN: EJ95-0448
NPDES No.: VT0020401

DRAFT
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 (Environmental Protection Rules, Chapter 13), and the federal Clean Water Act as amended (33 U.S.C. §1251 *et seq.*), and implementing federal regulations,

Burlington Electric Department
585 Pine Street
Burlington, VT 05401

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

Joseph C McNeil Generating Station
111 Intervale Road
Burlington, VT

to the **Winooski River** in accordance with the following conditions.

This permit shall become effective on April 1, 2021

This permit and the authorization to discharge shall expire on March 31, 2026.

Peter Walke, Commissioner
Department of Environmental Conservation

By: _____ Date: _____
Amy Polaczyk, Wastewater Program Manager
Watershed Management Division

I. SPECIAL CONDITIONS**A. EFFLUENT LIMITS****1. Discharge Point S/N 001**

- a. During the term of this permit, the Permittee is authorized to discharge from outfall serial number S/N 001 (located at Latitude 44.9170 and Longitude. -73.20200): cooling water blowdown combined with S/N 002 (low volume industrial boiler cooling water waste) to the **Winooski 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 | 0.365 MGD | 0.500 MGD | Continuous | Daily Total |
| Total Metals (1) | Monitor Only | | 1 x quarterly | 24-hour composite |
| Temperature (2) | | 99°F | Continuous | Daily Maximum |
| Turbidity | Monitor Only | | 1 x monthly | Grab |
| Total Nitrogen (TN) (3) | Monitor Only (mg/l) | | 2 x year | 24-hour composite |
| Nitrate/Nitrite (NO _x) (3) | Monitor Only (mg/l) | | 2 x year | 24-hour composite |
| Total Ammonia Nitrogen (TAN) (3) | Monitor Only (mg/l) | | 2 x year | 24-hour composite |
| Total Kjeldahl Nitrogen (TKN) (3) | Monitor Only (mg/l) | | 2 x year | 24-hour composite |
| pH (4) | 6.4 to 8.6 | | Continuous | Daily, Min/Max/Average |
| Total Residual Chlorine (5) | 0.2 mg/l | 0.28 mg/l | 1 x daily | Grab |

Samples collected in compliance with the monitoring requirements specified above shall be collected at a point following the combination of all waste streams and prior to discharge into the Winooski River.

- (1) Total Metals shall include Total Cadmium, Total Chromium, Total Copper, Total Iron, Total Lead, Total Nickel and Total Zinc.
- (2) See Special Condition I.A.3.c
- (3) These samples should be collected in the months of August/September and January/February. They should be reported by December 31 and June 30 each year. Total Nitrogen is calculated as the sum of Total Kjeldahl Nitrogen and Nitrate/Nitrite
- $$TN = TKN + NO_x$$
- (4) See Special Condition I.A.3.d
- (5) Monitoring for Total Residual Chlorine shall be required only during periods of chlorinated cooling water discharge. Chlorinated cooling water discharge may not be discharged for more than 2 hours in any one day. See Special Condition I.A.3.g

2. Discharge Point S/N 002

- a. During the term of this permit, the Permittee is authorized to discharge from outfall serial number S/N 002 (internal waste stream): Low volume wastes including boiler blowdown, demineralizing rinse water, reverse osmosis reject water, filter backwash and floor drain wastewater to the **Winooski River** via S/N 001. Such discharges shall be limited and monitored by the Permittee as specified below:

| EFFLUENT CHARACTERISTICS | DISCHARGE LIMITATIONS | | | MONITORING REQUIREMENTS | |
|--------------------------|-----------------------|-------------|--------------|-------------------------|-------------|
| | Monthly Average | Maximum Day | Annual Total | Measurement Frequency | Sample Type |

| | | | | | |
|-------------------------|-----------|-----------|-----------|-------------|-------------------|
| Flow | 0.125 MGD | 0.500 MGD | | Continuous | Daily Total |
| Total Suspended Solids | | 30 mg/l | | 1 x monthly | 24-hour composite |
| Total Phosphorus (1)(2) | 0.8 mg/l | | 37.47 lbs | 1 x monthly | 24-hour composite |
| Oil and Grease | 10 mg/l | 15 mg/l | | 1 x monthly | Grab |

Samples collected in compliance with the monitoring requirements specified above shall be collected at a location before the effluent combines with the S/N 001 discharge.

- (1) The Permittee shall operate the facility to meet the concentration limitations or pounds limitation, whichever is more restrictive.
- (2) Total Phosphorus shall be reported as Total Monthly Pounds, Running Total Annual Pounds, and Percentage of Running Total Annual Pounds to Annual Permit Limitation. See Conditions 1.B.4 and 1.B.5.

3. Special Conditions

- a. The effluent shall not have concentrations or combinations of contaminants including oil, grease, scum, foam, or floating solids which would cause a violation of the Vermont Water Quality Standards (VWQS).
- b. The effluent shall not cause visible discoloration of the receiving waters.
- c. In accordance with Section 2-04 of the Vermont Water Quality Standards, this permit establishes a mixing zone in the Winooski River for temperature not to exceed 200 feet from the outfall. Within the mixing zone, VWQS Section 3-02.1 is waived up to the temperature discharge limitation of 99°F.
- d. In accordance with Section 2-04 of the Vermont Water Quality Standards, this permit establishes a mixing zone in the Winooski River for pH not to exceed 200 feet from the outfall. Within the mixing zone, VWQS Section 3-03.6 is waived but not to exceed the pH limitation of 6.4-8.6 Standard Units.

- e. The permittee is limited to using those chemicals which are similar in composition, concentration and toxicity to those identified in the permit application unless substantially different chemicals are approved by the Secretary. A significant increase in the dosage rate or a substantial change in the chemicals used must be reviewed by the Secretary to assure that no adverse impact will occur in the receiving water. A substantial change in chemicals shall be defined as those chemicals that are not similar in composition, concentration, and toxicity to those identified in the application.
- f. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.
- g. Total Residual Chlorine (TRC) testing is required if the chlorinated cooling tower water is held in the cooling ponds for less than three hours **or** if chlorinated chemicals are used to treat an acute maintenance problem. TRC testing is not required if the chlorinated cooling tower water is held in the cooling ponds for at least three hours **and** chlorinated chemicals are used at levels necessary to prevent maintenance problems. Whether or not TRC testing is performed should be noted on the monthly Discharge Monitoring Reporting (DMR) forms (WR-43). If no tests are conducted within a month then the daily maximum and monthly average values should be reported using NODI code 9 (Conditional Monitoring – Not Required This Period). If chlorinated chemicals are used to treat an acute maintenance problem, then a sample shall be collected the day that the chlorinated waste is discharged **and** the day of the next discharge to provide adequate data to calculate a monthly average.

B. TOTAL PHOSPHORUS

1. Waste Load Allocation

This permit includes a formal total phosphorus waste load allocation (WLA) of 37.47 lbs., or 0.017 metric tons, per year, as established by the U.S. EPA in the 2016 “Phosphorus TMDLs for Vermont Segments of Lake Champlain” (LC TMDL). The Secretary reserves the right to reopen and amend this permit, pursuant to Condition II.B.4. of this permit, to include an alternate TP limitation or additional monitoring requirements based on the monitoring data, the results of phosphorus optimization activities, or a reallocation of phosphorus WLA between the Permittee and another Facility pursuant to the requirements of the TMDL and Vermont’s “Wasteload Allocation Process” Rule (Environmental Protection Rule, Chapter 17).

2. Phosphorus Optimization Plan

- a. **Within 120 days of permit issuance**, the Permittee shall develop or update (as appropriate), and submit to the Secretary a Phosphorus Optimization Plan (POP) to minimize the facility’s phosphorus discharge by implementing optimization

techniques that achieve phosphorus reductions using primarily existing facilities and equipment. The POP shall:

1. Be developed by a qualified professional with experience in the operation and design of power generation facilities in consultation with the facility;
 2. Evaluate alternative methods of operating the existing facility, including operational, chemical, process, and equipment changes designed to minimize phosphorus discharge. The techniques to be evaluated may include operational process changes to enhance biological or chemical phosphorus removal, and evaluation of alternatives to phosphorus containing chemicals (primarily TSP (trisodium phosphate) and DSP (disodium phosphate));
 3. Determine which alternative methods of operating the existing Facility, including operational, process, and equipment changes will be most effective at reducing phosphorus discharge; and
 4. Include a proposed implementation schedule for those methods of operating the Facility determined to be most effective at reducing phosphorus discharge.
- b. The Secretary shall review the POP. The Permittee shall commence implementation of the POP 60 days after submittal to the Secretary unless the Secretary rejects the POP prior to that date for failure to meet the requirements of subsection (a) of this section.
- c. The Permittee shall annually submit a report to the Secretary as an attachment to the monthly electronic Discharge Monitoring Reporting (DMR) form WR-43 that documents:
- i. The optimization techniques implemented under the POP during the previous year.
 - ii. Whether the techniques are performing as expected.
 - iii. The phosphorus discharge trends relative to the previous year.

The first annual report shall include data collected during 2021 and shall be attached to the December 2022 DMR form WR-43.

3. Phosphorus Elimination/Reduction Plan

- a. The Facility shall have 12 months from the permit issuance date to minimize discharge of total phosphorus.
- b. If after the 12-month optimization period, the Facility's actual, total phosphorus loads reach or exceed 80% of the LC TMDL WLA for the Facility, based on the Facility's 12 month running annual load calculated using the Running Total Annual Pounds Calculation (Condition I.B.4. of this permit) the Permittee shall, within 90 days of reaching or exceeding 80% of the LC TMDL WLA for the Facility, develop and submit to the Secretary a projection based on the Facility's current operations and expected future loadings of whether it will exceed its WLA during the permit term.

- c. If the facility is not projected to exceed its WLA within the permit term, the Facility shall reassess when it is projected to reach its WLA prior to seeking permit renewal and submit that information with its next permit application.
- d. If the facility is projected to exceed its WLA during the permit term, the Permittee shall submit a Phosphorus Elimination/Reduction Plan (PERP) within 6 months from the date of submittal of the projection plan submitted under Condition I.B.3.b. The PERP shall be submitted to the Secretary to ensure the Facility continues to comply with its WLA.
- e. The PERP shall be developed by qualified professionals in consultation with the Facility.
- f. The PERP shall include:
 - i. An evaluation of alternatives to ensure the Facility's compliance with its WLA;
 - ii. An identification of the chosen alternative or alternatives to ensure the Facility's compliance with its WLA;
 - iii. A proposed schedule, including an engineer approved design and construction schedule and, if the chosen alternative or alternatives require a pilot study, a scheduling for testing, that shall ensure the Facility's compliance with its WLA as soon as possible; and
 - iv. A financing plan that estimates the costs for implementing the PERP and describes a strategy for financing the project.
- g. The PERP shall be treated as an application to amend the permit, and therefore, shall be subject to all public notice, hearing, and comment provisions, in place at the time the plan is submitted, that are applicable to permit amendments. The Facility shall revise the PERP, if required by the Secretary.

4. Running Total Annual Pounds Calculation

Compliance with the annual TP limitation (presented in Condition I.A.2. and I.B.1.) will be evaluated each month, using the Running Total Annual Pounds Calculation. In order to calculate running annual TP loading relative to the TMDL WLA:

- a. Calculate the average of results for all TP monitoring events conducted in a month (Monthly Average TP Concentration). Units = mg/L
- b. For flow, use the average daily flow for the month as reported on the DMR. Units = MGD
- c. Calculate Total Monthly Pounds = (Monthly Average TP Concentration) × (average daily flow from DMR) × 8.34 × number of daily discharges in the month.
- d. Sum the results for the immediately preceding 12 months to derive the Running Total Annual Pounds.

5. Total Phosphorus Reporting

Total Phosphorus shall be reported monthly, via electronic Discharge Monitoring Report, in the following ways:

- a. Monthly Average TP Concentration. See Condition I.B.4.a.
- b. Total Monthly Pounds, meaning the total monthly pounds of TP discharged during the month. See Condition I.B.4.c.
- c. Running Total Annual Pounds, meaning the 12-month running annual TP load, as specified by Condition I.B.4.d.
- d. Comparison (%) of Running Total Annual Pounds to Annual Permit Limitation, meaning the percentage of the Running Total Annual Pounds to the Annual Total Phosphorus Limitation. The comparison shall be calculated as:

Percentage of Running Total Annual Pounds to Annual Permit Limitation, % = Running Total Annual Pounds / Annual TP Permit Limit \times 100

C. 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, 2025.

D. OPERATING FEES

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

E. PRIORITY POLLUTANTS

1. Appendix J Effluent Testing

By December 31, 2021, the Permittee shall submit the results of an effluent analysis of S/N 001 for the pollutants included found on Attachment A and submit the results to the Secretary. This includes pollutants found in Appendix J, Table 2 of 40 CFR Part 122, pollutants required annually by 40 CFR § 122.21(j) as well as parameters needed to interpret the pollutant data.

1. Priority Metals Effluent Testing

By December 31 2022 and each subsequent year of the permit term, the Permittee shall conduct an effluent analysis of S/N 001 for the metals (antimony, arsenic, beryllium, cadmium, copper, lead, nickel, selenium, silver, thallium and zinc) included in Appendix J,

Table 2 of 40 CFR Part 122 (see Attachment A), as well as for effluent temperature, effluent pH, Total Dissolved Solids, and Dissolved Oxygen, and submit the results to the Secretary. It is not necessary to duplicate quarterly metals sampling requirements. Samples shall be collected during the summer (August/September) in odd years and in the winter (January/February) in even years.

F. MONITORING AND REPORTING

1. Sampling and Analysis

The sampling, preservation, handling, and analytical methods used shall conform to the test procedures published in Title 40 of the Code of Federal Regulations (C.F.R.) Part 136. The Permittee shall use sufficiently sensitive test procedures (i.e., methods) approved under 40 C.F.R. Part 136 for the analysis of the pollutants or pollutant parameters required under this Section.

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. A description of the effluent sample location is included in Condition I.A.1.a and I.A.2.a.

2. Reporting

The Permittee is required to submit monthly reports of monitoring results as required in Condition I.A. and operational parameters on Discharge Monitoring Report (DMR) form WR-43 or through an electronic reporting system made available by the Secretary. Reports are due on the 15th day of each month, beginning with the month following the effective date of this permit.

Unless waived by the Secretary, the Permittee shall electronically submit its DMRs via Vermont's online electronic reporting system. The Permittee shall electronically submit additional compliance monitoring data and reports specified by the Secretary. When the Permittee submits DMRs using an electronic system designated by the Secretary, which requires attachment of scanned DMRs in PDF format, it is not required to submit hard copies of DMRs. The link below shall be used for electronic submittals:

<https://anronline.vermont.gov/>

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

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; 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 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 this permit; and
- i. For analyses performed by contract laboratories:
 - a. The detection level reported by the laboratory for each sample; and
 - b. The laboratory analytical report including documentation of the QA/QC and analytical procedures.

When “non-detects” are recorded, the method detection limit shall be reported and used in calculating any time-period averaging for reporting on DMRs.

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 form WR-43. Such increased frequency shall also be indicated.

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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, pursuant to Condition II.B.4. of this permit, to specify and limit any pollutants not previously limited.

2. Noncompliance Notification

- a. 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.
- 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 Secretary in this permit; or
 - v. Other causes such as acts of nature,the Permittee shall provide notice as specified in subdivision (c) of this subsection.
- c. Pursuant to 10 V.S.A. §1295, notice for “untreated discharges,” as defined.
 - i. Public notice. For “untreated discharges” an operator of a wastewater treatment facility (WWTF) or the operator’s delegate shall as soon as possible, but no longer

than one hour from discovery of an untreated discharge from the WWTF, 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 operator 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 operator 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.** Secretary notification. For “untreated discharges” an operator of a WWTF shall within 12 hours from discovery of an untreated discharge from the WWTF 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. For combined sewer overflows, the specific location of each untreated discharge means each outfall that has discharges during the wet weather storm event.
 - (2) Except for discharges from a WWTF 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 a WWTF 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 sewer structure involved.
 - (6) The person reporting the untreated discharge.
- d.** For any noncompliance covered under Condition II.A.2.b. of this permit, Burlington Electric Department 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 noncompliance;
- ii. A description of the non-complying discharge including its impact upon the receiving water;
- iii. Anticipated time the condition of noncompliance is expected to continue or, if such condition has been corrected, the duration of the period of noncompliance;
- 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 noncompliance.

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; and
- b. The Permittee shall provide an adequate operating staff which is duly qualified to carry out the operation, maintenance, and testing functions required to 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 Secretary.

The Permittee shall demonstrate the accuracy of the effluent flow measurement devices **weekly** and report the results on the monthly report forms. The acceptable limit of error is $\pm 10\%$.

For purposes of demonstrating compliance with the requirements of Condition II.A.3.a. of this permit regarding adequate laboratory controls and appropriate quality assurance procedures, the Permittee shall conduct and pass an annual laboratory proficiency test, via an accredited laboratory, for the analysis of all pollutant parameters performed within their facility laboratory and reported as required by this permit. This can be carried out as part of an EPA DMR-QA study. Results shall be submitted to the Secretary by **December 31, annually**. The first results are due by **December 31, 2021**.

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 (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, the environment, or human health resulting from noncompliance 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 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's discharge is covered under 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, unless notice is required sooner under Condition II.A.2.

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, the holder 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 Secretary shall proceed in accordance with chapter 170 of this title. 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; and
- (5) the cause or reason for the emergency is not due to willful or intended acts or omissions of the applicant.

Application shall be made to the Secretary at the following address: Agency of Natural Resources, Department of Environmental Conservation, One National Life Drive, Davis Building, 3rd 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 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 or monitor, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the 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 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; and

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, pursuant to Condition II.B.4. of this permit, 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

The Permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. Except as provided in "Bypass" (Condition II.A.5.) and "Emergency Pollution Permits" (Condition II.A.9.), nothing in this permit shall be construed to relieve the Permittee from civil or criminal penalties for noncompliance. Civil and criminal penalties for noncompliance 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 Secretary, 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.

DRAFT

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 – means the Vermont Agency of Natural Resources.

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

Bypass – means the intentional diversion of waste streams from any portion of the treatment facility.

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

Composite Sample – means 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 – means 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 – means the placing, depositing, or emission of any wastes, directly or indirectly, into an injection well or into the waters of the State.

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

Incompatible Substance – means 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 – means a value not to be exceeded in any grab sample.

Major Contributing Industry – means 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 treatment works or on the quality of effluent from that treatment works.

Maximum Day or Maximum Daily Discharge Limitation – means the highest allowable “daily discharge” (mg/L, lbs or gallons).

Mean – means the arithmetic mean.

Monthly Average or Average Monthly Discharge Limitation – means 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 – means the National Pollutant Discharge Elimination System.

Secretary – means the Secretary of the Agency of Natural Resources or the Secretary’s duly authorized representative.

Septage – means the liquid and solid material pumped from a septic tank, cesspool, or similar domestic sewage treatment system, or a holding tank when the system is cleaned or maintained.

Untreated Discharge – means (1) combined sewer overflows from a WWTF; (2) overflows from sanitary sewers and combined sewer systems that are part of a WWTF during dry weather flows, which result in a discharge to waters of the State; (3) upsets or bypasses around or within a WWTF during dry or wet weather conditions that are due to factors unrelated to a wet weather storm event and that result in a discharge of sewage that has not been fully treated to waters of the State; and (4) discharges from a WWTF to separate storm sewer systems.

Waste – means 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 – means 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 in a waste management zone due to the authorized discharge.

Waters – means all rivers, streams, creeks, brooks, reservoirs, ponds, lakes, springs, and all bodies of surface waters, artificial or natural, which are contained within, flow through, or border upon the State or any portion of it.

Weekly average or Average Weekly Discharge Limitation – means 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.

Whole Effluent Toxicity (WET) – means the aggregate toxic effect of an effluent measured directly by a toxicity test.

Wastewater Treatment Facility (WWTF) – means a treatment plant, collection system, pump station, and attendant facilities permitted by the Secretary for the purpose of treating domestic, commercial, or industrial wastewater.

ATTACHMENT A

pH of effluent
Dissolved Oxygen
Temperature of effluent

Metals (total recoverable), cyanide and total phenols:

Antimony
Arsenic
Beryllium
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Selenium
Silver
Thallium
Zinc
Cyanide
Total phenolic compounds

Volatile organic compounds:

acrolein
acrylonitrile
benzene
bromoform
carbon tetrachloride
chlorobenzene
chlorodibromomethane
chloroethane
2-chloroethylvinyl ether
chloroform
dichlorobromomethane
1,1-dichloroethane
1,2-dichloroethane
Trans-1,2-dichloroethylene
1,1-dichloroethylene
1,2-dichloropropane
1,3-dichloropropylene
ethylbenzene
methyl bromide
methyl chloride
methylene chloride
1,1,2,2-tetrachloroethane
tetrachloroethylene
toluene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethylene
vinyl chloride

Acid-extractable compounds:

p-chloro-m-cresol
2-chlorophenol
2,4-dichlorophenol
2,4-dimethylphenol
4,6-dinitro-o-cresol
2,4-dinitrophenol

2-nitrophenol
4-nitrophenol
pentachlorophenol
phenol
2,4,6-trichlorophenol

Base-neutral compounds:

acenaphthene
acenaphthylene
anthracene
benzidine
benzo(a)anthracene
benzo(a)pyrene
3,4-benzofluoranthene
benzo(ghi)perylene
benzo(k)fluoranthene
bis(2-chloroethoxy)methane
bis(2-chloroethyl)ether
bis(2-chloroisopropyl)ether
bis(2-ethylhexyl)phthalate
4-bromophenyl phenyl ether
butyl benzyl phthalate
2-chloronaphthalene
4-chlorophenyl phenyl ether
chrysene
di-n-butyl phthalate
di-n-octyl phthalate
dibenzo(a,h)anthracene
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
3,3'-dichlorobenzidine
diethyl phthalate
dimethyl phthalate
2,4-dinitrotoluene
2,6-dinitrotoluene
1,2-diphenylhydrazine
fluoranthene
fluorene
hexachlorobenzene
hexachlorobutadiene
hexachlorocyclo-pentadiene
hexachloroethane
indeno(1,2,3-cd)pyrene
isophorone
naphthalene nitrobenzene
N-nitrosodi-n-propylamine
N-nitrosodimethylamine
N-nitrosodiphenylamine
phenanthrene
pyrene
1,2,4-trichlorobenzene

AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
ONE NATIONAL LIFE DRIVE, DAVIS BUILDING, 3RD FLOOR
MONTPELIER, VT 05620-3522

FACT SHEET FOR DRAFT PERMIT
February 2021

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

PERMIT NO: 3-1219
PIN: EJ95-0448
NPDES NO: VT0020401

NAME AND ADDRESS OF APPLICANT:

Burlington Electric Department
585 Pine Street
Burlington, VT 05401

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Joseph C. McNeil Generating Station
111 Intervale Rd
Burlington, VT

RECEIVING WATER: Winooski River

CLASSIFICATION: All uses Class B(2) with a waste management zone. Class B waters are suitable for swimming and other primary contact recreation; irrigation and agricultural uses; aquatic biota and aquatic habitat; good aesthetic value; boating, fishing, and other recreational uses; and suitable for public water source with filtration and disinfection or other required treatment. A waste management zone is a specific reach of Class B(1) or B(2) waters designated by a permit to accept the discharge of properly treated wastes that prior to treatment contained organisms pathogenic to human beings.

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

The Secretary of the Vermont Agency of Natural Resources (hereinafter referred to as the "Secretary") received a renewal application for the permit to discharge into the designated receiving water from the above-named applicant on March 16, 2012. The facility's previous permit was issued on September 20, 2007. The previous permit (hereafter referred to as the "current permit") has been administratively continued, pursuant to 3 V.S.A. § 814, as the applicant filed a complete application for permit reissuance within the prescribed time period per the

Vermont Water Pollution Control Permit Regulations (VWPCPR) § 13.5(b). At this time, the Secretary has made a tentative decision to reissue the discharge permit.

The facility is engaged in the operation of a 50 MW steam powered electrical generating facility. This facility is classified as an Industrial non-Major NPDES WWTF which does not require a licensed Pollution Facility Operator.

A map showing the location of the facility, outfalls and the receiving water is provided in the Reasonable Potential Determination (RPD) (see Attachment A).

II. Description of Discharge

The Burlington Electric Department owns and operates the Joseph C McNeil Generating Station, a 50 MW steam powered electrical generating facility located on Intervale Road in Burlington. The discharge consists of cooling tower blowdown (S/N 001) and low volume wastes (S/N 002) specifically boiler blowdown, demineralized rinse water, reverse osmosis reject water, filter backwash, and treated floor drainage. S/N 002 combines with S/N 001 and discharges via the S/N 001 outfall. Non-contact cooling water is discharged without treatment, and other waste streams are treated in a pair of parallel settling ponds.

The wastewater treatment facility is a pair of settling ponds. The design flow of the facility is 0.500 million gallons per day (MGD). The average discharge from this facility over the last 5 years is about 0.14 MGD.

The facility maintains a constant discharge to the **Winooski** River. A schematic showing the flow of water through the facility is shown below in Figure 1.

Figure 1. McNeil Generating Station. J01 and 002 Basic Flow Diagram

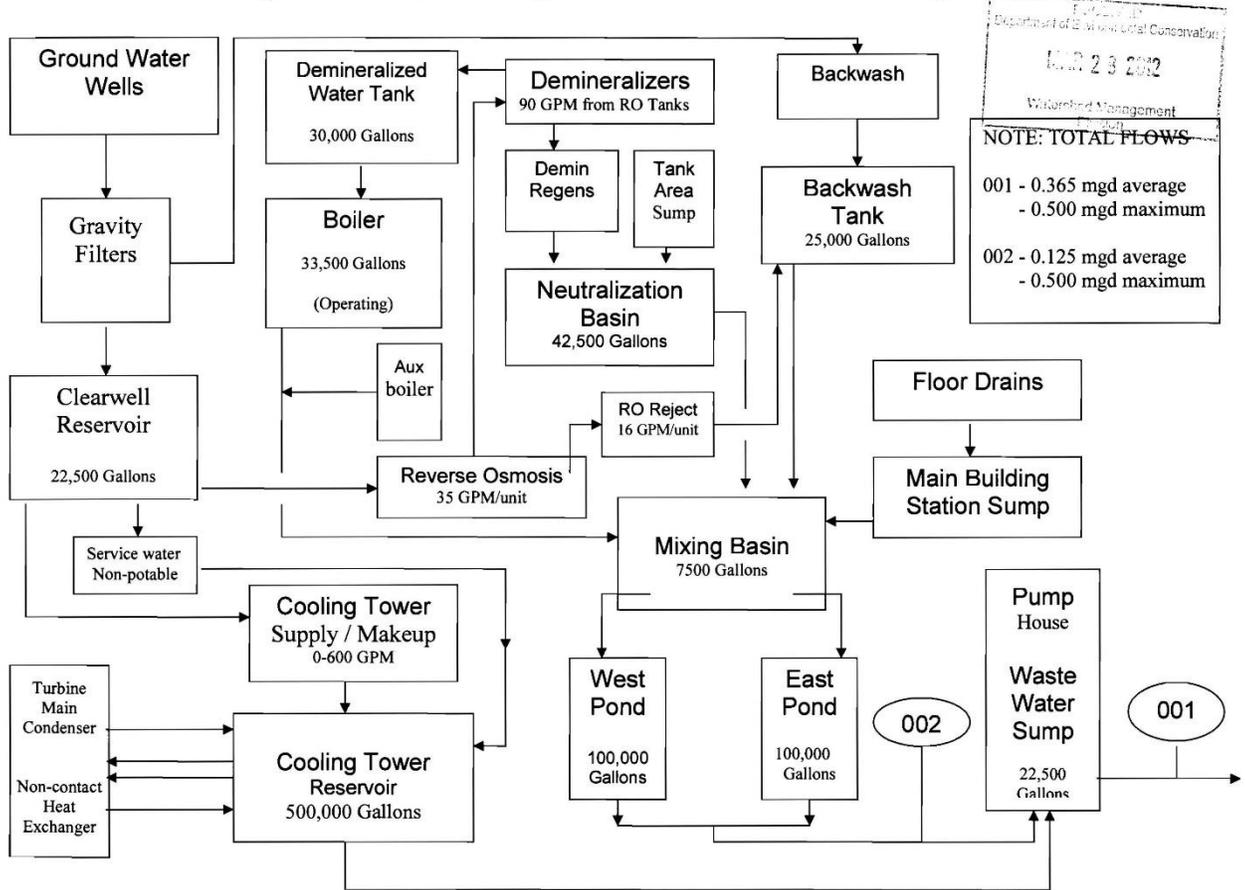


Figure 1 Joseph C. McNeil Generating Station Flow Schematic

III. Limitations and Conditions

The draft permit contains limitations for effluent flow, total metals (Cd, Cr,Cu,Fe,Pb,Ni,Zi), total suspended solids, total phosphorus, oil and grease, temperature, turbidity, pH, and total residual chlorine. It also contains monitoring requirements for turbidity, total nitrogen, nitrate/nitrite, total ammonia nitrogen, total Kjeldahl nitrogen and the Appendix J, Table 2 of 40 CFR Part 122 Priority Pollutants. The effluent limitations of the draft permit and the monitoring requirements may be found on the following pages of the draft permit:

| | |
|--------------------------|-----------------|
| Effluent Limitations: | Pages 2-4 of 23 |
| Monitoring Requirements: | Pages 4-9 of 23 |

IV. Statutory and Regulatory Authority

A. Clean Water Act and NPDES Background

Congress enacted the Clean Water Act (CWA or Act), “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” CWA § 101(a). To achieve this objective, the CWA makes it unlawful for any person to discharge any pollutant into the waters of the United States from any point source, except as authorized by specified permitting sections of the Act, one of which is Section 402. CWA §§ 301(a), 402(a). Section 402 establishes one of the CWA’s principal permitting programs, the National Pollutant Discharge Elimination System (NPDES). Under this section of the Act, the U.S. Environmental Protection Agency (EPA) may “issue a permit for the discharge of any pollutant, or combination of pollutants” in accordance with certain conditions. CWA § 402(a). The State of Vermont has been approved by the EPA to administer the NPDES Program in Vermont. NPDES permits generally contain discharge limitations and establish related monitoring and reporting requirements. CWA § 402(a)(1) - (2).

Section 301 of the CWA provides for two types of effluent limitations to be included in NPDES permits: “technology-based” limitations and “water quality-based” limitations. CWA §§ 301, 303, 304(b); 40 CFR Parts 122, 125, 131. Technology-based limitations, generally developed on an industry-by-industry basis, reflect a specified level of pollutant-reducing technology available and economically achievable for the type of facility being permitted. CWA § 301(b).As a class, Steam Electric Power Generating plants must meet performance-based requirements based on best available steam generating power plant technology. CWA § 423 Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category. However, this facility is exempt from those requirements because it is an existing discharge with a nameplate capacity of 50 MW. Previous permits have considered the limits included in these effluent limitation guidelines and have applied them as appropriate. This facility does not use water to scrub air emissions or to transport ash and therefore the guidelines applicable to those processes do not apply to this facility.

Water quality-based effluent limits, on the other hand, are designed to ensure that state water quality standards are achieved, irrespective of the technological or economic considerations that inform technology-based limits. Under the CWA, states must develop water quality standards for all water bodies within the state. CWA § 303. These standards have three parts: (1) one or more “designated uses” for each water body or water body segment in the state; (2) water quality “criteria,” consisting of numerical concentration levels and/or narrative statements specifying the amounts of various pollutants that may be present in each water body without impairing the designated uses of that water body; and (3) an antidegradation provision, focused on protecting high quality waters and protecting and maintaining water quality necessary to protect existing uses. CWA § 303(c)(2)(A); 40 C.F.R. § 131.12. The applicable water quality standards for this permit are the 2017 Vermont Water Quality Standards (Environmental Protection Rule, Chapter 29a).

A permit must include limits for any pollutant or pollutant parameter (conventional, non-conventional, toxic, and whole effluent toxicity) that is or may be discharged at a level that causes or has "reasonable potential" to cause or contribute to an excursion above any water quality standard, including narrative water quality criteria. See 40 CFR § 122.44(d)(1). An excursion occurs if the projected or actual in-stream concentration exceeds the applicable criterion. A NPDES permit must contain effluent limitations and conditions in order to ensure that the discharge does not cause or contribute to water quality standard violations.

Receiving stream requirements are established according to numerical and narrative standards adopted under state law for each stream classification. When using chemical-specific numeric criteria from the State's water quality standards to develop permit limits, both the acute and chronic aquatic life criteria are used and expressed in terms of maximum allowable instream pollutant concentrations. Acute aquatic life criteria are generally implemented through maximum daily limits and chronic aquatic life criteria are generally implemented through average monthly limits.

Where a state has not established a numeric water quality criterion for a specific chemical pollutant that is present in the effluent in a concentration that causes or has a reasonable potential to cause a violation of narrative water quality standards, the permitting authority must establish effluent limits in one of three ways: based on a “calculated numeric criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and fully protect the designated use”; on a “case-by-case basis” using CWA Section 304(a) recommended water quality criteria, supplemented as necessary by other relevant information; or, in certain circumstances, based on an “indicator parameter.” 40 CFR § 122.44(d)(1)(vi)(A-C).

The state rules governing Vermont’s NPDES permit program are found in the Vermont Water Pollution Control Permit Regulations (Environmental Protection Rule, Chapter 13).

1. Reasonable Potential Determination

In determining whether this permit has the reasonable potential to cause or contribute to an impairment, Vermont has considered:

- 1) Existing controls on point and non-point sources of pollution as evidenced by the Vermont

- surface water assessment database;
- 2) Pollutant concentration and variability in the effluent as determined from the permit application materials, monthly discharge monitoring reports (DMRs), or other facility reports;
 - 3) Receiving water quality based on targeted water quality and biological assessments of receiving waters, as applicable, or other State or Federal water quality reports;
 - 4) Toxicity testing results based on the Vermont Toxic Discharge Control Strategy, and compelled as a condition of prior permits;
 - 5) Available dilution of the effluent in the receiving water, expressed as the instream waste concentration. In accordance with the applicable Vermont Water Quality Standards, available dilution for rivers and streams is based on a known or estimated value of the lowest average flow which occurs for seven (7) consecutive days with a recurrence interval of once in ten (10) years (7Q10) for aquatic life and human health criteria for non-carcinogens, or at all flows for human health (carcinogens only) in the receiving water. For nutrients, available dilution for stream and river discharges is assessed using the low median monthly flow computed as the median flow of the month containing the lowest annual flow. Available dilution for lakes is based on mixing zones of no more than 200 feet in diameter, in any direction, from the effluent discharge point, including as applicable the length of a diffuser apparatus; and
 - 6) All effluent limitations, monitoring requirements, and other conditions of the proposed draft permit.

The Reasonable Potential Determination for this facility is attached to this Fact Sheet as Attachment A.

B. Anti-Backsliding

Section 402(o) of the CWA provides that certain effluent limitations of a renewed, reissued, or modified permit must be at least as stringent as the comparable effluent limitations in the current permit. EPA has also promulgated anti-backsliding regulations which are found at 40 C.F.R. § 122.44(l). Unless applicable anti-backsliding exemptions are met, the limits and conditions in the reissued permit must be at least as stringent as those in the current permit.

V. Description of Receiving Water

The receiving water for this discharge is the **Winooski River**, a designated seasonally (June 1 to September 30) Warm Water Fish Habitat. At the point of discharge, the river has a contributing drainage area of **1053** square miles. The summer 7Q10 flow of the river is estimated to be 147.4 cubic feet per second (CFS) and the summer Low Median Monthly flow is estimated to be 483.6 CFS. The instream waste concentration at the summer 7Q10 flow is .005 (0.5%) and the instream waste concentration at the summer Low Median Monthly flow is .002 (0.2%).

In addition, the Winooski River drains into Lake Champlain, which is impaired for phosphorus

and is subject to a Total Maximum Daily Load (TMDL) for phosphorus. This is discussed further in Section VII.D.1. of this Fact Sheet.

VI. Facility History and Background

The Burlington Electric Company operates the Joseph C. McNeil Generating Station, a 50 MW steam powered electrical generating facility. The facility is owned by Burlington Electric Company with interests held by Green Mountain Power and the Vermont Public Power Supply Authority. It opened in June 1984 after almost a decade of community interest in a biomass fired electrical generating facility. A 1989 upgrade allows the facility to also run on natural gas and oil. An NPDES permit to discharge to the Winooski River was first issued to this facility on June 7, 1983. The permit has been renewed in the intervening years to remove unneeded monitoring conditions and to add new conditions to address changing water quality issues.

VII. Permit Basis and Explanation of Effluent Limitation Derivation

This facility has two waste streams with different discharge compliance locations. S/N 001 discharges to the Winooski River and is a combination of all wastes discharged from the facility. S/N 002 discharges the treated boiler wastewater into the cooling water wastes prior to S/N 001. The discharge point that the permit limit applies to has been noted in the limit description.

A. Flow (S/N 001) – The draft permit maintains the monthly average flow limitation of 0.365 MGD and maximum day flow limitation of 0.500 MGD. This facility maintains a constant discharge. **Continuous** flow monitoring is required.

B. Flow (S/N 002) – The draft permit maintains the monthly average flow limitation of 0.125 MGD and maximum day flow limitation of 0.500 MGD. This facility maintains a constant discharge. **Continuous** flow monitoring is required.

C. Conventional Pollutants

1. Oil and Grease (S/N 002) –The monthly average of 10 mg/l and 15 mg/l daily maximum remain unchanged from the previous permit. Monitoring remains required monthly.

2. Total Suspended Solids (TSS) (S/N 002) – The Maximum Day effluent limitation of 30 mg/l for TSS remain unchanged from the current permit. Monitoring remains required monthly.

3. pH (S/N 001) – The pH limitation remains at 6.4 - 8.6 Standard Units as specified in current permit. This variance from the VWQS is needed because infrequently the discharge may exceed the range of 6.5-8.5 Standard Units. In accordance with Section 2-04 of the Vermont Water Quality Standards, this permit establishes a mixing zone in the Winooski River for pH not to exceed 200 feet from the outfall. Within the mixing zone, Section 3-03.6 is waived but not to exceed the pH limitation of 6.4-8.6 Standard Units. Monitoring remains at continuous with measurements reported for minimum, maximum and average values.

D. Non-Conventional and Toxics

1. Total Phosphorus (TP) (S/N 002)

Background:

Excess phosphorus entering Lake Champlain from a variety of sources has impaired the water quality of the lake. The Lake Champlain Total Maximum Daily Load (LC TMDL), places a cap on the maximum amount of phosphorus from point and non-point sources that is allowed to flow into the lake while still meeting Vermont's water quality standards. The EPA developed phosphorus TMDLs for the twelve Vermont segments of Lake Champlain in collaboration with the Vermont Agency of Natural Resources, Department of Environmental Conservation and the Vermont Agency of Agriculture, Food, and Markets, and released the document titled "Phosphorus TMDLs for Vermont Segments of Lake Champlain" (June 2016). The 2016 LC TMDL specifies allowable phosphorus loads, or waste load allocations (WLA), expressed as metric tons per year (mt/yr), for each of the 59 WWTFs that discharge to the Lake's watershed. Discharge (NPDES) permits will be issued by the Secretary in accordance with the permit issuance schedule in the Lake Champlain TMDL Phase 1 Implementation Plan (Chapter 3, page 46). The Secretary will follow this schedule unless special circumstances are raised by the facility that warrant the issuance of the permit sooner (e.g., planned facility upgrades), and the Program has sufficient staff capacity to handle the request.

Reductions in WLAs are targeted only to WWTFs in those lake segment watersheds where the currently permitted wastewater load represents a significant (defined as being 10% or greater) portion of the total phosphorus load to that segment from all sources (Main Lake, Shelburne Bay, Burlington Bay, St. Albans Bay) or where wastewater upgrades would meaningfully reduce the phosphorus reduction burden placed on non-wastewater (non-point) sources (Missisquoi Bay). Therefore, WWTFs discharging to the Port Henry, Otter Creek, Mallets Bay, Northeast Arm, Isle LaMotte, and the South Lake A/B lake segments were not assigned a new waste load allocation. The EPA also determined that wastewater facilities with a design flow of < 0.1 MGD would be given the same allocations as in the 2002 TMDLs due their minor contribution of phosphorus loading.

The LC TMDL establishes new annual WLAs for WWTFs with a design flow capacity of above 0.1 million gallons per day (MGD) that discharge to the Main Lake, Shelburne Bay, Burlington Bay, St. Albans Bay, and Missisquoi Bay lake segments. Specifically, WWTFs with a design flow capacity of 0.1 to 0.2 MGD were assigned WLAs based on a 0.8 mg/L effluent phosphorus concentration at permitted flow while WWTFs with design capacity of > 0.2 MGD were assigned a WLA based on a 0.2 mg/L effluent phosphorus concentration at permitted flow.

In the LC TMDL, EPA acknowledged and supported the Secretary's commitment to employ flexible approaches to implementing the WWTF WLAs including "providing a period of time for optimization to be pursued and the corresponding load reduction results to be realized, and then commencement of the process to upgrade phosphorus treatment facilities will be required when actual phosphorus loads reach 80% of the LC TMDL limits." The Wastewater

Management Program maintains a tracking system for phosphorus loading from Vermont WWTFs so facilities approaching or over the 80% threshold can be identified. The 80% phosphorus load threshold is calculated by comparing the individual WWTF phosphorus WLA established in the LC TMDL to the actual phosphorus discharge load from the WWTF over last 12 months:

WWTF Annual TP Load / LC TMDL WLA x 100

There are currently WWTFs in the Lake Champlain watershed with existing discharged loads of phosphorus already at, or above, 80% of allowable loads. To ensure facilities are operating as efficiently as possible, all reissued wastewater discharge (NPDES) permits under the LC TMDL will specify a period of 12-months for optimization to be pursued and the corresponding load reduction results to be realized, prior to evaluating where a facility ranks relative to the 80% trigger. Discharge permits will specify that after the optimization period, when an existing facility reaches 80% of its WLA for phosphorus (evaluated as a rolling, 12-month load), the Permittee will have to develop and submit a projection of whether the facility will exceed its WLA during the permit term and if it is projected to do so, then the facility will be required to develop a Phosphorus Elimination/Reduction Plan (PERP) that will ensure the facility continues to comply with its WLA.

Effluent TP limits in permits are expressed as:

- (1) total annual mass loads, and
- (2) for facilities that currently have an existing monthly effluent concentration limits for TP in their NPDES permit, as monthly effluent concentration limits.

Phosphorus Limit in Draft Permit:

The current discharge permit for this Facility includes a mass-based, effluent limit of 37.47 pounds of TP per year. This annual mass limitation was based on an allocation of 0.017 metric tons established in the 2002 Lake Champlain Phosphorus TMDL. The current permit also contains an effluent TP concentration limit of 0.8 mg/L, monthly average. The facility must be operated to meet both the annual mass limitation and the daily concentration limit.

This proposed draft permit contains a phosphorous effluent concentration limit of 0.8 mg/l, monthly average, and a mass effluent limit of 37.47 total pounds, annual limitation. The concentration effluent limitation is based on the requirements of 10 V.S.A. § 1266a and is unchanged from the current permit. The mass annual effluent limitation is based on the LC TMDLs. The LC TMDL allocated 0.017 metric tons per year or 37.47 pounds per year to the Joseph C. McNeil Generating Station.

This new, annual WLA remains unchanged from the current permit. The WLA was assigned by the 2016 Lake Champlain Phosphorus TMDL. The WLA was initially calculated for the 2002 Lake Champlain Phosphorus TMDL by using an effluent TP concentration of 0.1 mg/L at the Monthly Average discharge limitation of S/N 002 of 0.125 MGD. The 2016 TMDL used a slightly different conversion factor which reduced this WLA, and then further decreased the WLA by rounding down to the nearest hundredth of a pound. To convert units of the WLA from metric tons to pounds for the annual, mass-based TP permit limit, the following equation was used and the resulting WLA rounded down to the nearest hundredth of a pound:

$$(0.017 \text{ mt/yr}) (2204.62\text{lbs/mt}) = 37.47 \text{ lbs/yr}$$

The LC TMDL includes WLAs for WWTFs expressed as total annual mass loads. Compliance with the annual limit will be calculated each month using the Running Total Annual Pounds Calculation (Condition I.B.4. of the permit), rather than once at the end of the calendar year. The LC TMDL does not include monthly average concentration effluent limits for WWTFs or this facility. State law (10 V.S.A. 1266a) requires that, “No person directly discharging into the drainage basins of Lake Champlain or Lake Memphremagog shall discharge any waste that contains a phosphorus concentration in excess of 0.80 milligrams per liter on a monthly average basis.” Therefore, in addition to the annual mass load effluent limitation required by the TMDL, the permit must also include a monthly average concentration limit for phosphorus. While the WLA in the TMDL was calculated based on a TP effluent concentration of approximately 0.1 mg/L, the permit does not include 0.1 mg/L as the concentration effluent limitation because a permittee may not need to achieve 0.1 mg/L to ensure compliance with the WLA established in the TMDL. Rather the permit includes a monthly average concentration limit for phosphorus of 0.80 mg/L to ensure compliance with state law and to recognize seasonal variations in the facility’s discharge. It is important to note that because the annual mass load and average monthly concentration limits are not mathematically consistent in the permit, meeting a 0.1 mg/L concentration limit at design flows will not result in meeting the annual mass limit.

The permittee must comply with both limitations and, as required by the permit, must operate the facility to meet the more restrictive limitation, which may vary depending upon discharge flows at the facility. If the facility is operating at design flows, the annual mass load limitation will be the more restrictive limitation. However, if the facility is operating at low flows, the monthly average concentration limit may be the more restrictive limitation.

Monthly sampling for total phosphorus is required.

Condition I.B.5 of this draft permit requires the submission of monitoring reports to the Secretary specific to tracking TP in the discharge. A report that documents the annual TP discharged from the facility, summarizes phosphorus removal optimization and efficiencies, and tracks trends relative to the previous year shall be attached to the December WR-43 form. The annual and monthly TP loads discharged from the facility shall also be reported electronically with other required parameters.

Analysis in Support of Phosphorus Limit:

The Secretary is using the WLA from the LC TMDL¹ as the water quality based effluent limitation (WQBEL) for phosphorus for this permit. Because this is the first permit issued to this facility under the new LC TMDL and the TMDL is less than five years old², an analysis of the assumptions underlying the TMDL is not required. *In re Montpelier WWTF Discharge*

¹ Available at:

https://ofmpub.epa.gov/waters10/attains_impaired_waters.show_tmdl_document?p_tmdl_doc_blobs_id=79000

² The LC TMDL was issued June 17, 2016.

Permit, 2009 WL 4396740, 6, 9-10 (Vt. Env'tl. Ct. June 30, 2009) (stating that it “probably would have been meaningless to engage in further analysis” of the 2002 Lake Champlain TMDL a mere year and a half after its adoption, while also holding that when issuing a permit more than five years after the adoption of a TMDL, ANR must assess whether the past assumptions upon which the WLA was based upon “continue to have a basis of reliability”). Notwithstanding the fact that an analysis is not required, the Agency provides the following.

Using the WLA from the LC TMDL as the phosphorus WQBEL in the permit is appropriate because the State is making significant progress toward meeting the assumptions upon which the WLA is based.

First, the State has largely met the milestones in the LC TMDL Accountability Framework³ and is actively working to meet those that are still outstanding. For 2016, EPA has already given Vermont an “excellent” report card for meeting milestones by December 30, 2016 (see below). For 2017, as outlined in the 2018 Vermont Lake Champlain Phosphorus Total Maximum Daily Loads Accountability Framework Report⁴, the State has completed a majority of the milestones in the LC TMDL Accountability Framework due by December 30, 2017 and is actively working to complete those that are still outstanding. While not every milestone was completed by December 30, 2017, this is not sufficient to undermine the assumption that reductions in other sectors will occur in the future. For example, while the “Developed Lands General Permit” has not yet been issued, the State is actively working to adopt the rules necessary to issue and implement this permit, and the date by which applicants must apply for coverage under the permit – October 1, 2023 – has not changed. Thus, despite a delay in issuance of this permit, it is still appropriate to assume that reductions will be achieved in this sector based upon the timeframe envisioned when the LC TMDL was issued.

Second, the EPA’s assessment of the State’s progress under the LC TMDL has found that the State is making satisfactory progress. EPA’s “overall assessment is that Vermont has made excellent progress in achieving the milestones in the [LC TMDL] Accountability Framework” through December 30, 2016.⁵ EPA’s next “report card” is expected within a couple months. If EPA finds that the State’s progress is not satisfactory, EPA may, amongst other things, revise the TMDLs to reallocate additional load reductions from nonpoint to point sources (i.e. create more stringent WLAs). EPA has taken no such actions, but rather, has thus far provided positive assessment of the State’s compliance with the LC TMDL Accountability Framework. Therefore, the State has nothing from EPA indicating that the assumptions upon which the WLA was developed are no longer reliable.

With so little time having passed since adoption of the LC TMDL, with the State having completed or working to complete milestones, and with positive reports thus far from EPA, there is no reason to believe that the assumptions upon which the WLA was developed – including that discharges in other sectors will be reduced in the future – are no longer valid. Therefore, it is appropriate to establish the phosphorus WQBEL for this facility based upon its

³ For the Accountability Framework, see pages 54-59 of the LC TMDL.

⁴ Submitted by the State to EPA on March 7, 2018; available at:

<http://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2018VermontLakeChamplainPhosphorusTMDLAccountabilityFrameworkReport.pdf>

⁵ Letter dated February 15, 2017 from EPA Acting Regional Administrator Deborah A. Szaro to Secretary of Natural Resources Julie Moore and Secretary of Agriculture, Food and Markets Anson Tebbetts.

WLA in the LC TMDL.

Phosphorus Optimization and Elimination/Reduction Plans:

To ensure the facility is operating as efficiently as possible for purposes of phosphorus removal, Condition I.B.2 of the permit requires that within 120 days of the permit effective date, the permittee shall develop or update (as appropriate), and submit to the Secretary, a Phosphorus Optimization Plan (POP) to increase the facility's phosphorus removal efficiency by implementing optimization techniques that achieve phosphorus reductions using primarily existing facilities and equipment. The techniques to be evaluated may include operational process changes to enhance biological or chemical phosphorus removal, and evaluation of alternatives to phosphorus containing chemicals (primarily TSP (trisodium phosphate) and DSP (disodium phosphate)).

The facility shall have 12 months from the permit effective date to optimize removal of total phosphorus. If, after the 12-month optimization period, the facility's actual TP loads reach or exceed 80% of the LC TMDL WLA for the facility, based on the facility's 12-month running annual load calculated using the Phosphorus Load Calculation (Condition I.B.4 of the permit) the permittee shall, within 90 days of reaching or exceeding 80% of the LC TMDL WLA for the facility, develop and submit to the Secretary a projection based on the facility's current operations and expected future loadings of whether it will exceed its WLA during the permit term.

If the facility is not projected to exceed its WLA within the permit term, the facility shall reassess when it is projected to reach its WLA prior to permit renewal and submit that information with its next permit application. If the facility is projected to exceed its WLA during the permit term, the permittee shall submit a Phosphorus Elimination/Reduction Plan (PERP) within 6 months to the Secretary to ensure the facility continues to comply with its WLA. The PERP shall be treated as an application to amend the permit, and therefore, shall be subject to all public notice, hearing, and comment provisions, in place at the time the plan is submitted, that are applicable to permit amendments. The facility shall revise the PERP, if required by the Secretary.

2. Total Nitrogen (TN) (S/N 001)

To gather data on the amount of Total Nitrogen (TN) in this discharge and its potential impact on the receiving water, a bi-annual "monitor only" requirement for Total Nitrogen (TN), Nitrate/Nitrite (NO_x), Total Ammonia Nitrogen (TAN) and Total Kjeldahl Nitrogen (TKN) have been included in this permit. TN is a calculated value based on the sum of NO_x and TKN, and, shall be reported as pounds, calculated as:

$$\text{Average TN (mg/L)} \times \text{Total Daily Flow} \times 8.34$$

$$\text{where, TN (mg/L)} = \text{TKN (mg/L)} + \text{NO}_x \text{ (mg/L)}$$

Per EPA excess nitrogen (N) and phosphorus (P) are the leading cause of water quality degradation in the United States. Historically nutrient management focused on limiting a

single nutrient—phosphorus or nitrogen—based on assumptions that production is usually phosphorus limited in freshwater and nitrogen limited in marine waters. Scientific research demonstrates this is an overly simplistic model. The evidence clearly indicates management of both phosphorus and nitrogen is necessary to protect water quality. The literature shows that aquatic flora and fauna have differing nutrient needs, some are P dependent, others N dependent and others are co-dependent on these two nutrients.

Like P, N promotes noxious aquatic plant and algal growth. High concentrations of P and N together cause greater growth of algae than P alone. The relative abundance of these nutrients also influences the type of species within the community. Furthermore, a high N-to-P ratio may exacerbate the growth of cyanobacteria, while elevated levels of nitrogen increase toxicity in some cyanobacteria species. Given the dynamic nature of all aquatic ecosystems, for the State to fully understand the degradation to water quality it is necessary to limit P and monitor bioavailable N (including nitrate, ammonium, and certain dissolved organic nitrogen compounds).

Facilities with design flow greater than 1 MGD will complete monthly monitoring unless more frequent sampling is already required by the permit. WWTF Facilities with design flows less than 1 MGD will complete quarterly, unless more frequent sampling is already required by the permit. This facility does not treat nitrogen containing wastes and will complete monitoring twice a year. Samples will be collected in both the summer (August/September) and the winter (January/February) in order to capture seasonal variability in the effluent.

Total Nitrogen monitoring is at a twice a year frequency for this facility.

For more information, see:

<https://www.epa.gov/sites/production/files/documents/nandpfactsheet.pdf>.

3. **Total Kjeldahl Nitrogen (TKN) (S/N 001)** – TKN is the sum of nitrogen in the forms of ammonia (un-ionized (NH_3) and ionized (NH_4^+)), soluble organic nitrogen, and particulate organic nitrogen. To gather data on the amount of TKN in this discharge and its potential impact on the receiving water, a biannual “monitor only” requirement has been included in the draft permit.
4. **Nitrate/Nitrite (NO_x) (S/N 001)** – Nitrite and nitrate are oxygenated forms of nitrogen. To gather data on the amount of NO_x in this discharge and its potential impact on the receiving water, a biannual “monitor only” requirement has been included in the draft permit.
5. **Total Ammonia Nitrogen (TAN) (S/N 001)** – Ammonia has two forms of nitrogen, un-ionized (NH_3) and ionized (NH_4^+). TAN is the sum of both forms. To gather data on the amount of TAN in this discharge and its potential impact on the receiving water, a biannual “monitor only” requirement has been included in the draft permit.
6. **Temperature (S/N 001)** – The previous limitation 99°F maximum day remains unchanged. In accordance with Section 2-04 of the Vermont Water Quality Standards, this permit establishes a mixing zone in the Winooski River for temperature not to exceed 200 feet from the outfall. Within the mixing zone, Section 3-02.1 is waived up to the temperature discharge limitation of 99°F. Continuous monitoring remains required.

7. **Free Available Chlorine (S/N 001)** – The previous Free Available Chlorine limits of 0.2 mg/l, monthly average, and 0.5 mg/l, maximum day, were not protective of VWQS. Since VWQS are expressed in terms of Chlorine, and since Free Available Chlorine is contained within Total Residual Chlorine, new limits protective of VWQS for Total Residual Chlorine are proposed. The Free Available Chlorine limits are being removed from the permit requirements.
8. **Total Residual Chlorine (S/N 001)** –New limits for Total Residual Chlorine (TRC) of 0.28 mg/l Maximum Day and 0.2 mg/l Monthly Average are set to ensure compliance with the Vermont Water Quality Standards. Monitoring requirement remains daily and the discharge of chlorine containing wastes remains limited to 2 hours per day.

Under typical operating conditions, the levels of TRC required to maintain proper operating conditions in the cooling system is quickly attenuated in the cooling ponds due to the high temperature of the cooling water. If this water is held for a minimum of three hours, then it is not necessary to test the effluent for TRC prior to discharge. However, if higher doses of chlorinated chemicals are required to treat an acute problem, or if the water is held for less than three hours it is necessary to test for TRC. A TRC sample shall also be collected during the next discharge in order to provide sufficient data to calculate a monthly average. Whether or not testing is conducted shall be recorded on the monthly reports.

9. **Total Metals (Cd,Cr,Cu,Fe,Pb,Ni,Zi) (S/N 001)** –The permit retain the quarterly monitoring requirements for the following total metals: Cadmium, Chromium, Copper, Iron, Lead, Nickel and Zinc.
10. **Annual Monitoring** – In order to more accurately characterize the reasonable potential of discharges from this facility to violate VWQS monitoring requirements have been included in this permit for the pollutants included in Appendix J, Table 2 of 40 CFR Part 122, for pollutants required annually by 40 CFR § 122.21(j) as well as parameters needed to interpret the pollutant data. During the first year of the permit monitoring will be conducted for the pollutants found in Appendix J, Table 2 of 40 CFR Part 122, pollutants required annually by 40 CFR § 122.21(j) as well as parameters needed to interpret the pollutant data. For the subsequent years monitoring will be required for the metals (antimony, arsenic, beryllium, cadmium, copper, lead, nickel, selenium, silver, thallium and zinc) included in Appendix J, Table 2 of 40 CFR Part 122 (see Attachment A), as well as for the receiving water hardness, receiving water pH, effluent temperature, effluent pH, Total Dissolved Solids, and Dissolved Oxygen.

E. Special Conditions

1. **Laboratory Proficiency Testing** - To ensure there are adequate laboratory controls and appropriate quality assurance procedures, the Permittee shall conduct an annual laboratory proficiency test for the analysis of all pollutant parameters performed within their facility laboratory and reported as required by their NPDES permit. Proficiency Test samples must be

obtained from an accredited laboratory or as part of an EPA DMR-QA study. Results shall be submitted to the Secretary by December 31, annually.

2. **Electronic Reporting** - The EPA recently promulgated a final rule to modernize the Clean Water Act reporting for municipalities, industries, and other facilities by converting to an electronic data reporting system. The final rule requires the inclusion of electronic reporting requirements in NPDES permits that become effective after December 21, 2015. The rule requires that NPDES regulated entities that are required to submit discharge monitoring reports (DMRs), including majors and nonmajors, individually permitted or covered by a general permit, must do so electronically after December 2016. The Secretary has created an electronic reporting system for DMRs and has recently trained facilities in its use. As of December 2020, these NPDES facilities will also be expected to submit additional information electronically as specified in Appendix A in 40 CFR part 127.
3. **Reopener** - This draft permit includes a reopener whereby the Secretary reserves the right to reopen and amend the permit to implement an integrated plan to address multiple Clean Water Act obligations.

A. **Reasonable Potential Analysis**

The Secretary has conducted a reasonable potential analysis, which is attached to this Fact Sheet as Attachment A. Based on this analysis, the Secretary has determined that the available data does not clearly indicate any Reasonable Potential to cause an exceedance of VWQS as this facility is currently operated. However, the data available was limited in usefulness due to age, analysis methodology and in the availability of data for some pollutants. Additional monitoring is recommended so that these analyses can be repeated with increased robustness during the next permit issuance cycle. It was necessary to develop new WQBELs for Chlorine.

Recommended Biological and Water Quality Monitoring:

No additional instream monitoring by this facility is recommended.

Recommended Effluent Monitoring:

In addition to the monitoring required in the current permit, the following monitoring is suggested for inclusion in the renewed permit to provide additional data to support future Reasonable Potential Determinations:

- Biannual “monitor only” requirements for Nitrate/Nitrite (NO_x), Total Ammonia Nitrogen (TAN) and Total Kjeldahl Nitrogen (TKN) are suggested for inclusion in this permit. These samples should be collected during summer (August/September) and winter (January/February) seasons to capture seasonal variability in the effluent.
- The EPA priority metals should be monitored annually. These samples should be collected during alternating summer and winter seasons to capture seasonal variability.
- As shown in the attached WQBEL memo, the new permit should include Daily Maximum Total Residual Chlorine Limit of 0.28 mg/l and an Average Monthly Total Residual Chlorine Limit of 0.2 mg/l. The existing Free Available Chlorine Limits should be

removed from the permit because the new Total Residual Chlorine Limit is more protective of aquatic biota and because this facility has not reported a measurable discharge of Free Available Chlorine in the last 5 years. Total Residual Chlorine monitoring requirements remain at daily and the discharge of chlorinated wastes remains limited to two hours per day. TRC testing is not required under typical conditions if chlorinated cooling tower wastes are held for a minimum of three hours.

Conclusion:

After review of all available information it has been determined that there is not a reasonable potential for the discharge to cause or contribute to a water quality violation, and as such, the development of WQBELs other than for Chlorine, will not be necessary. Given the dilution (IWC at 7Q10 is = 0.005 (<1%)), this discharge does not appear to cause, have a reasonable potential to cause, or contribute to an instream toxic impact or instream excursion above the water quality criteria.

VIII. Procedures for Formulation of Final Determinations

The public comment period for receiving comments on this draft permit is from **February 5, 2021 through March 8, 2021** during which time interested persons may submit their written views on the draft permit. All written comments received by 4:30 PM on **March 8, 2021** will be retained by the Secretary and considered in the formulation of the final determination to issue, deny or modify the draft permit. The period of comment may be extended at the discretion of the Secretary.

Per Vermont Act 150, public comments concerning draft permits must be submitted via the Environmental Notice Bulletin (ENB) for all applications deemed administratively complete after January 1, 2018. In addition to providing a portal for submitting public comments, the ENB website presents details on the processing history, draft permit documents for review, and can be used to request public meetings. The ENB public site is <http://enb.vermont.gov> and the DEC ENB information page is <http://dec.vermont.gov/permits/enb>.

NPDES permits are considered Type 1 permits under Act 150 and are subject to a 30-day public comment period. All comments received within the period described above will be considered by the Department of Environmental Conservation in its final ruling to grant or deny authorization to discharge. Any person who has commented on the draft permit may, within 30 days of the final ruling by the Department of Environmental Conservation to grant or deny authorization to discharge, appeal the ruling to the Environmental Court pursuant to 10 V.S.A. Chapter 220.

**Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
1 National Life Drive 2 Main
802-828-1535**

A. MEMORANDUM

Prepared by: John Merrifield, Wastewater Program (WWP)



Cc: Amy Polaczyk, Manager, WWP
Bethany Sargent, Manager, Monitoring and Assessment Program (MAP)
Rick Levey, MAP

Date: May 18, 2020

Subject: Reasonable Potential Determination for the Joseph C. McNeil Generating Station

I. Facility Information:

Joseph C. McNeil Generating Station
111 Intervale Rd, Burlington, VT
Permit No. 3-1219
NPDES No. VT0020401
Facility Location: 44.49322, -73.2084 (NAD 83)
Approximate Outfall Location: 44.49170, -73.20200 (NAD 83)

II. Hydrology:

Receiving water: Winooski River
Facility Design Flow: 0.500 MGD = 0.774 CFS
Estimated 7Q10¹ = 147.4 CFS
Estimated LMM² = 483.6 CFS
Instream Waste Concentration at 7Q10 Flow (IWC-7Q10) = 0.005 (<1%)
Instream Waste Concentration at Low Median Monthly Flow (IWC-LMM) = 0.002 (<1%)

The Burlington Electric Department owns and operates the Joseph C. McNeil Generating Station which treats the effluent water in the following manner: Process waters are first oxidized through an aerator-degasifier system then pass through manganese green sand filters. Treated water is then routed either to the cooling tower make-up tank and/or the boiler feedwater treatment system. Boiler feedwater make-up receive additional treatment through a reverse osmosis system. Steam turbine condensate is treated through mixed bed demineralizers prior to reintroduction into the boiler water system. Plant floor drains are routed to a gravity plate oil separator prior to discharge into the wastewater mixing basin.

The Winooski River downstream of the Joseph C. McNeil Generating Station discharge is a Class B (2) water and is designated as a seasonally Warm Water (June 1-September 30) and seasonally Cold Water (October 1-May 31) Fish

¹ Using daily mean streamflows, the flow of the receiving water equal to the minimum mean flow for seven consecutive days, that has a 10% probability of occurring in any given year.

² "Low median monthly flow". Using daily mean streamflows, the median monthly flow of the receiving water for that month having the lowest median monthly flow.

Habitat. At the point of discharge, the river has a contributing drainage area of 1053.0 square miles. This facility does not discharge treated human waste and therefore does not have a waste management zone (WMZ).

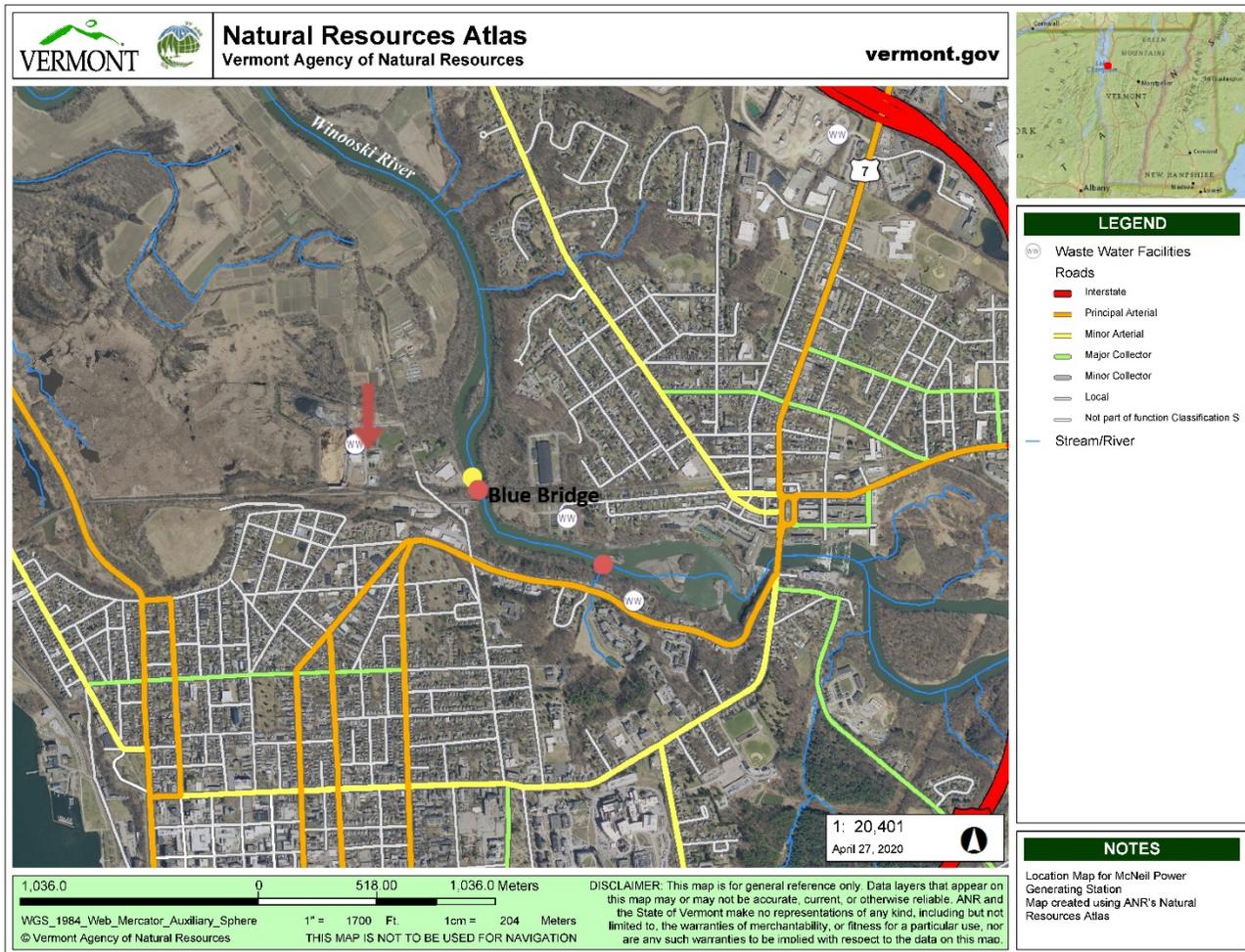


Figure 1. Winooski River near the Joseph C. McNeil Generating Station. The facility location is represented by a white dot containing "WW" with a red arrow., the outfall location is represented by a yellow dot, and upstream monitoring stations are shown with red dots(River Mile (RM)9.0 and RM 9.3). The location of sampling station RM 9.4 is unclear due to the split in the channel. Downstream sampling stations are not shown due to distance (~6.8 river miles). Also shown in this figure are the location of the "Blue Bridge" where temperature measurements were taken, and the City of Winooski's WWTF and the City of Burlington's River WWTF (the white dots containing "WW" not accompanied by the red arrow. The Winooski WWTF is located on the north side of the river and the Burlington River WWTF is located on the south side of the river. Figure produced with the Vermont Agency of Natural Resources Natural Resource Atlas (<https://anrmaps.vermont.gov/websites/anra5/>).

This memo is organized into the following sections:

- Summary of Effluent Data for the Joseph C. McNeil Generating Station
- Biological Assessments and Ambient Chemistry Data for the Winooski River above and below the Joseph C. McNeil Generating Station
- Assessment of Reasonable Potential (RP) of the Joseph C. McNeil Generating Station discharge to exceed Vermont Water Quality Standards (VWQSS)

III. Effluent Data for the Joseph C. McNeil Generating Station

A. Reported Effluent Data Summary:

Effluent data reported by the Joseph C. McNeil Generating Station is shown below in Table 1.

Table 1. Effluent Data for the Joseph C. McNeil Generating Station from 2/28/2015 to 12/31/2019.

| Parameter | Current Permit Limit | Minimum Value | Average Value | Maximum Value | n |
|--|-----------------------------|----------------------|----------------------|----------------------|----------|
| S/N 001 | | | | | |
| Annual Flow (MGD) (Monthly Average) | 0.365 | 0.03 | 0.14 | 0.29 | 59 |
| Annual Flow (MGD) (Daily Max) | 0.5 | 0.09 | 0.24 | 0.44 | 59 |
| Water Temp (°F) | 99 | 65.00 | 91.32 | 99.00 | 59 |
| pH | 6.5-8.5 | 5.80 | 7.92 | 8.90 | 59 |
| Turbidity (NTU) | monitor only | 0.20 | 1.44 | 6.13 | 59 |
| Free Available Chlorine (mg/L) Monthly Average | 0.2 | 0.00 | 0.00 | 0.00 | 59 |
| Free Available Chlorine (mg/L) Daily Max | 0.5 | 0.00 | 0.00 | 0.00 | 59 |
| Total Residual Chlorine (mg/L) | monitor only | 0.00 | 0.00 | 0.00 | 59 |
| Total Metal (Cd, Cr, Cu, Fe, Zn) (mg/l) | monitor only | 0.04 | 0.11 | 0.29 | 59 |
| Total Cadmium (mg/l) | monitor only | 0.00 | 0.00 | 0.00 | 59 |
| Total Chromium (mg/l) | monitor only | 0.01 | 0.01 | 0.01 | 59 |
| Total Copper (mg/l) | monitor only | 0.01 | 0.03 | 0.06 | 59 |
| Total Iron (mg/l) | monitor only | 0.02 | 0.04 | 0.19 | 59 |
| Total Lead (mg/l) | monitor only | 0.00 | 0.00 | 0.00 | 59 |
| Total Nickel (mg/L) | monitor only | 0.01 | 0.03 | 0.24 | 59 |
| Total Zinc (mg/l) | monitor only | 0.02 | 0.02 | 0.02 | 59 |
| S/N 002 | | | | | |
| Annual Flow (MGD) (Monthly Average) | 0.125 | 0.007 | 0.02 | 0.049 | 58 |
| Annual Flow (MGD) (Daily Max) | 0.5 | 0.021 | 0.07 | 0.115 | 58 |
| Total Suspended Solids (mg/L) Daily Max | 30 | 1.00 | 2.77 | 9.00 | 58 |
| Total Phosphorus (mg/l) (Monthly Average) | 0.8 | 0.01 | 0.04 | 0.16 | 58 |
| Total Phosphorus (lbs/year) | 37.47 | 1.05 | 1.46 | 1.86 | 5 |
| Oil and Grease (mg/L) | 10 | 2.00 | 2.07 | 3.70 | 58 |

B. Whole Effluent Toxicity Data Summary:

No Whole Effluent Toxicity (WET) limits or tests were included in the previous permit and therefore no WET data is available for analysis.

Due to the lack of toxic pollutants in toxic amounts in the effluent for this facility it is not recommended to include WET testing or limits in the new permit.

C. Biological Assessments and Ambient Chemistry Data for the Winooski River above and below the Joseph C. McNeil Generating Station

1. MAP assessment:

MAP maintains the VTDEC assessment database, an EPA-required database which describes the conditions of Vermont's surface waters with respect to their attainment of VWQS. For the Winooski River segment to which this facility discharges, the database indicates the receiving water does not fully support all designated uses. MAP maintains the VTDEC assessment database, an EPA-required database which describes the conditions of Vermont's surface waters with respect to their attainment of VWQS. The Winooski River segment to which this facility discharges, from the mouth to the Winooski Dam (~10.5 miles) is impaired due to E.coli and is listed on the 2018 Impaired 303(d) List. The Winooski River from the mouth up to Alder Brook is also on the 2016 Stressed Waters List and has the problems of stormwater, industry, agriculture and the pollutants sediments, nutrients, temperature, stormwater and toxic compounds prohibit the waters from attaining a higher water quality.

2. Biological Assessments:

Biological assessments were not conducted for this facility.

3. Ambient Chemistry Data:

The most recent ambient chemistry data available from VTDEC sampling is from 9/3/2010, when surface waters were sampled above the outfall at River Mile (RM) 9, 9.3 and 9.4 and below the outfall at RM 2.2 and 2.3. No data was available from LaRosa volunteers. The upstream sampling locations are approximately 0.05 to 0.5 miles upstream and the downstream sampling locations are approximately 6.8 miles downstream from the Joseph C. McNeil Generating Station WWTF outfall (Figure 1). The Winooski WWTF discharges below RM 9.3 so data from RM 9.3 and 9.4 does not represent the influence that this facility has on the upstream receiving waters. The downstream monitoring data is also subject to many influences besides the Joseph. C. McNeil Generating Station. Analyses performed in preparation of this memo were conducted with the best data available.

Data representativeness are assessed by evaluating the observed flow conditions from field sheets - whether measured or qualitatively described - at which samples were collected. Other contemporaneous streamflow data, such as the U.S. Geological Survey stream gage network, are also taken into consideration where proximal and representative of the hydrologic conditions at the time (e.g., unimpacted by artificial flow regulation). The downstream sampling location at this site is the most sensitive location, and the sampling results are determined to be representative of low flows based upon review of available streamflow observations. Thus, the data presented below are relevant for inclusion in this analysis. Water chemistry measures of relevant parameters for this assessment are summarized in Tables 2a and 2b.

Data used to evaluate in-stream chemistry is collected under low flow conditions (typically August or September) when turbidity is low, and no precipitation has been observed for 3 days.

Table 2a. Surface-water quality above and below the Joseph C. McNeil Generating Station Wastewater Treatment Facility collected by VTDEC.

| Visit Date | Above or Below (A/ B) | River Mile | Alkalinity (mg/l) | Conductivity (umho/cm) | Chloride (mg/l) | Dissolved Oxygen (mg/l) | Dissolved Oxygen Saturation (%) | Dissolved Phosphorus (ug/l) | pH | Temp (deg C) | Temp (deg F) | Total Ammonia Nitrogen (mg/l) | Total Color - visual method (PCU) | Total Hardness (mg/l) | Total Nitrate/Nitrite Nitrogen (mg/l) | Total Nitrogen (mg/l) | Total Phosphorus (ug/l) | Total Sulfate (mg/l) | Turbidity (NTU) |
|------------|-----------------------|------------|-------------------|------------------------|-----------------|-------------------------|---------------------------------|-----------------------------|-----|--------------|--------------|-------------------------------|-----------------------------------|-----------------------|---------------------------------------|-----------------------|-------------------------|----------------------|-----------------|
| 10/15/2008 | B | 2.6 | 64.1 | 241.0 | 28.1 | - | - | 13.8 | - | - | - | - | - | 75.4 | 0.7 | 0.9 | 16.3 | 9.9 | 2.2 |
| 8/19/2010 | B | 2.2 | 59.3 | 221.0 | 23.1 | 6.9 | 83.1 | 7.6 | 7.6 | 24.4 | 75.8 | < 0.05 | 22.5 | 66.1 | 0.7 | 0.8 | 15.6 | 10.5 | 2.8 |
| 8/19/2010 | B | 2.3 | 59.1 | 221.0 | 23.0 | 7.2 | 86.9 | 10.0 | 7.6 | 24.6 | 76.2 | < 0.05 | 17.5 | 67.0 | 0.7 | 0.8 | 16.3 | 10.1 | 2.1 |
| 8/19/2010 | A | 9.0 | 64.7 | 240.0 | 25.6 | 9.2 | 99.9 | 12.5 | 8.2 | 24.9 | 76.8 | < 0.05 | 20.0 | 73.6 | 0.8 | 0.8 | 19.8 | 9.4 | 1.5 |
| 8/19/2010 | A | 9.3 | 64.3 | 239.0 | 25.7 | 8.0 | 97.4 | 9.9 | 8.2 | 24.8 | 76.6 | < 0.05 | 20.0 | 72.6 | 0.8 | 0.9 | 16.2 | 10.3 | 1.7 |
| 8/19/2010 | A | 9.4 | 64.4 | 238.0 | 25.6 | 8.1 | 98.1 | 11.7 | 8.2 | 24.7 | 76.4 | < 0.05 | 20.0 | 73.3 | 0.7 | 0.9 | 16.5 | 10.4 | 1.9 |
| 9/3/2010 | B | 2.2 | 66.3 | 252.0 | 26.7 | 7.8 | 96.3 | 9.1 | 7.9 | 25.5 | 77.9 | < 0.05 | 20.0 | 77.9 | 0.9 | 1.0 | 17.5 | 11.8 | 2.0 |
| 9/3/2010 | B | 2.3 | 66.5 | 250.0 | 26.4 | 8.0 | 99.0 | 9.8 | 7.9 | 25.7 | 78.2 | < 0.05 | 15.0 | 77.5 | 0.8 | 1.0 | 18.1 | 11.9 | 1.9 |
| 9/3/2010 | A | 9.0 | 69.0 | 258.0 | 36.3 | 8.4 | 103.4 | 16.6 | 8.1 | 25.6 | 78.0 | < 0.05 | 17.5 | 80.6 | 0.7 | 0.9 | 18.9 | 11.4 | 1.5 |
| 9/3/2010 | A | 9.3 | 68.2 | 258.0 | 27.8 | 8.4 | 103.6 | 12.6 | 8.1 | 25.6 | 78.1 | < 0.05 | 17.5 | 80.1 | 0.7 | 1.0 | 19.5 | 11.7 | 1.4 |
| 9/3/2010 | A | 9.4 | 69.2 | 258.0 | 27.6 | 8.7 | 108.0 | 15.6 | 8.1 | 25.6 | 78.1 | < 0.05 | 15.0 | 80.8 | 0.8 | 0.9 | 18.6 | 11.5 | 1.4 |

Table 2b. Surface-water quality (metals) upstream and downstream of the Joseph C. McNeil Generating Station Wastewater Treatment Facility collected by VTDEC.

| Visit Date | Above or Below (A/ B) | Station | pH | Total Aluminum (ug/l) | Total Antimony (ug/l) | Total Arsenic (ug/l) | Total Beryllium (ug/l) | Total Cadmium (ug/l) | Total Calcium (mg/l) | Total Chromium (ug/l) | Total Copper (ug/l) | Total Iron (ug/l) | Total Lead (ug/l) | Total Magnesium (mg/l) | Total Manganese (ug/l) | Total Nickel (ug/l) | Total Potassium (mg/l) | Total Selenium (ug/l) | Total Silver (ug/l) | Total Sodium (mg/l) | Total Suspended Solids (mg/l) | Total Thallium (ug/l) | Total Zinc (ug/l) |
|------------|-----------------------|---------|-----|-----------------------|-----------------------|----------------------|------------------------|----------------------|----------------------|-----------------------|---------------------|-------------------|-------------------|------------------------|------------------------|---------------------|------------------------|-----------------------|---------------------|---------------------|-------------------------------|-----------------------|-------------------|
| 10/15/2008 | B | 2.6 | - | 33.0 | < 10 | < 1 | < 1 | < 1 | 24.6 | < 5 | < 10 | 271.0 | < 1 | 3.4 | 54.9 | < 5 | 1.4 | < 5 | < 1 | 16.4 | 1.8 | < 1 | < 50 |
| 8/19/2010 | B | 2.2 | 7.6 | 37.8 | < 10 | < 1 | < 1 | < 1 | 21.1 | < 5 | < 10 | 194.0 | < 1 | 3.2 | 52.8 | < 5 | 1.4 | < 5 | < 1 | 15.1 | - | < 1 | < 50 |
| 8/19/2010 | B | 2.3 | 7.6 | 34.1 | < 10 | < 1 | < 1 | < 1 | 21.5 | < 5 | < 10 | 158.0 | < 1 | 3.2 | 47.1 | < 5 | 1.3 | < 5 | < 1 | 15.0 | - | < 1 | < 50 |
| 8/19/2010 | A | 9.0 | 8.2 | 40.8 | < 10 | < 1 | < 1 | < 1 | 24.0 | < 5 | < 10 | 124.0 | < 1 | 3.3 | 48.3 | < 5 | 1.4 | < 5 | < 1 | 16.9 | - | < 1 | < 50 |
| 8/19/2010 | A | 9.3 | 8.2 | 40.6 | < 10 | < 1 | < 1 | < 1 | 23.6 | < 5 | < 10 | 117.0 | < 1 | 3.3 | 46.5 | < 5 | 1.5 | < 5 | < 1 | 16.7 | - | < 1 | < 50 |
| 8/19/2010 | A | 9.4 | 8.2 | 40.5 | < 10 | < 1 | < 1 | < 1 | 23.9 | < 5 | < 10 | 122.0 | < 1 | 3.3 | 48.1 | < 5 | 1.5 | < 5 | < 1 | 16.6 | - | < 1 | < 50 |
| 9/3/2010 | B | 2.2 | 7.9 | 31.8 | < 10 | < 1 | < 1 | < 1 | 25.2 | < 5 | < 10 | 142.0 | < 1 | 3.6 | 51.3 | < 5 | 1.6 | < 5 | < 1 | 17.5 | - | < 1 | < 50 |
| 9/3/2010 | B | 2.3 | 7.9 | 29.2 | < 10 | < 1 | < 1 | < 1 | 25.0 | < 5 | < 10 | 158.0 | < 1 | 3.7 | 46.7 | < 5 | 1.5 | < 5 | < 1 | 17.7 | - | < 1 | < 50 |
| 9/3/2010 | A | 9.0 | 8.1 | 31.2 | < 10 | < 1 | < 1 | < 1 | 26.0 | < 5 | < 10 | 122.0 | < 1 | 3.8 | 52.6 | < 5 | 1.6 | < 5 | < 1 | 17.9 | - | < 1 | < 50 |
| 9/3/2010 | A | 9.3 | 8.1 | 32.7 | < 10 | < 1 | < 1 | < 1 | 25.8 | < 5 | < 10 | 135.0 | < 1 | 3.8 | 56.1 | < 5 | 1.5 | < 5 | < 1 | 17.9 | - | < 1 | < 50 |
| 9/3/2010 | A | 9.4 | 8.1 | 33.6 | < 10 | < 1 | < 1 | < 1 | 26.0 | < 5 | < 10 | 115.0 | < 1 | 3.9 | 51.0 | < 5 | 1.6 | < 5 | < 1 | 17.8 | - | < 1 | < 50 |

IV. Assessment of Reasonable Potential of the Joseph C. McNeil Generating Station WWTF discharge to exceed Vermont Water Quality Standards

A. Methodology:

A steady-state mass balance approach was used to assess reasonable potential for the potential pollutants of concern based on the methods described in the Technical Support Document for Water Quality-based Toxics Control (TSD; EPA/505/2-90-001). The expected receiving water concentrations (RWC; C_r) of pollutants were calculated according to Equation 1 at critical conditions. If the expected receiving water concentration determined exceeds the applicable Vermont Water Quality Standard, limits must be included in the permit. Tables 3, 4 and 5 present this analysis for the Joseph C. McNeil Generating Station.

$$\text{Equation 1. } C_r = \frac{(Q_e)(C_e) + (Q_s)(C_s)}{Q_r}$$

Where:

C_r = resultant expected receiving water pollutant concentration (mg/L or ug/L)

Q_e = maximum permitted effluent flow (cfs).

C_e = critical effluent pollutant concentration (mg/L or ug/L)

Q_s = stream flow upstream of the point of discharge (cfs). Low Median Monthly flow for nutrients, 7Q10 for applying toxics criteria. When applicable, 30Q10 is used for chronic Total Ammonia Nitrogen assessments.

C_s = critical background in-stream pollutant concentration (units dependent on parameter, typically mg/L or ug/L).

$Q_r = (Q_s + Q_e)$ = resultant in-stream flow, after discharge (cfs)

NPDES regulations at §122.44(d)(1)(ii) require that permit writers consider the variability of the pollutant in the effluent when determining the need for Water Quality-Based Effluent Limits (WQBELs). EPA guidance for permit writers on how to characterize effluent concentrations of certain types of pollutants using a limited data set and accounting for variability is detailed in the TSD. The current analysis uses the TSD procedure to project a critical effluent concentration (C_{etsd}) of the 95th percentile of a lognormal distribution of observed effluent concentrations over 5 years. The 95th percentile is calculated from the effluent data set using the number of available effluent data points (n) for the measured concentration of the pollutant and the coefficient of variation (CV) of the data set to predict the critical pollutant concentration in the effluent. When less than 10 data points are available, the CV is set to 0.6. For less than 10 items of data, the uncertainty in the CV is too large to calculate a standard deviation or mean with sufficient confidence (TSD). The CV and n are used to determine the factor (TSD pg 54) that is multiplied by the maximum observed effluent concentration (C_e) to determine C_{etsd} .

$$\text{Equation 2. } C_{etsd} = \text{TSD}_{\text{factor}} \times C_e$$

Where:

C_{etsd} = Effluent concentration adjusted to 95th percentile value (mg/L or ug/L)

$\text{TSD}_{\text{factor}}$ = Factor based upon EPA TSD Table 3-2, pg 54

C_e = critical (maximum observed) effluent pollutant concentration (mg/L or ug/L)

The Instream Waste Concentration (IWC) is a measure of the effluent dilution and is also used as an estimate of the facility's potential to cause or contribute to an excursion of the VWQS. The IWC equation is the simplification of the flow portion of the mass balance equation (Equation 1) and is shown below in Equation 3:

$$\text{Equation 3. } IWC = \frac{(Q_e)}{(Q_r)}$$

The critical effluent pollutant concentration (C_e) can be multiplied by the IWC to approximate the resultant receiving water concentrations (C_r).

The VWQS set limits on the warming influence of waste stream discharges into receiving waters. The amount of warming allowed is dependent upon the fishery type and the ambient water temperature. Since water changes density due to temperature, flow rates were converted to mass flux rates by calculating the density of water at the appropriate temperature. In order to calculate the potential increase in receiving waters the following equations were used. Subscripts of e, s and r are used to differentiate the values used in the calculations and signify the discharged effluent, upstream receiving water and downstream combined receiving waters respectively as shown in Table 6. Unit conversions were performed, as necessary.

$$\text{Equation 4. } D = 999.84847 + 0.06337563 * T - 0.008523829 * T^2 + 0.00006943248 * T^3 - 0.0000003821216 * T^4$$

Where:

D = Density of water at calculated temperature in kg/m^3

T = Temperature of water in degrees C

This equation was taken from the [ITS-90 Density of Water Formulation for Volumetric Standards Calibration](#)

$$\text{Equation 5. } F = Q * D$$

Where:

F = Mass Flux of water, kg/s

Q = Flow rate in m^3/s

D = Density of Water in kg/m^3

$$\text{Equation 6. } T_r * F_r = T_e * F_e + T_s * F_s$$

Where:

T_r = resultant temperature in the downstream receiving waters

F_r = mass flux of the downstream receiving water

T_e = effluent discharge temperature (Permit Limit)

F_e = mass flux of the effluent

T_s = temperature of upstream water

F_s = mass flux of upstream water

$$\text{Equation 7. } T_r = (T_e * F_e + T_s * F_s) / F_r$$

Where:

T_r = resultant temperature in the downstream receiving waters

F_r = mass flux of the downstream receiving water

T_e = effluent discharge temperature (Permit Limit)

F_e = mass flux of the effluent

Ts = temperature of upstream water

Fs = mass flux of upstream water

This analysis of reasonable potential used the following data and assumptions:

- Average values of observed upstream and downstream chemical data were used for most calculations; exceptions are described below.
- Upstream pollutant concentrations (C_s) and effluent concentrations (C_e) were set equal to one half the Reporting Limit (RL) when data were censored at the Reporting Limit. The reporting limit (RL) is the minimum value reported as a detection.
- Effluent pollutant concentrations (C_e) were set to the maximum observed effluent concentrations * TSD 95th percentile multiplier over the last 5 years of data collected except for E. coli which was set at the instantaneous limit. The symbol C_{etsd} is used to represent this value.
- Hardness for determining hardness-dependent metal criteria is based upon the lowest observed downstream concentration.
- Temperature calculation were performed using an ambient temperature set at the upper limit for the fishery type.

The spreadsheet used for these calculations is part of the permit record and available upon request.

B. Chlorine

The results of mass balance calculations for Chlorine were calculated using Equation 1 are presented in Table 3 below. The reported effluent data does not indicate that there is Reasonable Potential for Chlorine to violate VWQS.

However, the current permit limits for Free Available Chlorine are not protective of VWQS. As a result it is necessary to develop new WQBELs for Chlorine. As shown in the attached WQBEL memo, the new permit should include Daily Maximum Total Residual Chlorine Limit of 0.28 mg/l and an Average Monthly Total Residual Chlorine Limit of 0.2 m/l.

In wastewater chemistry chlorine refers to the aqueous mixture of hypochlorite (ClO^-) and its conjugate, hypochlorous acid (HClO). It can also refer to dissolved chlorine gas (Cl_2) which reacts with water to form hypochlorite/hypochlorous acid. The reactive hypochlorite ions bind to organic matter and other ions in the water. This binding leads to the deactivation of bacteria such as E. coli, but also exerts toxic effects on more desirable lifeforms. Hypochlorite that has bound to matter in the water is unavailable for other reactions.

Chlorine testing in the water and wastewater fields usually refers to two kinds of tests: Free Available Chlorine and Total Residual Chlorine. Free Available Chlorine is the portion of the hypochlorite/hypochlorous acid mix that has not bonded with anything else and which is available to kill bacteria with. Total Residual Chlorine is the whole amount of the hypochlorite/hypochlorous acid mix in the water, both free and bound. Free Available Chlorine is a subset of Total Residual Chlorine.

$$\text{Total Residual Chlorine} = \text{Free Available Chlorine} + \text{Bound Chlorine}$$

$$\text{Total Residual Chlorine} \geq \text{Free Available Chlorine}$$

In a drinking water or HVAC field Free Available Chlorine is tested for because the operators are interested in how much potential the water has to continue to kill harmful bacteria. In wastewater and environmental chemistry, operators are interested in protecting aquatic life by complying with the VWQS. VWQS for chlorine

are expressed in terms of Total Residual Chlorine. A limit on Total Residual Chlorine limits both the bound and the Free Available Chlorine and is equally or more protective of aquatic biota than a Free Available Chlorine limit of the same numerical value.

The existing Free Available Chlorine Limits should be removed because the Total Residual Chlorine limit is more protective of VWQS and because this facility has not reported a detectable level of Free Available Chlorine in their discharge during the previous 5 years. Total Residual Chlorine monitoring requirements remain at daily and the discharge of chlorinated wastes remains limited to two hours per day.

C. Turbidity

The results of mass balance calculations for Turbidity were calculated using Equation 1 are presented in Table 3 below.

D. pH

Insufficient data is available to rigorously calculate the pH change in receiving waters due to the discharge. However, it is possible to examine the downstream monitoring data and no violations of VWQS are observed. The IWC of this discharge is low (0.005 @7Q10), and the effluent is buffered to operate within the permit limits which would help to reduce uncontrolled pH changes. These changes would have significant deleterious effects on the machinery and there is every reason to believe that it would be remedied quickly to avoid damage to the power plant. An existing mixing zone of 200 feet exists to provide for complete mixing. This facility does not have Reasonable Potential to cause a violation of VWQS for pH considering the existing and proposed limits.

Table 3. Mass Balance for Chlorine and Turbidity around the Joseph C. McNeil Generating Station

| | Chlorine (mg/L) | Turbidity (NTU) | Notes |
|--|--|---|--|
| Qs (cfs) | 147.42 | | <i>Estimated 7Q10 flow</i> |
| Qe (cfs) | 0.774 | | <i>permitted effluent discharge</i> |
| Qr = Qs + Qe (cfs) | 148.19 | | <i>Qs+Qe</i> |
| 7Q10 IWC | 0.005 | | <i>Qe/(Qs+Qe)</i> |
| Cs | 0 | 0.89 | <i>upstream pollutant concentration</i> |
| Cetsd | 0.00 | 9.81 | <i>effluent pollutant concentration adjusted by TSD factor (permit limit for E.coli) Values for S/N002 Used.</i> |
| Cr = (CsQs+CetsdQe)/Qr | 0.00 | 0.93 | <i>resultant pollutant concentration in receiving water</i> |
| Temp (deg C) | | | <i>Values used in analysis.</i> |
| pH | | | <i>Values used in analysis.</i> |
| Hardness as CaCO₃ (mg/L) | 72.60 | | <i>Min. Downstream Value</i> |
| Fish Habitat | Cold Water | | <i>Fishery Type</i> |
| | Oncorhynchus (e.g., Rainbow trout) Absent | | <i>Additional Fishery Information</i> |
| VWQS Criteria (2017) | | | |
| Primary Contact Recreation | | N/A VWQS is based on annual dry weather average | |
| Protection of Aquatic Biota - Acute | 0.019 | | |
| Protection of Aquatic Biota - Chronic | 0.011 | 10.00 | |
| Exceedance Calculated? | | | |
| Primary Contact Recreation | | | |
| Protection of Aquatic Biota - Acute | NO | | |
| Protection of Aquatic Biota - Chronic | NO | NO | |

F. Total Metals

The results of mass balance calculations for Total Metals calculated using Equation 1 are presented in Table 4 below.

Table 4. Mass Balance for Metals of Concern around the Joseph C. McNeil Generating Station WWTF

| | unit | Metal (Total) | | | | | | |
|--|--|---------------|--------------|--------|-------|------|--------|------|
| | | Cadmium | Chromium III | Copper | Iron | Lead | Nickel | Zinc |
| Hardness as CaCO ₃ | mg/L | 72.60 | | | | | | |
| Qe | cfs | 0.77 | | | | | | |
| Cetsd | ug/L | 2.2 | 5.6 | 67.2 | 323.0 | 1.1 | 480.0 | 25.3 |
| Qs | cfs | 147.42 | | | | | | |
| Cs (Average) | ug/L | 1 | 3 | 5 | 185 | 1 | 3 | 25 |
| Qr = Qs+Qe | cfs | 148.19 | | | | | | |
| Cr = (QeCetsd+QsCs)/Qr | ug/L | 0.5 | 2.5 | 5.3 | 185.3 | 0.5 | 5.0 | 25.0 |
| Aquatic Biota Acute limit | ug/L | 1.5 | 4390 | 10.8 | none | 64.8 | 358.6 | 93.4 |
| Aquatic Biota Chronic limit | ug/L | 0.7 | 77.1 | 7.4 | 1000 | 2.5 | 39.9 | 92.6 |
| Human Health, Consumption of water and organisms limit | ug/L | none | none | none | 300 | none | none | none |
| Human Health, Consumption of organisms only limit | ug/L | none | none | none | none | none | none | none |
| Water Quality Standard Exceedances | No Exceedances were calculated based upon available data. | | | | | | | |

No exceedances of VWQS were calculated from the available dataas shown in Table 4. However, the data set used to perform the calculations is limited in the number of measurements, and the techniques used to perform Arsenic and Thallium measurements have Reporting Limits that are greater than the VWQS. Annual discharge monitoring for the EPA priority metals should be added to the permit requirements, receiving water quality should continue to be monitored, and the potential for metals in the effluent to violate VWQS should be revisited as analysis methodology improves.

G. Nutrients

The results of mass balance calculations for Total Phosphorus calculated using Equation 1 are presented in Table 5 below.

Table 5. Assessment of Total Phosphorus of Concern around the Joseph C. McNeil Generating Station

| | Total Phosphorus (ug/L) | Notes |
|---|--------------------------------|---|
| Qs (cfs) | 483.64 | Estimated LMM flow |
| Qe (cfs) | 0.774 | permitted effluent discharge |
| Qr = Qs + Qe (cfs) | 484.42 | Qs+Qe |
| IWC | 0.0016 | Qe/(Qs+Qe) |
| Cs | 16.76 | upstream pollutant concentration (average) |
| Cetsd | 240 | effluent pollutant concentration adjusted by TSD method. (S/N 002) |
| Cr = (CsQs+CetsdQe)/Qr | 17.12 | calculated resultant downstream pollutant concentration |
| Stream Type | B2 Warm Water, Medium-Gradient | |
| Calculated Instream Contribution from Effluent | 0.35 | difference between observed upstream concentration and calculated resultant downstream concentration. Mass Balance Method |
| VWQS Criteria (2017) | | |
| Threshold Criteria | 27 | |
| VWQS Exceeded? | No | |

1. Total Nitrogen (TN):

TN is the sum of nitrate, nitrite, ammonia, soluble organic nitrogen, and particulate organic nitrogen.

TN is a calculated value based on the sum of NO_x and TKN, and, shall be reported as pounds, calculated as:

Average TN (mg/L) x Total Daily Flow (MGD) x 8.34 = Pounds TN/day

where, TN (mg/L) = TKN (mg/L) + NO_x (mg/L)

Per EPA excess nitrogen (N) and phosphorus (P) are the leading cause of water quality degradation in the United States. Historically nutrient management focused on limiting a single nutrient—phosphorus or nitrogen—based on assumptions that production is usually phosphorus limited in freshwater and nitrogen limited in marine waters. Scientific research demonstrates this is an overly simplistic model. The evidence clearly indicates management of both phosphorus and nitrogen is necessary to protect water quality. The literature shows that aquatic flora and fauna have differing nutrient needs, some are P dependent, others N dependent and others are co-dependent on these two nutrients.

Like P, N promotes noxious aquatic plant and algal growth. High concentrations of P and N together cause greater growth of algae than P alone. The relative abundance of these nutrients also influences the type of species within the community. Furthermore, a high N-to-P ratio may exacerbate the growth of cyanobacteria, while elevated levels of nitrogen increase toxicity in some cyanobacteria species. Given the dynamic nature of all aquatic ecosystems, for the State to fully understand the degradation to water quality it is necessary to limit P and monitor bioavailable N (including nitrate, ammonium, and certain dissolved organic nitrogen compounds).

This facility discharges cooling water and is not a likely source of nitrogen. No limits were included in previous permits and discharge information is not available. To gather data on the amount of Total Nitrogen (TN) in this discharge and its potential impact on the receiving water, including biannual “monitor only” requirements for Nitrate/Nitrite (NO_x), Total Ammonia Nitrogen (TAN) and Total Kjeldahl Nitrogen (TKN) are suggested for inclusion in this permit. These samples should be collected during in both the summer (August/September) and winter (January/February) seasons to capture seasonal variability in the effluent.

2. Total Phosphorus (TP):

The potential impacts of phosphorus discharges from this facility to the receiving water have been assessed in relation to the narrative criteria in §29A-302(2)(A) of the 2017 VWQS, which states:

In all waters, total phosphorous loadings shall be limited so that they will not contribute to the acceleration of eutrophication or the stimulation of the growth of aquatic biota in a manner that prevents the full support of uses.

To interpret this standard, the Secretary relies on a framework which examines TP concentrations in relation to existing numeric phosphorus criteria and response criteria in §29A-306(a)(3)(c) of the VWQS, for streams that can be assessed using macroinvertebrate biocriteria. Under this framework, a positive finding of compliance with the narrative standard can be made when nutrient criteria are attained, or when specific nutrient response variables; pH, Turbidity, Dissolved Oxygen, and aquatic life use, all display compliance with their respective criteria in the Water Quality Standards. To assist in determining whether this facility’s TP discharge is in compliance with VWQS the analysis is broken into an analysis of the TP numeric standard and an analysis of the Nutrient Response Conditions needed to determine compliance with the narrative standard.

a) Total Phosphorus Numeric Analysis:

The TP concentrations in the Winooski River are less than or equal to the 2017 nutrient criteria threshold of 27 ug/L Total Phosphorus in a Class B Warm Water, Medium-Gradient stream. The calculated change in the in-stream TP concentration attributable to the Joseph C. McNeil Generating Station is 0.35 ug/L. This calculation is presented above in Table 5.

b) Total Phosphorus Nutrient Response Conditions Analysis:

The lack of biological assessments in the receiving water precludes a full analysis of Total Phosphorus Nutrient Response Conditions.

The Combined Nutrient Response is determined by comparing values for pH, turbidity, Dissolved Oxygen (both concentration and percent saturation) and the aquatic biota to VWQS. No aquatic biota data is available, however, by comparing the remaining parameters to the monitoring data shown in Table 2a it is seen that the receiving water meets the VWQS for available data.

c) Total Phosphorus Reasonable Potential Determination:

The numeric criteria for TP are not exceeded by when calculated at this facility's full design flow and with the receiving water at 7Q10 conditions. Therefore, this facility does not have reasonable potential to violate VWQS.

This facility is subject to 10 V.S.A. 1266a, which reads "No person directly discharging into the drainage basins of Lake Champlain or Lake Memphremagog shall discharge any waste that contains a phosphorus concentration in excess of 0.80 milligrams pper liter on a monthly average basis. Discharges of less than 200,000 gallons per day, permitted on or before July 1, 1991, shall not be subject to the requirements of this subsection." Therefore, the permit must include a Total Phosphorus limit of 0.8 mg/L.

This facility is subject to the 2016 Lake Champlain Phosphorus TMDL. That document assigns the facility an Annual Waste Load Allocation to 0.017 mt/year or 37.47 lbs/year.

H. Increase In Ambient Temperature Due to Cooling Water Discharge:

VWQS has provisions to protect aquatic life from excessive changes in temperature due to the discharge of cooling waters. The standard is based upon the type of fishery as well as the ambient temperature of the receiving water. This facility is a seasonal Warm/Cold water fishery with Warm Water criteria applying between June 1 and September 30. Temperature data from near the Blue Bridge which is just upstream of the facility's discharge point, was analyzed to determine the 7 day rolling average between June 1 and September 30. This value was above 66°F and therefore the allowable change in temperature is 1°F. As shown in Table 6 below, the calculated potential for this facility to influence the receiving water at 7Q10 flows is 0.17 °F. The existing permitted discharge temperature of 99°F is protective of water quality and Reasonable Potential does not exist for this discharge to violate VWQS for temperature changes.

Table 6. Assessment of Temperature Change in the Winooski River due to discharge from the Joseph C. McNeil Generating Station

| Change in Temperature due to Discharge | | |
|--|----------|-------------------|
| Calculated Change in Receiving Water Temperature | 0.17 | degrees F |
| Allowable Change in Temperature | 1 | degrees F |
| Reasonable Potential to Violate VWQS? | No | |
| Effluent | | |
| Effluent Flow (Ce): | 0.500 | MGD |
| | 0.7736 | CFS |
| | 0.0219 | m ³ /s |
| Effluent Discharge Temperature (Te) | 99 | degrees F |
| | 37.22 | degrees C |
| Density of Effluent Water at Te (De) | 993.24 | kg/m ³ |
| Effluent Flux Fe= De * Ce | 21.76 | kg/s |
| | | |
| Upstream Receiving Water | | |
| Upstream Receiving Water Flow @7Q10 (Cs) | 147.2 | CFS |
| | 4.1682 | m ³ /s |
| Upstream Receiving Water Temperature (Ts) | 66 | degrees F |
| | 18.89 | degrees C |
| Density of Upstream Water at Ts (Ds) | 998.42 | kg/m ³ |
| Upstream Flux (Fs) = Ds * Cs | 4161.66 | kg/s |
| | | |
| Mixing Calculations | | |
| Combined Downstream Flux (Fr) = Fe + Fs | 4183.42 | kg/s |
| Fe * Te | 809.89 | kg-degrees C/s |
| Fs * Ts | 78609.18 | kg-degrees C/s |
| Fr * Tr = Fs * Ts + Fe * Te | 79419.07 | kg-degrees C/s |
| Fr = Fe + Fs | 4183.42 | kg/s |
| Combined Temp Tr = (Fs*Ts+Fe*Te)/Fr | 18.98 | degrees C |
| Combined Temp Tr | 66.17 | degrees F |
| Change in RW Temp (Tr-Ts) | 0.17 | degrees F |

V. Summary of Reasonable Potential Determinations

The analysis of available data does not clearly indicate any Reasonable Potential to cause an exceedance of VWQS as this facility is currently operated. However, the data available was limited in usefulness due to age, analysis methodology and in the availability of data for some pollutants. Additional monitoring is recommended so that these analyses can be repeated with increased robustness during the next permit issuance cycle. It was necessary to develop new WQBELs for Chlorine because the previous limits were not protective of water quality. If the previous limits had been met at design flows calculations indicate that there would be exceedances of VWQS in the receiving water. The limits were revised to bring them into alignment with the VWQS and also to eliminate a redundant test.

A. Recommended Biological and Water Quality Monitoring:

No additional instream monitoring by this facility is recommended.

B. Recommended Effluent Monitoring:

In addition to the monitoring required in the current permit, the following monitoring is suggested for inclusion in the renewed permit to provide additional data to support future Reasonable Potential Determinations:

- Biannual “monitor only” requirements for Nitrate/Nitrite (NO_x), Total Ammonia Nitrogen (TAN) and Total Kjeldahl Nitrogen (TKN) are suggested for inclusion in this permit. These samples should be collected during summer (August/September) and winter (January/February) seasons to capture seasonal variability in the effluent.
- The EPA priority metals should be monitored annually. These samples should be collected during alternating summer and winter seasons to capture seasonal variability.
- As shown in the attached WQBEL memo, the new permit should include Daily Maximum Total Residual Chlorine Limit of 0.28 mg/l and an Average Monthly Total Residual Chlorine Limit of 0.2 mg/l. The existing Free Available Chlorine Limits should be removed because the Total Residual Chlorine limit is more protective of VWQS and due to the history of nondetectable Free Available Chlorine discharges. Total Residual Chlorine monitoring requirements remain at daily and the discharge of chlorinated wastes remains limited to two hours per day.

C. Conclusion:

After review of all available information it has been determined that there is not a reasonable potential for the discharge to cause or contribute to a water quality violation, and as such, the development of WQBELs other than for Chlorine, will not be necessary. Given the dilution (IWC at 7Q10 is = 0.005 (<1%)), this discharge does not appear to cause, have a reasonable potential to cause, or contribute to an instream toxic impact or instream excursion above the water quality criteria.

**Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
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MEMORANDUM



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Date: May 11, 2020

Subject: WQBEL Permit Limit Review and Calculations for the Joseph C. McNeil Generating Station.(3-1219)

I. Introduction

This memo serves as a record of the review and calculation of Water Quality Based Effluent Limits (WQBEL) and is intended to supplement the Reasonable Potential Determination memo prepared for the subject facility. The memo is broken into the following parts:

- An introduction
- A description of new or revised permit limit requirements.
- A description of the methodology used to develop WQBEL permit limits
- Narrative justifications for any new permit limits

The spreadsheet used to perform these calculations is available upon request.

II. New Permit Limits

| Effluent Characteristics (Constituents) | WQBEL Discharge Limitations | | | | | | | | | |
|--|-----------------------------|--------------|-----------------|----------------|-------------|----------------------|----------------|--------------|-----------------------|--------------------|
| | Annual Average | Annual Limit | Monthly Average | Weekly Average | Maximum Day | Monthly Average | Weekly Average | Maximum Day | Instantaneous Maximum | Sampling Frequency |
| | | lbs/year | Mass (lbs/day) | | | Concentration (mg/L) | | | | (per month) |
| Total Residual Chlorine | | | | | | 0.2 | | 0.28 | | Daily (30)* |
| Free Available Chlorine | | | | | | Monitor Only | | Monitor Only | | Daily (30) |

The constituents shown above in Table 1 were developed in order to ensure that the proposed discharge is protective of Vermont Water Quality Standards (VWQS) in the receiving water.

- * Total Residual Chlorine does not need to be measured under the following conditions:
 - Cooling water will be held in the cooling ponds for minimum of 3 hours before discharge to the river.
 - Chlorine containing chemicals are used at doses required to maintain a clean and functional system.
- Total Residual Chlorine samples must be collected if:
 - Cooling water is held in the cooling ponds for less than 3 hours or
 - Bacterial buildup or other problems require the use of higher than normal doses of chlorinate containing chemicals.

The following constituents were not analyzed as WQBELs: Flow, Total Metals, TSS, Turbidity, Total Phosphorus, Oil & Grease, and pH. These constituents are either subject to TBELs (including TMDLs), didn't have Reasonable Potential or the data and analytical capacity to model as WQBELs is unavailable.

III. WQBEL calculation methodology

The Water-Quality Based Effluent Limitations (WQBELs) for pollutants of concern were assessed via the mass balance steady state model method outlined in the Chapter 4 of the EPA's Technical Support Document for Water Quality-Based Toxics Control (TSD) (page 86). Results were then compared to the current permit limit. The recommended permit limit was selected by comparing applicable Technology-Based Effluent Limits (TBELs), current WQBELs, and WQBELs calculated based on 2017 VWQS acute and chronic criteria.

The steady-state mass balance method produces a Waste Load Allocation (WLA), the critical effluent pollutant concentration based on the VWQS acute and chronic critical thresholds for the constituent(s) of concern. The method assumes complete mixing of the pollutant within the receiving water. The resulting WLA is the WQBEL for each acute and chronic VWQS criteria dilution assessed.

Per the TSD method, WLA results were used to calculate the Long-Term Average (LTA) for each criteria type using methods provided in Table 5-1 (TSD page 102). WLA multipliers are picked from the 99th percentile column. The most conservative LTA is then used to determine the Maximum Daily Limit (MDL) or Average Monthly Limit (AML) using the calculation shown in Table 5-2 (TSD page 103). The 99th percentile column is used for the MDL calculation and the 95th percentile columns are used for the AML calculation.

In this process data for the facility and receiving waters is used. When necessary values for VWQS were calculated based upon the methods described in their appendices and footnotes. Monitoring frequency are taken from the existing permit or assigned for new pollutants based upon similar facilities. In the absence of ambient receiving water data a value of 5% of the VWQS has been generally assumed for the upstream concentration. Please see the individual calculation tabs for specific analyses.

The resulting MDL and AML are compared with the existing permit limits, any applicable TBELs including TMDLs, and any legislated limits to determine the final effluent limits that are protective of quality standards. The proposed limits are entered into the spreadsheet and Table 1 (above) and a short narrative is prepared justifying the limits. Those narratives are presented in the next section.

IV. Justification of Proposed WQBELs

1. Chlorine

The existing permit requires monitoring for both Free Available Chlorine and Total Residual Chlorine. Total Residual Chlorine is a monitor only constituent and the current Maximum Day and Monthly Average limitations for Free Available Chlorine are based upon the Effluent Limit Guidelines for Stream Generation Power Plants. This facility burns wood rather than fossil fuels and therefore those guidelines do not strictly apply. Analysis of the existing permit limits indicates that they are not protective of VWQS and that new WQBELs must be calculated. Total Residual Chlorine measures the total amount of chlorine present water which includes Free Available Chlorine and chlorine that has already reacted with other chemicals in the water. VWQS are expressed in terms of chlorine without reference to it being reactive.

a) *Free Available Chlorine*

Free Available Chlorine is a component of Total Residual Chlorine. Therefore, any Total Residual Chlorine Limit also restricts Free Available Chlorine concentrations. This facility has an excellent record of low Free Available Chlorine discharge concentrations (no detectable results reported in the last 5 years). In consideration of those two factors, and the new limits on Total Residual Chlorine proposed below, the existing Free Available Chlorine limits should be replaced with monitor only requirements. Consideration should be made of removing this constituent from the permit.

b) *Total Residual Chlorine*

A new Maximum Day limit of 0.28 mg/l for Total Residual Chlorine is recommended based upon this analysis. It is recommended that the existing Monthly Average limit for Available Free Chlorine of 0.2 mg/l be adopted for Total Residual Chlorine.

This discharge is limited to a duration of two hours per day. In order to account for this the receiving water flow rate was divided by 12 to get the amount of flow in 2 hours. It is assumed that this mixed volume travels as a plug down the river, and therefore it is appropriate to analyze acute toxicity by comparing the fully mixed 2 hour plug flows to the acute criteria. However, in order to evaluate chronic toxicity, it is necessary to look at an exposure time of 4 days using EPA Allowable Average Concentration criteria. This facility is located 9 miles from Lake Champlain, and the effluent is not resident in the Winooski River for a full 4 days. It is unknown what dilution occurs in the lake, and therefore the analysis of a Monthly Average limit is not possible. However, it is fully expected that the dilution factor in the lake is at least 2, and therefore the proposed limit of 0.2 mg/l is protective of VWQS and in agreement with the value calculated for a plug that retained its integrity for 4 days of 0.11 mg/l. In all likelihood the dilution factor is at least 12 due to the river flows that occur when discharges do not contain chlorine. The calculation spreadsheet is available on request. These limits on Total Residual Chlorine are more protective of water quality than limits on Free Available Chlorine because Free Available Chlorine is a subset of Total Residual Chlorine.

A request was received from the facility to not require testing of TRC if chlorinated water was held in the cooling pods for at least 3 hours. In order to assess this request DEC asked for and received TRC results for samples collected just after discharge from the cooling tower, as well as in the effluent from the cooling ponds. Due to an unexpected mechanical problem it was not possible to obtain more data. This data is presented below, and it can be seen that the highest TRC concentration is seen at the initial discharge from the cooling tower at 0.14 mg/l. This value is ½ the proposed maximum day limit for TRC. Values for the wastewater discharge are less than 0.08 mg/l. None of the samples from the waste water discharge or cooling tower exceed the daily limit. The cooling ponds allow for TRC to dissipate fairly quickly due to the elevated temperature of the water. If the water is held in the cooling pond for at least 3 hours, and chlorinated chemicals are used as described in the November 24, 2020 email from Ross Predom to John Merrifield, then it is not necessary to test for TRC before discharging. If more extensive chlorination is required to clean out bacteria buildup or other extraordinary circumstances, then a TRC sample should be collected to ensure compliance with the permit limits.

| Date | Description | Cooling Tower | Waste Water Discharge |
|------------|--------------------------|---------------|-----------------------|
| 12/14/2020 | At Initial Discharge | 0.08 | 0.05 |
| 12/14/2020 | 1 hour Post Chlorination | 0.07 | 0.06 |
| 12/15/2020 | Mid Chlorination | 0.11 | - |
| 12/15/2020 | At Initial Discharge | 0.1 | 0.03 |
| 12/15/2020 | 1 hour Post Chlorination | 0 | 0 |
| 1/7/2021 | At Initial Discharge | 0.14 | 0.08 |
| 1/25/2021 | At Initial Discharge | 0.07 | 0.06 |
| 1/27/2021 | At Initial Discharge | 0.08 | 0.05 |

AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
1 NATIONAL LIFE DRIVE – DAVIS 3
MONTPELIER, VERMONT 05620-3522

NOTICE: DRAFT DISCHARGE PERMIT
PUBLIC NOTICE NUMBER: 3-1219
PUBLIC COMMENT PERIOD: February 5, 2021 to March 8, 2021

PERMITTEE INFORMATION

PERMITTEE NAME: Burlington Electric Department
Joseph C McNeil Generating Station
PERMITTEE ADDRESS: 585 Pine Street
Burlington, VT 05401
PERMIT NUMBER: 3-1219
PROJECT ID NUMBER: EJ95-0448

DISCHARGE INFORMATION

NATURE: Cooling water blowdown and low volume industrial boiler cooling water from a steam powered electrical generation facility.
VOLUME: 0.500 MGD
RECEIVING WATER: Winooski River
EXPIRATION DATE: March 31, 2026
DESCRIPTION: This is a draft discharge permit proposed for issuance to the Burlington Electric Department for the discharge of cooling water and low volume industrial boiler cooling water wastes from the Joseph C McNeil Generating Station at 111 Intervale Road, Burlington, VT 05401 to the Winooski River.

TENTATIVE DETERMINATIONS

Tentative determinations regarding effluent limitations and other conditions to be imposed on the pending Vermont permit have been made by the State of Vermont Agency of Natural Resources (VANR). The limitations imposed will assure that the Vermont Water Quality Standards and applicable provisions of the Federal Clean Water Act, PL 92-500, as amended, will be met.

FURTHER INFORMATION

The complete application, proposed permit, and other information are on file and may be inspected by appointment on the 3rd floor of the Davis Building at 1 National Life Drive, Montpelier, Vermont. Copies, obtained by calling 802-828-1115 from 7:45 AM to 4:30 PM Monday through Friday, will be made at a cost based upon the current Secretary of State Official Fee Schedule for Copying Public Records. The draft permit and fact sheet may also be viewed on the Division's website: <https://anrweb.vt.gov/DEC/IWIS/ReportViewer2.aspx?Report=WWPublicNotices&ViewParms=False>.

PUBLIC COMMENTS/PUBLIC HEARINGS

Written public comments on the proposed permit are invited and must be received on or before the close of the business day (4:30 pm) on **March 8, 2021** to the Agency of Natural Resources, Department of Environmental Conservation, Watershed Management Division, 1 National Life Drive – Davis 3, Vermont 05620-3522. Comments may also be submitted by e-mail using the e-mail comment provisions included at

<https://anrweb.vt.gov/DEC/IWIS/ReportViewer2.aspx?Report=WWPublicNotices&ViewParms=False>.

All comments received by the above date will be considered in formulation of the final determinations.

During the notice period, any person may submit a written request to this office for a public meeting to consider the proposed permit. The request must state the interest of the party filing such request and the reasons why a meeting is warranted. A meeting will be held if there is a significant public interest (including the filing of requests or petitions for such meeting) in holding such a meeting.

FINAL ACTION/RIGHTS TO APPEAL TO THE ENVIRONMENTAL COURT

At the conclusion of the public notice period and after consideration of additional information received during the public notice period, VANR will make a final determination to issue or to deny the permit. Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Court within 30 days of the date of the decision. The appellant must submit the Notice of Appeal and include the applicable filing fee, payable to the state of Vermont.

The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Court; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and the description of the property, project or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal.

The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings.

The address for the Vermont Environmental Court is: Vermont Superior Court, Environmental Division, 32 Cherry Street, 2nd Floor, Suite 303, Burlington VT 05401 (Tel. (802) 951-1740. For further information, see the Vermont Rules for Environmental Court Proceedings, available online at www.vermontjudiciary.org.

Peter Walke, Commissioner
Department of Environmental Conservation