

November 8, 2021

Dear GlobalFoundries:

After the permit was issued, mistakes were found within the Final Issued NPDES Direct Discharge Permit 3-1295 while entering information into the Wastewater Inventory (WWInv), the Wastewater Program's compliance and permitting database. The permit is being amended to correct these mistakes. The following is a summary of proposed changes, which are highlighted, bolded, and italicized in the draft amended permit:

1. In Condition I.A.1, Cyanide was misspelled as "Cynide" and has been corrected.
2. Total phosphorus % running total pounds was in the wrong column in Condition I.A.1 when compared to other permits exported from the WWInv database. This was changed to remain consistent with the WWInv report export function.
3. Discharge Point S/N 007 constituents in Condition I.A.2 measuring units were revised to read as ug/L, not mg/L.
4. Condition I.B.j was removed in other permits that were posted publicly preceding this permit's posting. This condition was removed as is captured by existing Condition I.B.i.
5. Condition I.B.p was revised to list out all constituents subject to composite sampling.
6. An additional schedule item compliance date row was added for the Permit Condition I.G.5 for the phosphorus optimization plan annual report and Condition I.I.4 for the biocide usage report, to account for the full duration of the permit term.
7. Phosphorus was spelled incorrectly as "phosphorous" in Condition I.G.3(a)(ii) of the permit and was revised. This was also detected and corrected in Part VII.C.1 of the Fact Sheet.
8. Parts VII.D.a-t of the Fact Sheet were included to parallel with Permit Conditions I.B.a-t discharge special conditions.
9. Part VII.C.2-4 of the Fact Sheet language was revised to clarify the nitrogenous monitoring frequency requirements that were commented on previously. No changes are proposed from issued permit.
10. Condition I.B.b in the Permit was revised to specify the pH sampling background samples must be taken upstream and 50 ft downstream the discharge point, within a timespan of 24 hours. This condition is changed from the current permit. Part VII of the Fact Sheet, where discharge point S/N 007 pH monitoring requirements are discussed, was revised to account for permit changes.
11. Condition I.B.h in the Permit was revised to specify the 5 regulated PFAS constituent EPA approved analytical method the contract laboratory should use to process samples. Part VII.C.13 and VII.D of the Fact Sheet were revised to reflect the revised Permit.

Please send any questions to Jamie Bates via email to Jamie.Bates@vermont.gov or by phone to (802)-490-6183.

Sincerely,

A handwritten signature in blue ink that reads "Jamie Bates". The signature is written in a cursive, flowing style.

Jamie Bates, Direct Discharge Analyst (she/her)
Vermont Department of Environmental Conservation
Watershed Management Division, Wastewater Management Program

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.: 3-1295
PIN: EJ91-0002
NPDES No.: VT0000400

DRAFT *AMENDED*
DISCHARGE PERMIT

Facility Name: GLOBALFOUNDRIES
Facility Address: 1000 River Road – B966
Essex Junction, VT 05452
Coordinates: Lat: 44.4841267 Long: -73.1116762
Expiration Date: March 31, 2026
Reapplication Date: September 30, 2025

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, GLOBALFOUNDRIES U.S. 2 LLC (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 the GlobalFoundries Facility (hereinafter referred to as the “WWTF” or “Facility”) to the Winooski River, in accordance with the following conditions.

This permit shall be effective on **XXXX**.

Peter Walke, Commissioner
Department of Environmental Conservation

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

I. PERMIT SPECIAL CONDITIONS**A. EFFLUENT LIMITS AND MONITORING REQUIREMENTS**

1. **Discharge Point S/N 001**, Latitude 44.4773758 and Longitude. -73.095481: During the term of this permit, the Permittee is authorized to discharge from outfall serial number S/N 001 from sanitary and semi-conductor manufacturing treated wastewater to the Winooski River, an effluent for which the characteristics shall not exceed the values listed below. This discharge is also comprised of treated intermittent non-contact cooling water. Such discharges shall be limited and monitored by the Permittee as specified below:

Constituent; Sampling Point and Sample Type	Season and Sampling Frequency	Quantity	Quantity	Conc.	Conc.	Conc.
Flow; Effluent; Continuous	Year Round Daily	Monitor MGD Monthly Avg				
Flow; Annual Average; Calculated	12/01-12/31 Annual	8.0 MGD Annual Avg				
BOD, 5-Day; Effluent; 24 Hour Comp	06/01 –10/31 Weekly	Monitor lbs/day Monthly Avg				
E. Coli; Effluent; Grab	Year Round Weekly					77 #/100 ml Instant Max
Nitrogen, Ammonia Total; Effluent; Grab	Year Round 2 per Month				Monitor mg/l Monthly Avg	Monitor mg/l Daily Max
Nitrite Plus Nitrate Total; Effluent; 24 Hour Comp	11/01 - 5/31 Monthly		Monitor lbs/day Daily Max			Monitor mg/l Daily Max
Nitrite Plus Nitrate Total; Effluent; 24 Hour Comp	06/01 - 10/31 Weekly	Monitor lbs/day Monthly Avg	Monitor lbs/day Daily Max		Monitor mg/l Monthly Avg	Monitor mg/l Daily Max
Nitrogen, Kjeldahl Total; Effluent; 24 Hour Comp	11/01 - 05/31 Monthly		Monitor lbs/day Daily Max			Monitor mg/l Daily Max
Nitrogen, Kjeldahl Total; Effluent; 24 Hour Comp	06/01 - 10/31 Weekly	Monitor lbs/day Monthly Avg	Monitor lbs/day Daily Max		Monitor mg/l Monthly Avg	Monitor mg/l Daily Max
Nitrogen, Total; Effluent; Calculated	11/01 - 05/31 Monthly		Monitor lbs/day Daily Max			Monitor mg/l Daily Max
Nitrogen, Total; Effluent; Calculated	06/01 - 10/31 Weekly	Monitor lbs/day Monthly Avg	Monitor lbs/day Daily Max		Monitor mg/l Monthly Avg	Monitor mg/l Daily Max
Phosphorus, Total; Effluent; 24 Hour Comp	Year Round Weekly				0.8 mg/l Monthly Avg	

Table continued						
Constituent; Sampling Point and Sample Type	Season and Sampling Frequency	Quantity	Quantity	Conc.	Conc.	Conc.
Phosphorus, Total; Effluent; Calculated	Year Round Monthly	Monitor lbs Annual Total	Monitor lbs Monthly Total	Monitor % Monthly Total		
Phosphorus, Total; Annual Average; Calculated	12/01 - 12/31 Annual	4872.0 lbs/yr Annual Total				
Suspended Solids, Total; Effluent; 24 Hour Comp	Year Round Weekly		437.0 lbs/day Daily Max			10.5 mg/l Daily Max
Ultimate Oxygen Demand; Effluent; Calculated	06/01 - 10/31 Weekly		2300.0 lbs/day Daily Max			
Cadmium, Total; Effluent; 24 Hour Comp	02/01 – 02/28 Semi-Annual	0.42 lbs/day Monthly Avg	0.62 lbs/day Daily Max		0.07 mg/l Monthly Avg	0.11 mg/l Daily Max
Cadmium, Total; Effluent; 24 Hour Comp	07/01 – 07/31 Semi-Annual	0.42 lbs/day Monthly Avg	0.62 lbs/day Daily Max		0.07 mg/l Monthly Avg	0.11 mg/l Daily Max
Chromium, Trivalent; Effluent; 24 Hour Comp	02/01 – 02/28 Semi-Annual	45.7 lbs/day Monthly Avg	66.7 lbs/day Daily Max		1.71 mg/l Monthly Avg	2.77 mg/l Daily Max
Chromium, Trivalent; Effluent; 24 Hour Comp	07/01 – 07/31 Semi-Annual	45.7 lbs/day Monthly Avg	66.7 lbs/day Daily Max		1.71 mg/l Monthly Avg	2.77 mg/l Daily Max
Copper, Total; Effluent; 24 Hour Comp	Year Round 2 per Month	2.6 lbs/day Monthly Avg	3.5 lbs/day Daily Max		2.07 mg/l Monthly Avg	3.38 mg/l Daily Max
Iron, Total; Effluent; 24 Hour Comp	Year Round Monthly				Monitor mg/l Monthly Avg	Monitor mg/l Daily Max
Lead, Total; Effluent; 24 Hour Comp	Year Round 2 per Month	1.05 lbs/day Monthly Avg	1.81 lbs/day Daily Max		0.43 mg/l Monthly Avg	0.69 mg/l Daily Max
Nickel, Total; Effluent; 24 Hour Comp	Year Round 2 per Month	22.95 lbs/day Monthly Avg	39.66 lbs/day Daily Max		2.38 mg/l Monthly Avg	3.98 mg/l Daily Max
Silver, Total; Effluent; 24 Hour Comp	02/01 – 02/28 Semi-Annual	0.66 lbs/day Monthly Avg	0.97 lbs/day Daily Max		0.24 mg/l Monthly Avg	0.43 mg/l Daily Max
Silver, Total; Effluent; 24 Hour Comp	07/01 – 07/31 Semi-Annual	0.66 lbs/day Monthly Avg	0.97 lbs/day Daily Max		0.24 mg/l Monthly Avg	0.43 mg/l Daily Max

Table continued						
Constituent; Sampling Point and Sample Type	Season and Sampling Frequency	Quantity	Quantity	Conc.	Conc.	Conc.
Zinc, Total; Effluent; 24 Hour Comp	Year Round 2 per Month	37.97 lbs/day Monthly Avg	52.68 lbs/day Daily Max		1.48 mg/l Monthly Avg	2.61 mg/l Daily Max
Cyanide , free (amen. To chlorination) Effluent; Grab	Year Round Monthly	4.77 lbs/day Monthly Avg	6.97 lbs/day Daily Max		0.65 mg/l Monthly Avg	1.2 mg/l Daily Max
Fluoride; Effluent; 24 Hour Comp	Year Round 2 per Month				17.4 mg/l Monthly Avg	28.0 mg/l Daily Max
Hydrogen Peroxide; Effluent; 24 Hour Comp	Year Round Weekly				10.0 mg/l Monthly Avg	15.0 mg/l Daily Max
Oil and Grease; Effluent; Grab	02/01 – 02/28 Semi-Annual	1734.72 lbs/day Monthly Avg	3469.44 lbs/day Daily Max		26.0 mg/l Monthly Avg	52.0 mg/l Daily Max
Oil and Grease; Effluent; Grab	07/01 – 07/31 Semi-Annual	1734.72 lbs/day Monthly Avg	3469.44 lbs/day Daily Max		26.0 mg/l Monthly Avg	52.0 mg/l Daily Max
pH; Effluent; Grab	Year Round Daily				6.5 s.u. Min	8.5 s.u. Max
Total Toxic Organics; Effluent; Grab	01/01 – 3/31 Quarterly					1.37 mg/l Daily Max
Total Toxic Organics; Effluent; Grab	04/01 – 6/30 Quarterly					1.37 mg/l Daily Max
Total Toxic Organics; Effluent; Grab	07/01 – 09/30 Quarterly					1.37 mg/l Daily Max
Total Toxic Organics; Effluent; Grab	10/01 – 12/30 Quarterly					1.37 mg/l Daily Max
Whole Effluent Toxicity, NOEL- C; Effluent; Calculated	01/01 – 02/28 Semi-Annual				>7% Instant Max	
Whole Effluent Toxicity, NOEL- C; Effluent; Calculated	08/01 – 10/31 Semi-Annual				>7% Instant Max	

Table continued						
Constituent; Sampling Point and Sample Type	Season and Sampling Frequency	Quantity	Quantity	Conc.	Conc.	Conc.
Perfluoro-1-hexanesulfonic acid (PFHxS); Effluent; 24 Hour Comp	07/01/2021 – 09/30/2021 Quarterly					Monitor ug/l Daily Max
Perfluoro-1-hexanesulfonic acid (PFHxS); Effluent; 24 Hour Comp	10/01/2021 – 12/31/2021 Quarterly					Monitor ug/l Daily Max
Perfluoro-1-hexanesulfonic acid (PFHxS); Effluent; 24 Hour Comp	01/01/2022 – 3/31/2022 Quarterly					Monitor ug/l Daily Max
Perfluoro-1-hexanesulfonic acid (PFHxS); Effluent; 24 Hour Comp	04/01/2022 – 6/30/2022 Quarterly					Monitor ug/l Daily Max
Perfluoro-1-hexanesulfonic acid (PFHxS); Effluent; 24 Hour Comp	12/01 – 12/31 Annual beginning 2022					Monitor ug/l Daily Max
Perfluoro-1-octanesulfonic acid (PFOS); Effluent; 24 Hour Comp	07/01/2021 – 09/30/2021 Quarterly					Monitor ug/l Daily Max
Perfluoro-1-octanesulfonic acid (PFOS); Effluent; 24 Hour Comp	10/01/2021 – 12/31/2021 Quarterly					Monitor ug/l Daily Max
Perfluoro-1-octanesulfonic acid (PFOS); Effluent; 24 Hour Comp	01/01/2022 – 3/31/2022 Quarterly					Monitor ug/l Daily Max
Perfluoro-1-octanesulfonic acid (PFOS); Effluent; 24 Hour Comp	04/01/2022 – 6/30/2022 Quarterly					Monitor ug/l Daily Max
Perfluoro-1-octanesulfonic acid (PFOS); Effluent; 24 Hour Comp	12/01 – 12/31 Annual beginning 2022					Monitor ug/l Daily Max
Perfluoroheptanoic acid (PFHpA); Effluent; 24 Hour Comp	07/01/2021 – 09/30/2021 Quarterly					Monitor ug/l Daily Max
Perfluoroheptanoic acid (PFHpA); Effluent; 24 Hour Comp	10/01/2021 – 12/31/2021 Quarterly					Monitor ug/l Daily Max

Table continued						
Constituent; Sampling Point and Sample Type	Season and Sampling Frequency	Quantity	Quantity	Conc.	Conc.	Conc.
Perfluoroheptanoic acid (PFHpA); Effluent; 24 Hour Comp	01/01/2022 – 3/31/2022 Quarterly					Monitor ug/l Daily Max
Perfluoroheptanoic acid (PFHpA); Effluent; 24 Hour Comp	04/01/2022 – 6/30/2022 Quarterly					Monitor ug/l Daily Max
Perfluoroheptanoic acid (PFHpA); Effluent; 24 Hour Comp	12/01 – 12/31 Annual beginning 2022					Monitor ug/l Daily Max
Perfluorooctanoic acid (PFOA); Effluent; 24 Hour Comp	07/01/2021 – 09/30/2021 Quarterly					Monitor ug/l Daily Max
Perfluorooctanoic acid (PFOA); Effluent; 24 Hour Comp	10/01/2021 – 12/31/2021 Quarterly					Monitor ug/l Daily Max
Perfluorooctanoic acid (PFOA); Effluent; 24 Hour Comp	01/01/2022 – 3/31/2022 Quarterly					Monitor ug/l Daily Max
Perfluorooctanoic acid (PFOA); Effluent; 24 Hour Comp	04/01/2022 – 6/30/2022 Quarterly					Monitor ug/l Daily Max
Perfluorooctanoic acid (PFOA); Effluent; 24 Hour Comp	12/01 – 12/31 Annual beginning 2022					Monitor ug/l Daily Max
Perfluorononanoic acid (PFNA); Effluent; 24 Hour Comp	07/01/2021 – 09/30/2021 Quarterly					Monitor ug/l Daily Max
Perfluorononanoic acid (PFNA); Effluent; 24 Hour Comp	10/01/2021 – 12/31/2021 Quarterly					Monitor ug/l Daily Max
Perfluorononanoic acid (PFNA); Effluent; 24 Hour Comp	01/01/2022 – 3/31/2022 Quarterly					Monitor ug/l Daily Max
Perfluorononanoic acid (PFNA); Effluent; 24 Hour Comp	04/01/2022 – 6/30/2022 Quarterly					Monitor ug/l Daily Max
Perfluorononanoic acid (PFNA); Effluent; 24 Hour Comp	12/01 – 12/31 Annual beginning 2022					Monitor ug/l Daily Max

2. **Discharge Point S/N 007** located at Latitude 44.477387 and Longitude. -73.0957149: During the term of this permit, the Permittee is authorized to discharge from outfall serial number S/N 007 for potential groundwater seepage, condensate from cooling coils from dehumidifying incoming building air, stormwater from roof/parking lot drains, and truck unload/load stations to the Winooski River, an effluent which shall be monitored to specifications below. The Permittee shall comply with stormwater inspection and monitoring requirements specified in Condition 1.D. of this permit.

Constituent; Sampling Point and Sample Type	Season and Sampling Frequency	Concentration	Concentration
Tetrachloroethylene; Effluent; Grab	01/01 – 3/31 Quarterly		Monitor <i>ug/l</i> Daily Max
Tetrachloroethylene; Effluent; Grab	04/01 – 6/30 Quarterly		Monitor <i>ug/l</i> Daily Max
Tetrachloroethylene; Effluent; Grab	07/01 – 09/30 Quarterly		Monitor <i>ug/l</i> Daily Max
Tetrachloroethylene; Effluent; Grab	10/01 – 12/30 Quarterly		Monitor <i>ug/l</i> Daily Max
Trichloroethylene; Effluent; Grab	01/01 – 3/31 Quarterly		Monitor <i>ug/l</i> Daily Max
Trichloroethylene; Effluent; Grab	04/01 – 6/30 Quarterly		Monitor <i>ug/l</i> Daily Max
Trichloroethylene; Effluent; Grab	07/01 – 09/30 Quarterly		Monitor <i>ug/l</i> Daily Max
Trichloroethylene; Effluent; Grab	10/01 – 12/30 Quarterly		Monitor <i>ug/l</i> Daily Max
Vinyl Chloride; Effluent; Grab	01/01 – 3/31 Quarterly		Monitor <i>ug/l</i> Daily Max
Vinyl Chloride; Effluent; Grab	04/01 – 6/30 Quarterly		Monitor <i>ug/l</i> Daily Max
Vinyl Chloride; Effluent; Grab	07/01 – 09/30 Quarterly		Monitor <i>ug/l</i> Daily Max
Vinyl Chloride; Effluent; Grab	10/01 – 12/30 Quarterly		Monitor <i>ug/l</i> Daily Max
Ethyl Benzene; Effluent; Grab	01/01 – 3/31 Quarterly		Monitor <i>ug/l</i> Daily Max
Ethyl Benzene; Effluent; Grab	04/01 – 6/30 Quarterly		Monitor <i>ug/l</i> Daily Max
Ethyl Benzene; Effluent; Grab	07/01 – 09/30 Quarterly		Monitor <i>ug/l</i> Daily Max

Table Continued			
Constituent; Sampling Point and Sample Type	Season and Sampling Frequency	Concentration	Concentration
Ethyl Benzene; Effluent; Grab	10/01 – 12/30 Quarterly		Monitor ug/l Daily Max
Dichloroethene; Effluent; Grab	01/01 – 3/31 Quarterly		Monitor ug/l Daily Max
Dichloroethene; Effluent; Grab	04/01 – 6/30 Quarterly		Monitor ug/l Daily Max
Dichloroethene; Effluent; Grab	07/01 – 09/30 Quarterly		Monitor ug/l Daily Max
Dichloroethene; Effluent; Grab	10/01 – 12/30 Quarterly		Monitor ug/l Daily Max
Xylene; Effluent; Grab	01/01 – 3/31 Quarterly		Monitor ug/l Daily Max
Xylene; Effluent; Grab	04/01 – 6/30 Quarterly		Monitor ug/l Daily Max
Xylene; Effluent; Grab	07/01 – 09/30 Quarterly		Monitor ug/l Daily Max
Xylene; Effluent; Grab	10/01 – 12/30 Quarterly		Monitor ug/l Daily Max
pH; Effluent; Grab	01/01 – 3/31 Quarterly	6.5 s.u. Min	8.5 s.u. Max
pH; Effluent; Grab	04/01 – 6/30 Quarterly	6.5 s.u. Min	8.5 s.u. Max
pH; Effluent; Grab	07/01 – 09/30 Quarterly	6.5 s.u. Min	8.5 s.u. Max
pH; Effluent; Grab	10/01 – 12/30 Quarterly	6.5 s.u. Min	8.5 s.u. Max

3. **Discharge Points S/N 002 and S/N 011.** During the term of this permit, the Permittee is authorized to discharge from S/N 002 and S/N 011: condensate from cooling coils from dehumidifying incoming building air, stormwater from roof/parking lot drains, building underdrains, truck unload/load stations, and controlled secondary containment basins to the Winooski River. Flows commingle with treated groundwater and vapor extraction well water resulting from activities permitted separately under 3-1559 prior to discharging.

Outfall ID	Latitude	Longitude
S/N 002	44.4790581	-73.0951856
S/N 011	44.4770432	-73.1018723

The Permittee shall comply with inspection and monitoring requirements specified in Condition 1.D. of this permit.

4. **Discharge Points S/N 004, S/N 006, S/N 008, S/N 012, S/N 013, and S/N 017.** During the term of this permit, the Permittee is authorized to discharge potential groundwater seepage and stormwater from roof/parking lot drains, building underdrains, truck unload/load stations, and controlled secondary containment basins to the Winooski River from the following outfall locations:

Outfall ID	Latitude	Longitude
S/N 004	44.4802921	-73.0944371
S/N 006	44.4818737	-73.090985
S/N 008	44.4757775	-73.0966447
S/N 012	44.4776829	-73.1023341
S/N 013	44.4792557	-73.1047941
S/N 017	44.4776568	-73.0933708

The Permittee shall comply with inspection and monitoring requirements specified in Condition 1.D. of this permit.

5. **Discharge Points S/N 009, S/N 010, S/N 014, S/N 015, S/N 016, S/N 018, and S/N 019.** During the term of this permit, the Permittee is authorized to discharge only stormwater runoff from roof/parking lot drains from the following outfall locations:

Outfall ID	Latitude	Longitude
S/N 009	44.4743718	-73.0974427
S/N 010	44.4755204	-73.1014874
S/N 014	44.4810949	-73.1074045
S/N 015	44.481786	-73.1084978
S/N 016	44.4739444	-73.0949246
S/N 018	44.4755608	-73.0942909
S/N 019	44.4832852	-73.110394

The Permittee shall comply with inspection and monitoring requirements specified in Condition 1.D. of this permit.

B. Discharge Special Conditions

- a. Samples shall be taken at a representative location prior to discharging to the Winooski River.
- b. The pH of the discharge described under Condition 1.A.2 shall be between 6.50 and 8.50 standard units or fall within the background range of the receiving water if it exceeds these limitations. Due to pH variations in natural waters, an effluent sample within ± 0.50 S.U. of background shall be deemed acceptable. Background samples shall be collected upstream of the discharge point **and 50 feet downstream, within 24 hours of receiving a pH result that exceeds limitations.** All pH monitoring results shall be included on the monthly discharge Monitoring Report, including any upstream receiving water analyses.
- c. Any discharge of stormwater is subject to Condition I.D.
- d. The effluent limitation for Ultimate Oxygen Demand (UOD) is based on the Lower Winooski River Wasteload Allocation Order and shall be applicable from June 1st to October 31st annually. Results from the five-day Biochemical Oxygen Demand (BOD₅) and Total Kjeldahl Nitrogen (TKN) monitoring collected from June 1st to October 31st shall be used to calculate UOD with the following formula:

$$\text{UOD (lbs/day)} = [(\text{BOD5 (lbs/day)} \times 1.43) + (\text{TKN (lbs/day)} \times 4.57)]$$

- e. Total Annual Pounds of Phosphorus shall be defined as the sum of all the Total Monthly Pounds of Phosphorus discharged for the calendar year and shall be calculated as follows:

$$[(\text{Monthly Average Phosphorus Concentration}) \times (\text{Total Monthly Flow}) \times 8.34]$$

(See required Total Phosphorus monitoring report form WR43-TP to report monthly totals)

- f. The Permittee shall operate the facility to meet the concentration limitations or pounds limitation, whichever is more restrictive.
- g. NOEL-C is the concentration of the effluent in a sample that causes No Observed (Chronic) Effect (i.e. mortality or reduced growth to the test population at a 7-day exposure interval of observation).
- h. The Permittee shall monitor the effluent from the treatment systems for the five regulated per- and polyfluoroalkyl substances (PFAS) substances listed in Condition I.A.1. at a minimum frequency of once per quarter within the first 12 months from the permit effective date. After the first year, monitoring shall be conducted annually.

PFAS shall be analyzed utilizing E.P.A. modified Method 537 Version 1.1, incorporating isotope dilution, in accordance with Department of Defense (DoD) Quality Systems Manual (QSM) 5.2. The Permittee shall utilize a Clean Water Act multilab validated method for PFAS, when a sufficiently sensitive test procedure (i.e., method) has been approved under 40 C.F.R. Part 136. The Permittee shall report the results of the PFHxS, PFHpA, PFNA, PFOS, and PFOA on DMR form WR-43.

- i. The discharge shall be free from substances in kind or quantity that settle to form harmful benthic deposits; float as foam, debris, scum or other visible substances; produce odor, color, or turbidity that is not naturally occurring and would render the surface water unsuitable for its designated uses; result in the dominance of nuisance species; or interfere with recreational activities; or which would cause a violation of the Vermont Water Quality Standards.

j. RESERVED

- k. Escherichia coli (E. coli) grab samples shall be collected between the hours of 6:00 a.m. to 6:00 p.m.
- l. These discharges shall not cause erosion or contain sediment which causes or contributes to a violation of water quality standards of the receiving water.
- m. Total Toxic Organics (TTO) (Codified at 40 C.F.R. Part 413, 433, 465, 467, 468, 469) shall mean the summation of all quantifiable results observed that are greater than 0.01 mg/l for the toxic organics listed in Attachment D. The sum of TTOs must meet the effluent limitation in Condition I.A.1.
- n. Monthly average flow shall be calculated by summing the daily effluent flow for each day in the given month and dividing the sum by the number of days of discharge in that month.
- o. Total Nitrogen (TN) shall be reported as pounds TN and calculated as: $\text{TN (mg/L)} \times \text{Total Daily Flow} \times 8.34$; where $\text{TN (mg/L)} = \text{TKN (mg/L)} + \text{NO}_x \text{ (mg/L)}$.
- p. Composite samples for BOD₅, TSS, TP, TKN, NO_x, **Total Zinc, Total Copper, Total Cadmium, Chromium Trivalent, Total Iron, Total Lead, Total Nickel, Total Silver, Fluoride, Hydrogen Peroxide, Perfluoro-1-hexanesulfonic acid (PFHxS), Perfluoro-1-octanesulfonic acid (PFOS), Perfluoroheptanoic acid**

(PFHpA), Perfluorooctanoic acid (PFOA), and Perfluorononanoic acid (PFNA) shall be taken during the hours of 6:00 AM to 6:00 PM unless otherwise specified. Eight hours is the minimum period for the composite. 24 hours is the maximum for the composite.

- q. If the effluent discharged for a period of 90 consecutive days exceeds 80 percent of the permitted flow limitation, the Permittee shall submit to the Secretary projected loadings and a program for maintaining satisfactory treatment levels.
- r. The Permittee shall demonstrate the accuracy of the effluent flow measurement device weekly and report the results on the monthly report forms. The acceptable limit of error is $\pm 10\%$.
- s. To ensure self-reported data accurately quantifies the amount of copper discharged, effluent copper analyses shall be carried out using a method that assures a Method Detection Limit (MDL) of 0.006 mg/L or lower. This level of detection may be achieved using EPA methods 200.7 and 200.8 listed in 40 C.F.R. Part 136 which have estimated detection limits of 0.0054 mg/L and 0.004 mg/L, respectively.
- t. Any action on the part of the Secretary in reviewing, commenting upon or approving plans and specifications for the construction of WWTFs shall not relieve the Permittee from the responsibility to achieve effluent limitations set forth in this permit and shall not constitute a waiver of, or act of estoppel against any remedy available to the Secretary, the State of Vermont, or the federal government for failure to meet any requirement set forth in this permit or imposed by state or federal law.

C. WASTE MANAGEMENT ZONE

In accordance with the 10 V.S.A Section 1252, this permit hereby establishes a waste management zone that extends from the outfall of the Wastewater Treatment Facility in the Winooski River downstream 1.0 mile.

D. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

The EPA report “Storm Water Management for Industrial Activities, Developing Pollution Prevention Plans and Best Management Practices” Report number EPA 832-R-92-006 should be used to ensure this Condition is satisfied. The minimum requirements for the SWPPP are described within this section.

1. **Deadlines for updated Stormwater Pollution Prevention Plan (SWPPP):**
By no later than 180 days after the effective date of this permit, the Permittee shall update and implement a revised SWPPP. The Plan shall describe and ensure the implementation of practices which are to be used to reduce the pollutants in stormwater discharges associated with industrial activities.
2. **Areas of the Facility Regulated:** These areas include but are not limited to ground surfaces immediately adjacent to manufacturing areas, processing or material storage areas; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste materials, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined at 40 C.F.R. § 401) including the stormwater collection system; sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and materials remain and are exposed to stormwater.

- a. Regulated stormwater collection system outfalls subject to Condition 1.D.: S/N 002, S/N 004, S/N 006, S/N 007, S/N 008, S/N 009, S/N 010, S/N 011, S/N 012, S/N 013, S/N 014, S/N 015, S/N 016, S/N 017, S/N 018, and S/N 019.
3. The SWPPP shall include a list of pollutant(s) or pollutant constituents associated with each regulated area. This list must include non-stormwater discharges and potential sources of pollutants that may commingle with stormwater discharges associated with regulated areas. Constituents mentioned in the SWPPP, and that are not already listed in Condition I.A.1 and 2 of this permit, may not be subject to effluent limit guidelines.
 4. The SWPPP must include a description of existing and potential future stormwater control measures with the applicable schedules and procedures. The Permittee must select, design, install, implement, and document control measures (including best management practices) to minimize pollutant discharges. Such control measures include but are not limited to maintenance, good housekeeping, erosion prevention and sediment control, and spill prevention and response.
 5. On an as needed basis, maintenance and/or repairs for control measures must be completed immediately by the Permittee to minimize stormwater pollutant discharges. During such maintenance or repairs, the Permittee shall clean up any contaminated surfaces so that the material will not be discharged during subsequent storm events. The Permittee must notify the Secretary within 30 days of planned, or within 24 hours of any emergency, maintenance or repairs occurring in the stormwater management system. Rationale for modifications, repairs, and maintenance shall be recorded in the SWPPP. Upon review, the Secretary may request additional monitoring and increase the frequency of inspections for the duration of the project.
 6. The Permittee must conduct the following inspections and document them in the SWPPP:
 - a. Dry Weather Routine Facility Inspection: During facility operating hours, the Permittee shall conduct monthly inspections of areas covered by the requirements in this permit. Increased inspection frequency may be appropriate for some types of equipment, processes and stormwater control measures, or areas of the facility with significant activities and materials exposed to stormwater.

At least once each calendar year, the routine inspection must be conducted during a period when a stormwater discharge is occurring. Inspections must be performed by qualified personnel, or with at least one member of the stormwater pollution prevention team participating. Inspectors must consider the results of visual and analytical monitoring (if any) for the past year when planning and conducting stormwater inspections. During an inspection when there is a stormwater discharge, control measures implemented to comply with effluent limits must be observed to ensure they are functioning correctly. Discharge points listed in Condition I.D.2.a. must also be observed during this inspection. If such discharge locations are inaccessible, nearby downstream locations must be inspected.

- b. Wet Weather Visual Inspection: The stormwater management system and locations of areas exposed to precipitation or stormwater, including but not limited to fueling station, industrial vehicle and equipment maintenance and/or cleaning areas, material handling areas, material storage areas, processing areas, and disposal areas, must be visually inspected quarterly during wet weather. For the discharge points listed in Condition I.D.2.a., the wet weather visual monitoring must be made:
 - For a sample in a clean, colorless glass or plastic container, and examined in a well-lit area;
 - On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and the Permittee must document why it was not possible to take the sample within the first 30 minutes.

- In the case of snowmelt, samples must be taken during a period with a measurable discharge from the site; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge. The 72-hour (three-day) storm interval does not apply if less than a 72-hour (three-day) interval is representative for local storm events during the sampling period.
- Visually inspect or observe the sample for the following water quality characteristics:
 - Color;
 - Odor;
 - Clarity (diminished);
 - Floating solids;
 - Settled solids;
 - Suspended solids;
 - Foam;
 - Oil sheen; and
 - Other obvious indicators of stormwater pollution.

The Permittee has multiple discharge points/outfalls and may develop an inspection plan for how each stormwater outfall will be inspected at least once per quarter. This plan may include a rotating inspection schedule within a single quarter in order to meet the dry weather routine facility inspection and wet weather visual inspection requirements. In the event outfalls were not observed during the quarter due to lack of runoff from precipitation events or snow melt resulting in a discharge, then the Permittee must explain why the outfall was not inspected or why no discharge had occurred.

- c. The Permittee shall notify the Secretary within 24 hours of any observed issues with the water quality characteristics listed above, resulting from an inspection. Rationale for the issue and a plan to resolve the issue shall be recorded in the SWPPP. Upon review, the Secretary may request additional monitoring and increase the frequency of inspections for the duration of the issue.
7. The SWPPP must include the person(s) or position(s) responsible for inspection, the inspection schedule, specific items to be covered by an inspection for each outfall, and the person(s) or position(s) responsible for maintenance. Records of inspections shall be maintained and kept on file with the Plan.
8. Signature and Plan Review: The SWPPP shall be signed by the Permittee or a properly designated representative. A copy of the SWPPP shall be kept at the facility and shall be made available to the Secretary or a properly designated representative upon request.
9. The Permittee shall amend the SWPPP whenever there is a change in design, construction, operation, or maintenance at the facility which has a significant effect on the potential for the discharge of pollutants to the waters of the State or if the SWPPP cannot achieve the general objectives of controlling pollutants in stormwater discharges associated with industrial activity.
10. The Permittee shall submit the plan according to the following table:

Due Date	Event Description
12/28/2021	The Permittee shall submit the completed SWPPP by this date to the Secretary; 180 days after the effective date.

E. WHOLE EFFLUENT TOXICITY (WET) TESTING ACUTE/CHRONIC

1. Annually, two Whole Effluent Toxicity Tests shall be conducted on S/N 001 and shall consist of the following:

- a) One WET test shall be conducted as a one species (*Ceriodaphnia dubia*) chronic WET test and occur between January 1st to February 28th. A hydrogen peroxide analysis shall be conducted on the initial sample, the dilution water, and each aliquot of replenishment water. The results of this test shall be submitted with the appropriate WR-43 discharge monitoring report.
 - b) One WET test shall be conducted as two species (*Pimpephales promelas* and *Ceriodaphnia dubia*) chronic WET test to occur between August 1st and October 31st. A hydrogen peroxide analysis shall be conducted on the initial sample, the dilution water, and each aliquot of replenishment water. The results of this test shall be submitted with the appropriate WR-43 discharge monitoring report.
- 2. The WET tests shall be conducted according to the procedures and guidelines specified in “Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms” and “Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms” (both documents U.S. EPA October 2002 or, if a newer edition is available, the most recent edition).
 - 3. Based upon the results of these tests or any other toxicity tests conducted, the Secretary reserves the right to reopen and amend this permit to require additional WET testing or a Toxicity Reduction Evaluation.
 - 4. Permittees may request the use of lab water for controls and dilution if:
 - a) acquiring receiving water is hazardous due to weather or topography
 - b) previous WET tests have shown that receiving water has and poor performance in the lab controls or dilution
 - c) requested by the Permittee and approved by the Secretary

In the event this permit is administratively continued pursuant to 3 V.S.A. § 814, the Permittee shall sample and report as prescribed below in a manner that assures WET results are: obtained in January or February and submitted to the Secretary by June 30; and (b) obtained in August, September, or October and submitted to the Secretary by December 31.

- 5. The Permittee shall sample and report according to the following table:

Due Date	Event Description
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6/30/2022	The Permittee shall submit <i>Ceriodaphnia dubia</i> chronic WET test results from January to February monitoring.
12/31/2022	The Permittee shall submit <i>Pimpephales promelas</i> and <i>Ceriodaphnia dubia</i> chronic WET test results from August to October monitoring.
6/30/2023	The Permittee shall submit <i>Ceriodaphnia dubia</i> chronic WET test results from January to February monitoring.
12/31/2023	The Permittee shall submit <i>Pimpephales promelas</i> and <i>Ceriodaphnia dubia</i> chronic WET test results from August to October monitoring.
6/30/2024	The Permittee shall submit <i>Ceriodaphnia dubia</i> chronic WET test results from January to February monitoring.
12/31/2024	The Permittee shall submit <i>Pimpephales promelas</i> and <i>Ceriodaphnia dubia</i> chronic WET test results from August to October monitoring.
6/30/2025	The Permittee shall submit <i>Ceriodaphnia dubia</i> chronic WET test results from January to February monitoring.
12/31/2025	The Permittee shall submit <i>Pimpephales promelas</i> and <i>Ceriodaphnia dubia</i> chronic WET test results from August to October monitoring.

F. POWER FAILURE

In order to maintain compliance with the effluent limitations and prohibitions of this permit, the Permittee shall either:

1. Provide an alternative power source sufficient to operate the wastewater control facilities, or if such alternative power source is not in existence, or
2. 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.

Due Date	Event Description
12/31/2021	The Permittee shall notify the Secretary of alternative power sources available and/or production controls in place that the Permittee plans to use in the event there is power failure at the facility.

G. PHOSPHORUS OPTIMIZATION PLAN

1. Wasteload Allocation for Phosphorus

This permit includes a total phosphorus (TP) water quality based effluent limitation of consistent with the waste load allocation (WLA) for TP, established by the U.S. Environmental Protection Agency (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 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 wasteload allocations between the Permittee and another WWTF pursuant to the requirements of TMDL and Vermont’s “Wasteload Allocation Process” Rule (Environmental Protection Rule, Chapter 17).

2. Total Phosphorus Calculations and Reporting

Total Phosphorus shall be reported monthly, via electronic Discharge Monitoring Report and on the WR-43-TP, in the following ways:

1. Monthly Average Phosphorus Concentration = The average concentration of phosphorus discharged this monitoring period. (sum of all daily discharges (mg/l) measured during the month divided by the number of daily discharges measured during the month)
2. Total Monthly Pounds Phosphorus = The total pounds of phosphorus discharged this monitoring period. ((Monthly Average Phosphorus Concentration) x (Total Monthly Flows) x 8.34)
3. Running Total Annual Pounds = The 12-month running annual TP load. (Sum the Total Monthly Pounds results for the immediately preceding 12 months)
4. Comparison (%) of Running Total Annual Pounds to Annual Permit Limitation = The percentage of the Running Total Annual Pounds to the Annual TP Limitation. The comparison shall be calculated as:
 $\% = \text{Running Total Annual Pounds} / \text{Annual TP Permit Limit} \times 100$

3. Phosphorus Optimization Plan

- a. 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 WWTF's phosphorus removal efficiency by implementing optimization techniques that achieve phosphorus reductions using primarily existing facilities and equipment. The POP shall:
 - i. Be developed by a qualified professional with experience in the operation and/or design of WWTFs in consultation with the WWTF;
 - ii. Evaluate alternative methods of operating the existing WWTF, including operational, process, and equipment changes designed to enhance phosphorus removal. The techniques to be evaluated may include operational process changes to enhance biological and/or chemical **phosphorus** removal, incorporation of anoxic/anaerobic zones, septage receiving policies and procedures, and side stream management;
 - iii. Determine which alternative methods of operating the existing WWTF, including operational, process, and equipment changes will be most effective at increasing phosphorus removal; and
 - iv. Include a proposed implementation schedule for those methods of operating the WWTF determined to be most effective at increasing phosphorus removal.
- 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.
- c. The Permittee shall annually submit a report to the Secretary as an attachment to the monthly electronic Discharge Monitoring Reporting (DMR) form and the WR-43-TP form 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.

4. Phosphorus Reduction and Elimination Plan (PERP)

a) The WWTF shall have 12 months from the permit effective date to optimize removal of TP.

If, after the optimization period, the WWTF's actual, TP loads reach or exceed 80% of the annual mass limit for the WWTF, based on the WWTF's 12-month running annual load calculated using the Running Total Annual Pounds Calculation, the Permittee shall, within 90 days of reaching or exceeding 80% of the annual mass limit for the WWTF, develop and submit to the Secretary a projection based on the WWTF's current operations and expected future loadings of whether it will exceed its annual mass limit during the permit term.

b) If the WWTF is not projected to exceed its annual mass limit within the permit term, the WWTF shall reassess when it is projected to reach its annual mass limit prior to permit renewal and submit that information with its next permit application.

c) If the WWTF is projected to exceed its annual mass limit 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 submitted under Part 2 of this Section. The PERP shall be submitted to the Secretary to ensure the WWTF continues to comply with its annual mass limit.

d) 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 Permittee shall revise the PERP, if required by the Secretary. The PERP shall be developed by qualified professionals in consultation with the WWTF operator. The PERP shall include:

e) An evaluation of alternatives to ensure the WWTF's compliance with its annual mass limit;

f) An identification of the chosen alternative or alternatives to ensure the WWTF's compliance with its annual mass limit;

g) A proposed schedule, including an engineer approved design and construction schedule and, if the chosen alternative or alternatives require a pilot study, a schedule for testing, that shall ensure the WWTF's compliance with its annual mass limit as soon as possible; and

h) A financing plan that estimates the costs for implementing the PERP and describes a strategy for financing the project.

5. The Permittee shall report according to the following table:

Due Date	Event Description
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10/29/2021	The Permittee shall submit a POP and implement optimization techniques to achieve reductions in TP 120 days after the permit effective date.
12/28/2021	The Permittee shall commence implementation of the POP 60 days after submitting to the Secretary.
1/31/2022	The Permittee shall submit an annual report that documents TP trends and optimization techniques.
1/31/2023	The Permittee shall submit an annual report that documents TP trends and optimization techniques for the previous year.
1/31/2024	The Permittee shall submit an annual report that documents TP trends and optimization techniques for the previous year.
1/31/2025	The Permittee shall submit an annual report that documents TP trends and optimization techniques for the previous year.
	<i>The Permittee shall submit an annual report that documents TP trends and optimization</i>

H. QUALITY ASSURANCE REPORT / PROFICIENCY TESTING

1. In accordance with 10 V.S.A. § 1263.d.2, the Secretary may require a laboratory quality assurance sample program to ensure qualification of laboratory analysts. For purposes of demonstrating compliance with the requirements 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.
2. In the event this permit is administratively continued pursuant to 3 V.S.A. § 814, the Permittee shall continue to complete annual proficiency tests and report by December 31 each year.
3. The Permittee shall report on quality assurance according to the following table:

Due Date	Event Description
12/31/2021	The Permittee shall submit a passing Laboratory Proficiency Test.
12/31/2022	The Permittee shall submit a passing Laboratory Proficiency Test.
12/31/2023	The Permittee shall submit a passing Laboratory Proficiency Test.
12/31/2024	The Permittee shall submit a passing Laboratory Proficiency Test.
12/31/2025	The Permittee shall submit a passing Laboratory Proficiency Test.

I. BIOCIDES CHEMICAL USAGE REPORT

1. The Permittee shall track biocide chemical class, types, and amounts used at the facility on a semi-annual basis.
2. Usage of such chemicals shall be in accordance with the label pursuant to 40 C.F.R. § 156.10(i)(2)(ii) to prevent and control negative impacts to the receiving water. Chemical amounts and treatment durations shall not exceed specific product label, or chemical Safety Data Sheet, requirements.
3. Annual reports shall include the following information:
 - a) The active ingredient or type of chemical used at the facility.

- b) The total quantity in pounds or concentration in ug/L or mg/L used within the reporting period.
- c) An indicator for whether doses applied are treated prior to discharging.
- d) A description for whether the dosing and duration of chemical used exceeded the product label requirements at any time during the reporting period.
- e) Any changes in the types of biocide chemicals used and their corresponding maximum dose values.
- f) Each biocide chemical type included in the report shall have a corresponding chemical Safety Data Sheet attachment.

4. The Permittee shall report on biocide chemical usage according to the following table:

Due Date	Event Description
6/30/2022	The Permittee shall submit the Biocide Chemical Semi-Annual Report.
12/31/2022	The Permittee shall submit the Biocide Chemical Semi-Annual Report.
6/30/2023	The Permittee shall submit the Biocide Chemical Semi-Annual Report.
12/31/2023	The Permittee shall submit the Biocide Chemical Semi-Annual Report.
6/30/2024	The Permittee shall submit the Biocide Chemical Semi-Annual Report.
12/31/2024	The Permittee shall submit the Biocide Chemical Semi-Annual Report.
6/30/2025	The Permittee shall submit the Biocide Chemical Semi-Annual Report.
12/31/2025	<i>The Permittee shall submit the Biocide Chemical Semi-Annual Report.</i>

II. GENERAL CONDITIONS

A. GENERAL REQUIREMENTS

1. 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 (Environmental Protection Rule, Chapter 13), and § 402 of the Clean Water Act, as amended.

2. Operating Fees

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

3. Duty to Comply

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.B.5) and “Emergency Pollution Permits” (Condition II.B.8), nothing in this permit shall be construed to relieve the Permittee from civil or criminal penalties for noncompliance.

4. Civil and Criminal Liability

Civil and criminal penalties for non-compliance are provided for in 40 C.F.R. § 122.41(a)(2)-(3) and 10 V.S.A. Chapters 47, 201, and 211. As of the effective date of this permit, the Vermont statutory penalties, which are subject to change, are as follows:

- a. Pursuant to 10 V.S.A. Chapter 47, a civil penalty not to exceed \$10,000.00 a day for each day of violation.

b. Pursuant to 10 V.S.A. Chapter 47, a fine not to exceed \$25,000.00 or imprisonment for not more than six months, or both.

c. Pursuant to 10 V.S.A. Chapter 47, any person who knowingly makes any false statement, representation or certification in any application, record, report, plan, or other document filed or required to be maintained by this permit, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained by this permit, shall upon conviction, be punished by a fine of not more than \$10,000.00 or by imprisonment for not more than six months, or by both.

d. Pursuant to 10 V.S.A. Chapter 201, a penalty of not more than \$42,500.00 for each determination of a separate violation. In addition, if the Secretary determines that a violation is continuing, the Secretary may assess a penalty of not more than \$17,000.00 for each day the violation continues. The maximum amount of penalty assessed under this provision shall not exceed \$170,000.00.

e. Pursuant to 10 V.S.A. Chapter 211, a civil penalty of not more than \$85,000.00 for each violation. In addition, in the case of a continuing violation, a penalty of not more than \$42,500.00 may be imposed for each day the violation continues.

5. Reopener Clause

In accordance with 40 C.F.R. § 122.44(c), this permit may be reopened and modified during the life of the permit to incorporate any applicable standard for sewage sludge use or disposal promulgated under section 405(d) of the Clean Water Act. The Secretary may promptly modify or revoke and reissue this permit if the standard for sewage sludge use or disposal is more stringent than any requirements for sludge use or disposal in the permit, or controls a pollutant or practice not limited in the permit.

6. Permit Modification, Suspension, and Revocation

Pursuant to 40 C.F.R. § 124.5, the Secretary may modify, revoke and reissue, or terminate for cause, in whole or in part, the authorization to discharge under this permit. These actions may be taken for the reasons specified in 40 C.F.R. § 122.62 (modification or revocation and reissuance) and § 122.64 (termination), including:

- a.** Violation of any terms or conditions of this permit;
- b.** There are material and substantial alterations or additions to the permitted facility or activity;
- c.** New information is received that was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and would have justified the application of different permit conditions at the time of issuance;
- d.** To correct technical mistakes, such as errors in calculation, or mistaken interpretations of law made in determining permit conditions;
- e.** Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;
- f.** Reallocation of WLA under the LC TMDL;
- g.** A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

- h.** Development of effluent limitation guidelines based on the final Clean Water Act (CWA) authorized method for PFAS detection in wastewater effluent.

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

7. 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 § 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.A.6 of this permit, in accordance with the toxic effluent standard or prohibition and the Permittee so notified.

8. Other Materials

Other materials ordinarily produced or used in the operation of this facility, which have been specifically identified in the application, may be discharged at the maximum frequency and maximum level identified in the application, provided:

a. They are not:

(i) Designated as toxic or hazardous under provisions of Sections 307 and 311, respectively, of the Clean Water Act, or

(ii) Known to be hazardous or toxic by the Permittee, except that such materials indicated in (i) and (ii) above may be discharged in certain limited amounts with the written approval of, and under special conditions established by, the Secretary or their designated representative, if the substances will not pose any imminent hazard to the public health or safety;

b. The discharge of such materials will not violate the Vermont Water Quality Standards; and

c. The Permittee is not notified by the Secretary to eliminate or reduce the quantity of such materials entering the water.

9. Removed Substances

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.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

11. Duty to Provide Information

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

12. 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.

13. 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.

14. Confidentiality

Pursuant to 10 V.S.A. § 1259(b):

Any records or information obtained under this permit program that constitutes trade secrets under 1 V.S.A. § 317(c)(9) shall be kept confidential, except that such records or information may be disclosed to authorized representatives of the State and the United States when relevant to any proceedings under 10 V.S.A. Chapter 47.

Claims for confidentiality for the following information will be denied:

- a. The name and address of any permit applicant or Permittee.
- b. Permit applications, permits, and effluent data.
- c. Information required by application forms, including information submitted on the forms themselves and any attachments used to supply information required by the forms.

15. Navigable Waters

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

16. 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.

17. Duty to Reapply

If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must apply for and obtain a new permit. The Permittee shall submit a new application at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Director. The Director shall not grant permission for applications to be submitted later than the expiration date of the existing permit.

18. Other 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.

B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper 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 properly operate and maintain in good working order all facilities and systems of treatment and control (and related appurtenances) installed or used by the Permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by the Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.
- b.** The Permittee shall provide an adequate operating staff, consistent with the Operator Rule (Environmental Protection Rule, Chapter 4), which is duly qualified to carry out the operation, maintenance, and testing functions required to ensure compliance with the conditions of this permit; and
- c.** The operation and maintenance of the WWTF shall be performed only by a person or persons holding a valid license to engage in the practice of pollution abatement facility operation.

2. Need to Halt or Reduce Activity not a Defense

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.

3. Duty to Mitigate

The Permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. The Permittee shall also take all reasonable steps to minimize or prevent any adverse impact to waters of the State, the environment, or human health resulting from non-compliance with any condition specified in this permit, including accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.

4. Dry Weather Flows

Dry weather flows of untreated municipal wastewater from any sanitary or combined sewers are not authorized by this permit and are specifically prohibited by state and federal laws and regulations. If for any reason there is a discharge to waters of the State of dry weather flows of untreated municipal wastewater from any sanitary or combined sewer, the operator of the WWTF or the operator's delegate shall comply with the notice requirements outlined in this permit.

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.

In addition to § 1268 findings, such bypass must meet the following three conditions:

- a.** Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
- b.** There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
- c.** The Permittee submitted notices as required under 40 C.F.R. § 122.41(m)(3):
 - (i) Anticipated bypass. If the Permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.
 - (ii) Unanticipated bypass. The Permittee shall submit notice of an unanticipated bypass as required in Condition II.D.3 (24-hour notice).

6. Upset

a. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Condition II.B.6.b of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

b. Conditions necessary for a demonstration of upset. A Permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

- (i) An upset occurred and that the Permittee can identify the cause(s) of the upset;
- (ii) The permitted facility was at the time being properly operated; and
- (iii) The Permittee submitted notice of the upset as required in Condition II.D.3 (24-hour notice).
- (iv) The Permittee complied with any remedial measures required under Condition II.B.3.

c. Burden of proof. In any enforcement proceeding the Permittee seeking to establish the occurrence of an upset has the burden of proof.

8. Emergency Pollution Permits

a. 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.D.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:

- (i) 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;
- (ii) the denial of an emergency pollution permit would work an extreme hardship upon the applicant;
- (iii) the granting of an emergency pollution permit will result in some public benefit;
- (iv) the discharge will not be unreasonably harmful to the quality of the receiving waters; and
- (v) the cause or reason for the emergency is not due to willful or intended acts or omissions of the applicant.

b. Application shall be made to the Secretary at the following address: Agency of Natural Resources, Department of Environmental Conservation, One National Life Drive, Davis 3, Montpelier VT 05620-3522.

C. MONITORING REQUIREMENTS

1. Monitoring and Records

a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

b. Except for records of monitoring information required by this permit related to the Permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least 5 years (or longer as required by 40 C.F.R. § 503), the Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period shall be extended during the course of unresolved litigation and may be extended by request of the Secretary at any time.

c. Records of monitoring information shall include:

- (i) The date, exact place, and time of sampling or measurements;
- (ii) The individual(s) who performed the sampling or measurements;
- (iii) The date(s) analyses were performed;
- (iv) The individual(s) who performed the analyses;

(v) The analytical techniques or methods used; and

(vi) The results of such analyses.

(vii) The records of monitoring activities and results, including all instrumentation and calibration and maintenance records;

(viii) 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

(ix) 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.

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

d. Monitoring must be conducted according to test procedures approved under 40 C.F.R. § 136 unless another method is required under 40 C.F.R. Subchapters N or O.

2. Quality Control

a. 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.

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

3. Right of Entry

The Permittee shall allow the Secretary, or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

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.

D. REPORTING 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 advance notice to the Secretary of such changes. This notification applies to pollutants which are subject neither to effluent limitations in this permit, nor to notification requirements for toxic pollutants under 40 C.F.R. § 122.42(a)(1). Following such notice, the permit may be modified, pursuant to Condition II.A.6 of this permit, to specify and limit any pollutants not previously limited.

2. Change in Introduction of Pollutants to WWTF

a. The Permittee, within 30 days of the date on which the Permittee is notified of such discharge, shall provide notice to the Secretary of the following:

- (i) Any new introduction of pollutants into the treatment works from a source which would be a new source as defined in § 306 of the Clean Water Act if such source were discharging pollutants;
- (ii) Except for such categories and classes of point sources or discharges specified by the Secretary, any new introduction of pollutants into the treatment works from a source which would be subject to § 301 of the Clean Water Act if such source were discharging pollutants; and
- (iii) Any substantial change in volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into such works at the time of issuance of the permit.

b. The notice shall include:

- (i) The quality and quantity of the discharge to be introduced into the system, and
- (ii) The anticipated impact of such change in the quality or quantity of the effluent to be discharged from the WWTF.

3. 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 subdivisions c and d of this subsection.

c. Pursuant to 10 V.S.A. § 1295, notice for “untreated discharges,” as defined in section III.

(i) Public notice. For “untreated discharges” an operator of the 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 the 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:

(a) 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.

(b) Except for discharges from the WWTF to a separate storm sewer system, the date and approximate time the untreated discharge began.

(c) 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.

(d) Except for discharges from the 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.

(e) 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.

(f) The person reporting the untreated discharge.

d. For any non-compliance not covered under Condition II.D.3.c of this permit, an operator of the WWTF or the operator’s delegate 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 of becoming aware of such condition:

(i) Cause of non-compliance;

- (ii) A description of the non-complying discharge including its impact upon the receiving water;
- (iii) Anticipated time the condition of non-compliance is expected to continue or, if such condition has been corrected, the duration of the period of non-compliance;
- (iv) Steps taken by the Permittee to reduce and eliminate the non-complying discharge; and
- (v) Steps to be taken by the Permittee to prevent recurrence of the condition of non-compliance.

e. For noncompliance events related to combined sewer overflows, sanitary sewer overflows, or bypass events, these reports must include the data described above (with the exception of time of discovery) as well as the type of event (sanitary sewer overflows, or bypass events), type of sewer overflow structure (e.g., manhole, outfall pipe), discharge volumes untreated by the treatment works treating domestic sewage, types of human health and environmental impacts of the sewer overflow event, and whether the noncompliance was related to wet weather.

4. Planned Changes

a. The Permittee shall give notice to the Secretary as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

- (i) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 C.F.R. § 122.29(b); or
- (ii) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements at 40 C.F.R. § 122.42(a)(1).
- (iii) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

5. 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
- (iii) The prospective owner or operator has adequate funding to operate and maintain the treatment system and remain in compliance with the terms and conditions of the permit.

c. The date of the sale or transfer.

The Secretary may require additional information dependent upon the current status of the facility operation, maintenance, and permit compliance.

6. Monthly Reporting

a. The Permittee is required to submit monthly reports of monitoring results 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.

b. Unless waived by the Secretary, the Permittee shall electronically submit its DMRs via Vermont's on-line 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 electronic submittals are submitted through the State of Vermont Agency of Natural Resources' Online Services Portal, or its replacement.

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

7. Signature Requirements

a. All reports shall be signed:

(i) For a corporation. By a responsible corporate officer or a duly authorized representative of that person. For the purpose of this section, a responsible corporate officer means: (1) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (2) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

(ii) For a partnership or sole proprietorship. By a general partner or the proprietor, respectively; or

(iii) For a municipality, state, or other public agency. By either a principal executive officer or ranking elected official, or a duly authorized representative of that person.

b. For the purposes of subdivision (d) of this subsection, a person is a duly authorized representative only if:

(i) The authorization is made in writing by a person described in subdivision (d) of this subsection;

(ii) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, or an individual or position having overall responsibility for environmental matters for the company; and

(iii) The written authorization is submitted to the Secretary.

c. Changes to authorization. If an authorization under subdivision (e) of this subsection is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of subdivision (e) of this subsection must be submitted to the Secretary prior to or together with any reports, information, or applications to be signed by an authorized representative.

d. Certification. Any person signing a document under subdivisions (d) or (e) of this subsection shall make the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

8. 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.

III. 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 § 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 D

Total Toxic Organics (TTO)

The term "total toxic organics" in Condition I.A.1 and I.B.m. shall mean the sum of the concentrations for each of the following toxic organic compounds, which are found in the discharge (S/N 001) at a concentration greater than ten micrograms per liter (10 ug/l). The permittee will be required to report the analysis for those individual toxic organics listed below that are greater than ten micrograms per liter.

1,2,4-trichlorobenzene	dibutyl phthalate
chloroform*	anthracene
1,2-dichlorobenzene	butyl benzyl phthalate
1,3-dichlorobenzene	1,2-diphenylhydrazine
1,4-dichlorobenzene	1,1-dichloroethylene
ethylbenzene	2,4,6-trichlorophenol
1,1, 1-trichloroethane	carbon tetrachloride
methylene chloride	1,2-dichloroethane
naphthalene	1,1,2-trichloroethane
2-nitrophenol	dichlorobromomethane
phenol	trichloroethylene
bis (2-ethylhexyl) phthalate	toluene
tetrachloroethylene	isophorone
2-chlorophenol	4-nitrophenol
pentachlorophenol	2,4-dichlorophenol

*Chloroform has been detected in the intake water, obtained from the Champlain Water District, in concentrations of 0.065 ppm. The source is chlorine used to disinfect the drinking water supply. The intake concentrations will continue to be included in the TTO calculations. Both the concentrations of chloroform from the intake water and from the permittee's wastewater will be shown on monthly monitoring reports. This will more accurately represent the permittee's actual contribution of chloroform to the wastewater discharge.

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 **AMENDED** PERMIT
(November 2021)

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

PERMIT NO: 3-1295
PIN: EJ91-0002
NPDES NO: VT0000400

NAME AND ADDRESS OF APPLICANT:

GLOBALFOUNDRIES U.S 2 LLC
1000 River Road
Essex Junction, Vermont 05452

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

GLOBALFOUNDRIES
1000 River Road
Essex Junction, Vermont 05452

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. Facility and Proposed Action

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 1, 2008 and was later transferred to the above-named applicant on June 24, 2015. The facility's previous permit was issued on January 15, 2004. 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 the treatment of wastewater effluent from semiconductor manufacturing (Standard Industrial Classification (SIC) code 3674 for Semiconductors and Related Activities) and development activities

using three main processes: chemical metal polishing (CMP) pretreatment, biological wastewater treatment, and industrial wastewater treatment. It is classified as a Grade II Domestic Major and Grade II Industrial Metals NPDES WWTF.

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. 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, WWTFs must meet performance-based requirements based on available wastewater treatment technology. CWA § 301(b)(1)(B). The performance level for WWTFs is referred to as “secondary treatment.” Secondary treatment is comprised of technology-based requirements expressed in terms of BOD5, TSS and pH; 40 C.F.R. Part 133.

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.

III. Facility History and Background

International Business Machines (IBM) owned and operated the semiconductor manufacturing facility and industrial wastewater treatment system located in Essex Junction, VT from 1960 to 2015. During this time, the facility was covered under direct discharge permit 3-1295. In June of 2015, IBM transferred facility and permit 3-1295 ownership to GLOBALFOUNDRIES U.S. Inc. (GF or Global). At this time, the remediation of groundwater was regulated by a mutually agreed upon Consent Order between IBM and Vermont Agency of Natural Resources (VTANR). Per the conditions of the sale, IBM continues to operate groundwater remediation systems at the facility under the NPDES Direct Discharge Permit, No. 3-1559.

Prior to the transfer of ownership to GF, flows from the IBM groundwater treatment equalization tank, now covered under 3-1559, were conveyed to the Industrial Waste Treatment Facility (IWTF) which is covered under this permit, 3-1295. Within the equalization tank, treated groundwater commingled with treated process wastewater from the semiconductor facility. These two treatment systems were physically separated, such that no treated groundwater is conveyed to S/N 001 under 3-1295, as part of the 2015 final sale agreement between both companies.

In 2003, the permit received comments during the public noticing period which were thoroughly reviewed and responded to. These comments were carefully considered and incorporated to the current permit conditions along with results from a new reasonable potential determination. The Secretary's response to these comments are referenced where necessary throughout this document.

IV. Description of Discharge

GLOBALFOUNDRIES maintains a complex wastewater treatment facility engaged in the treatment of sanitary and industrial wastewater via three main processes: chemical metal polishing (CMP) pretreatment, biological wastewater treatment, and industrial wastewater treatment (See Attachment B.1).

- The Chemical Metal Polishing (CMP) pretreatment process includes an equalization basin, reaction tanks, a holding tank, and thickeners.
- The Biological wastewater treatment process includes three Sequencing Batch Reactors (SBRs) with a jet aeration system. The SBRs have 14 steps to achieve complete nitrification and biological phosphorus removal. Sugar and dog food are added to the SBRs as necessary, to provide adequate food for the biological treatment system. Sanitary wastewater is treated in the Biological wastewater treatment process is mixed with the Industrial wastewater and disinfected via a pH adjustment process prior to discharge. This is captured under Metal Finishing Category Guidelines per 40 CFR Part 433 and Electrical and Electronic Components Category Guidelines per 40 CFR Part 469.
- The Industrial waste treatment process includes solids contact and reactor type clarifiers in which pH adjusted wastewater is combined with conditioned solids, lime and polymer in a center reaction well, and metals are precipitated out.

- Solids are dewatered in two plate and frame filter presses and hauled to the Coventry Landfill for use as daily cover. Any solids removed from cleaning tanks in the wastewater treatment process are either returned to the system for full treatment or managed as hazardous waste.

GLOBALFOUNDRIES also operates and maintains a stormwater management system. The facility maintains a Stormwater Pollution Prevention Plan (SWPPP) that tracks control measures, otherwise best management practices (BMPs) conducted by the Permittee to minimize pollutant discharges, and routine inspections and maintenance for the stormwater system.

The Facility Design Flow is 12.4 CFS (8 MGD). The average flow to the facility over the last 5 years is about 3.2 MGD.

The WWTF maintains a constant discharge to the Winooski River from S/N 001.

V. Description of Receiving Water

The receiving water for this discharge is the Winooski River, a designated Warm Water Fish Habitat. At the point of discharge, the river has a contributing drainage area of 1049.0 square miles. The summer 7Q10 flow of the river is estimated to be 146.9 cubic feet per second (CFS) and the summer Low Median Monthly flow is estimated to be 481.8 CFS. The instream waste concentration at the summer 7Q10 flow is 0.078 (>1%) and the instream waste concentration at the summer Low Median Monthly flow is 0.025 (>1%).

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.C.1. of this Fact Sheet.

Discharge mixing analyses were completed as part of the wastewater treatment facility upgrade completed in the mid-1990s, dilution modeling (CORMIX) was conducted in April 1995 and November 1997 (2003 Comment Response 9). Specifically, as part of a toxicity investigation in 1995, the Agency required the facility to conduct a mixing zone study to help assess potential instream impacts of Whole Effluent Toxicity associated with this discharge. In November 1997, after the Permittee had expanded their permitted discharge from 5.0 MGD to 8.0 MGD and modified the outfall, IBM, on their own accord, conducted additional mixing zone modeling to document the instream mixing of the increased discharge. The results of this modeling indicate that complete mix of IBM's discharge occurs approximately 30 meters (98 feet) downstream from the outfall pipe S/N 001 under 7Q10 flow conditions (2003 Comment Response 9).

The establishment of mixing zones is dependent on the methodology prescribed in the VWQS for applying numeric criteria. The VWQS prescribe a different methodology for applying toxic pollutant criteria than nontoxic pollutants. Toxic Substances of the VWQS mandates that the Secretary apply the toxic pollutant criteria either at the median annual stream flow for carcinogens or the 7Q10 flow for threshold toxicants and aquatic biota-based criteria. Such methodology utilized in the permit for the application of toxic pollutant criteria, is consistent with the Vermont Toxic Discharge Control Strategy (2003 Comment Response 10).

For non-toxic pollutant criteria (pH, E. coli, etc.) the VWQS do not prescribe the use of 7Q10 flow or median annual flows in the application of those water quality criteria. In those instances, the criteria always apply except where a permitted discharge qualifies for a mixing zone under the criteria established in the VWQS. The Secretary concludes that for the non-toxic pollutant's compliance with the discharge permit limitations will always ensure compliance with water quality criteria at the point of discharge and the need for a mixing zone is not triggered (2003 Comment Response 10).

VI. Limitations and Conditions

The Draft Permit contains monitoring requirements or numeric limitations for effluent flow, metals, nonmetals, nutrients, volatile organic compounds, whole effluent toxicity (WET) testing, biocide chemicals, and pre- and polyfluoroalkyl substances (PFAS).

- Metals: Cadmium, Chromium III, Copper, Cyanide, Zinc, Lead, Nickel, Silver, and Iron.
- Nonmetals: Escherichia coli, Fluoride, Hydrogen Peroxide, Oil and Grease, Total Suspended Solids, Total Toxics Organics, Ultimate Oxygen Demand, pH, five-day Biochemical Oxygen Demand, and Total Ammonia Nitrogen.
- Nutrients: Total Phosphorus, Nitrate/Nitrite, Total Nitrogen, and Total Kjeldahl Nitrogen.
- Volatile organic compounds: Tetrachloroethylene, Trichloroethylene, Dichloroethene, Vinyl Chloride, Ethyl Benzene, and Xylene.
- Total Toxic Organics
- Whole Effluent Toxicity No Observed (Chronic) Effect (i.e., mortality or reduced growth to the test population at a 7-day exposure interval of observation), otherwise NOEL-C.
- Biocide Chemicals
- PFAS:
 - 1) perfluorohexanesulfonic acid (PFHxS) or Perfluoro-1-hexanesulfonic acid (PFHxS),
 - 2) perfluoroheptanoic acid (PFHpA),
 - 3) perfluorooctanoic acid (PFOA),
 - 4) perfluorooctanesulfonic acid (PFOS) or Perfluoro-1-octanesulfonic acid (PFOS), and
 - 5) perfluorononanoic acid (PFNA).

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 2-6 of 35
Monitoring Requirements:	Pages 6-8 of 35

Necessary changes were made to remove the groundwater treatment system discharges that no longer apply to this permit 3-1295, but now are permitted separately under 3-1559 for IBM. Such changes significantly altered Draft Permit Condition I.A.

VII. Permit Basis and Explanation of Effluent Limitation Derivation

Discharge Point S/N 001 (sanitary and semi-conductor manufacturing treated wastewater, and treated intermittent non-contact cooling water):

A. **Flow** – The Draft Permit maintains the annual average flow limitation of 8.0 MGD. This facility maintains a constant discharge. Continuous flow monitoring is required.

B. Conventional Pollutants

1. **Biochemical Oxygen Demand (BOD₅)** – The monitor only requirements for BOD₅ remain unchanged from the current permit. The BOD₅ weekly monitoring requirement is effective from June 1st to October 31st of each year. This monitoring is necessary to derive the UOD loading from the facility discharge.
2. **Total Suspended Solids (TSS)** – The daily maximum concentration of 10.5 mg/L and daily maximum mass limit of 437.0 lbs./day remains unchanged from the current permit. The TSS weekly monitoring requirement

is unchanged from the current permit. These limitations were based on the concentration limitation and flow of 5.0 MGD which was permitted until March 19, 1997 when the discharge of 8.0 MGD was authorized. The concentration limit is based on the best professional judgement of the Agency for a properly treated effluent from this industrial and sanitary wastewater treatment facility.

3. *Escherichia coli* – The E. coli limitation is 77/100ml, instantaneous maximum, based upon the limitation in the current permit and the anti-backsliding provisions of Section 402(o) of the CWA. Weekly monitoring is required in the Draft Permit and unchanged from the current permit.

On 7/7/2020, GF notified the Secretary that the laboratory used to process E. Coli Samples switched to Method 9223B-2004 which is different from the permit specified Method 9213. This method is listed under EPA's Clean Water Act List of Approved Biological Methods for Wastewater and Sewage and Sludge. The new method remains in compliance with the NPDES permit.

4. pH – The pH limitation remains at 6.5 - 8.5 Standard Units as specified in Section 29A-303(6) in the Vermont Water Quality Standards. Monitoring remains at daily.

C. Non-Conventional and Toxics

1. Total Phosphorus (TP)

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 can 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 12,193 pounds of TP per year. This annual mass limitation was based on an allocation for TP 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, consistent with the annual load limit.

This proposed Draft Permit contains a **phosphorus** effluent concentration limit of 0.8 mg/l, monthly average, and a mass effluent limit of 4,872 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 2.210 metric tons per year or 4,872 pounds per year to the GLOBALFOUNDRIES WWTF.

This new, annual WLA represents a 60% reduction (-7,321 pounds) from the current permit and is equivalent to setting the effluent TP limit at 0.2 mg/L at the design capacity of the WWTF (8.0 MGD). 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 pound:

$$(2.210 \text{ mt/yr}) (2204.62\text{lbs/mt}) = 4872.0 \text{ lbs/yr}$$

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.G.2.c. 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. 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 0.20 mg/L, the permit does not include 0.20 mg/L as the concentration effluent limitation because a Permittee may not need to achieve 0.20 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 0.8 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.

Continued weekly sampling for total phosphorus is required in the Draft Permit.

Condition I.G.3.c 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 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.

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.

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.

Since less than five years have passed since the 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 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.G.3. 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 WWTF’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 and/or chemical **phosphorus** removal, incorporation of anaerobic/anoxic zones, septage receiving policies and procedures, and side stream management.

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 WWTF’s actual TP loads reach or exceed 80% of the LC TMDL WLA for the WWTF, based on the WWTF’s 12-month running annual load calculated using the Phosphorus Load Calculation (Condition I.G.2.d. of the permit) the Permittee shall, within 90 days of reaching or exceeding

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.

80% of the LC TMDL WLA for the WWTF, develop and submit to the Secretary a projection based on the WWTF'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 WWTF 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 WWTF 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 WWTF shall revise the PERP, if required by the Secretary.

The Permit was amended after being effective on July 1, 2021 to move the "Monitor % Monthly Total" in Condition I.A.1 for Total Phosphorus into the correct column (shifted a space to the left). This location is compatible with the Wastewater Inventory export report.

2. Total Nitrogen (TN)

To gather data on the amount of Total Nitrogen (TN) in this discharge and its potential impact on the receiving water, a monthly "monitor only" requirement for Nitrate/Nitrite (NO_x), and monthly "monitor only" from November to May and weekly "monitor only" from June to October for Total Kjeldahl Nitrogen (TKN) has 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 shall complete monthly monitoring unless more frequent sampling is already required by the current permit. Facilities with design flows less than 1 MGD shall complete quarterly monitoring unless more frequent sampling is already required by the current permit.

Monitoring is proposed to be "monitor only", on a weekly basis from June through October, and monthly from November through May. Weekly mass quantity and concentration results shall be reported as monthly average

and daily maximum values. Monthly mass quantity and concentration results shall be reported a daily maximum values for TN.

This constituent's monitoring frequencies received public comment during the current permit's public noticing period. These are unchanged from the current permit and the comments received are attached to this Fact Sheet.

For more information, see:

<https://www.epa.gov/sites/default/files/documents/nandfactsheet.pdf>

3. Total Kjeldahl Nitrogen (TKN)

TKN is the sum of nitrogen in the forms of ammonia (un-ionized (NH₃) and ionized (NH₄⁺)), soluble organic nitrogen, and particulate organic nitrogen.

The existing weekly "monitor only" requirement for the daily maximum and monthly average mass quantity of TKN in pounds per day from June 1st to October 31st remains in the Draft Permit. This monitoring is necessary to derive the UOD loading from the facility discharge.

Monitoring is proposed to be "monitor only", on a weekly basis from June through October, and monthly from November through May. Weekly mass quantity and concentration results shall be reported as monthly average and daily maximum values. Monthly mass quantity and concentration results shall be reported a daily maximum values for TKN. Results shall be used to calculate TN results.

This constituent's monitoring frequencies received public comment during the current permit's public noticing period. These are unchanged from the current permit and the comments received are attached to this Fact Sheet.

4. Nitrate/Nitrite (NO_x)

Nitrite Plus Nitrate as Nitrogen (NO_x) – Nitrite (NO₂⁻) and Nitrate (NO₃⁻) are oxidized forms of Nitrogen. NO_x is needed to calculate Total Nitrogen (TN). To gather data on the amount of Total Nitrogen in this discharge, Nitrite (NO₂⁻) plus Nitrate (NO₃⁻) monitoring is proposed in the renewed permit. The proposed monitoring is once per weekly for the summer and once per monthly during the winter.

The sum of Nitrite (NO₂⁻) and Nitrate (NO₃⁻) is represented as NO_x to simplify the notation in wastewater chemistry. The x represents the number of Oxygen atoms (2 or 3) and the negative charge notation (-) is dropped. This notation is also used in atmospheric chemistry where other oxidation states are possible.



Test results are reported in terms of Nitrogen (N) because water quality standards are generally expressed in terms of Nitrogen for simplicity and consistency. This constituent (NO_x) is sometimes also shown as (NO₂/NO₃), No_x, NO_x, Nitrate/Nitrite Nitrogen, and Nitrite Plus Nitrate Total 1 Det. (As N).

Monitoring is proposed to be "monitor only", on a weekly basis from June through October, and monthly from November through May. Weekly mass quantity and concentration results shall be reported as monthly average and daily maximum values. Monthly mass quantity and concentration results shall be reported a daily maximum value for NO_x. Results shall be used to calculate TN results.

This constituent's monitoring frequencies received public comment during the current permit's public noticing period. These are unchanged from the current permit and the comments received are attached to this Fact Sheet.

5. Total Ammonia Nitrogen (TAN)

Ammonia has two forms of nitrogen, un-ionized (NH_3) and ionized (NH_4^+). TAN is the sum of both forms. A concentrated ammonia fluoride solution is used in the manufacturing process and ammonia is present in the discharge. However, as shown in the attached Reasonable Potential Determination (RPD), effluent TAN concentrations are below the instream water quality standard for ammonia, therefore a limitation is not needed. Continued monitoring is necessary to ensure the quality of the discharge does not change.

The RPD for TAN considers the instream VWQS criteria based on factors such as instream pH, temperature, assuming *Oncorhynchus* (e.g., Rainbow trout) are present in the receiving water, and the instream is at 7Q10 flow. TAN was assessed for both summer and winter conditions. The higher the water temperature, the less ammonia there can be in the river without affecting the biota which is why the criteria decreases when temperatures increase. The current permit was issued prior to the promulgation of the 2013 EPA Aquatic Life Criteria for Ammonia – Freshwater. No RP was calculated based upon the reported effluent data and the updated VWQS. TAN requirements remain unchanged from the twice monthly, “monitor only”, maximum daily and average monthly concentration requirement. This will continue to evaluate the potential for toxicity in the receiving water and to collect nutrient information to support further analysis of the Lake Champlain TP TMDL.

6. Ultimate Oxygen Demand (UOD)

The UOD mass effluent maximum daily limitation for this discharge remains as 2300 lbs./day and shall only be monitored weekly from June 1st to October 31st. This limitation is based on the 1988 Lower Winooski River Wasteload Allocation Order (WLA study). The Secretary maintains this WLA because the physical data collected in the river such as the slope, reaeration rates, river velocity, time of travel, reach length, etc. during the WLA Study and utilized in the computer modeling to develop the Winooski River Wasteload Allocation have not changed and are still valid (2003 Comment Responses 14). Since phosphorus can accelerate algal activity in a river which exerts an oxygen demand, the model for the Allocation assumed a phosphorus effluent concentration of 1.0 mg/l from all the point sources in the river.

Since all the point sources in the lower Winooski River are now required to discharge 0.8 mg/L or less phosphorus per the Lake Champlain Phosphorus TMDL, the Lower Winooski Wasteload Allocation has become more conservative over time. Additionally, the Colchester No. 2 wastewater treatment facility discharge was allocated 350 pounds per day of UOD but this discharge does not exist, therefore the Winooski River Wasteload Allocation still ensures that the VWQS for dissolved oxygen in Class B waters are met (2003 Comment Responses 14).

The UOD limit is a Maximum Day limitation; meaning Maximum Day as "The highest allowable "daily discharge" (mg/l, lbs or gallons)". To properly calculate the Maximum Day UOD of a discharge, the BOD and TKN values collected on the same day must be used. Otherwise, the UOD calculated would be invalid since the pollutants were not measured on the same day and are not representative of the discharge (2003 Comment Response 15). With respect to establishing BOD and TKN limitations, since UOD is calculated from a ratio-based formula, attempting to establish individual BOD and TKN limitations is not appropriate since there can be countless BOD and TKN combinations used in the formula and the discharge could still comply with the UOD limitation (2003 Comment Response 15).

7. Metals

The water quality based effluent limitations (WQBELs) and technology based effluent limitation (TBELs) for metals in the Draft Permit are based on the Vermont Water Quality Standards (VWQS) or the current federal categorical effluent limitations. Since this discharge is subject to the 40 CFR Part 433.16, the concentration based effluent parameters for this subsection were included in the permit. Mass loading effluent limitations for Total Cadmium (monthly average and maximum day), Total Copper (monthly average), Total Lead (monthly average and maximum day), Total Nickel (monthly average), Total Silver (monthly average and maximum day), and Total Zinc (monthly average and maximum day) have been calculated as WQBELs (2003 Comment Response 1 & 3). These were calculated using both acute and chronic thresholds protective of the aquatic biota in the VWQS. TBELs for the mass loadings of Total Chromium III (monthly average and maximum day) and Total Nickel (maximum day) were incorporated into the permit which are specified in 40 CFR 433.16 (2003 Comment Response 1 & 3). These TBELs are based on the characteristics of specific industrial wastewater and the availability of wastewater treatment technologies to produce a specific effluent quality.

The mass effluent limitation was calculated for each parameter in 40 CFR 433.16 based on the categorical standard concentration limitation and flow of 8.0 MGD. Mass effluent limitations for each parameter were calculated based on the 2017 Vermont Water Quality Standards using an upstream hardness of 51 mg/L, a 7Q10 flow in the receiving water of 146.9 CFS and a discharge flow of 8.0 MGD. The Secretary compared the VWQS base limitation with the Metal Finishing based limitation for each parameter and included the most restrictive mass limitation in the permit.

From 1974 through 1976, 14 actual hardness values were collected in the Winooski River with the mean hardness being 57 mg/l. In the 1990s, calcium and magnesium were sampled in the Winooski River. Nine Calcium and Magnesium samples were collected. The mean of these samples was 16.2 mg/l of Calcium and 2.6 mg/l of Magnesium. These values were then used to calculate hardness. The Secretary used the standard formula for calculating hardness:

$$\text{Hardness mg/l} = [(2.497(\text{Ca mg/l})) + (4.118(\text{Mg mg/l}))]$$

The average was calculated to be 51 mg/l (2003 Comment Response 11). This value was used to assess metal concentrations dependent on the hardness within the receiving water.

With respect to the protection of human health criteria within the VWQS, many of the heavy metal effluent limitations proposed for pollutants discharging from S/N 001 are based on the criteria to protect aquatic life or are technology based effluent limitations. These limitations are more stringent than effluent limitations derived for the protection of human health. The properties of each pollutant (toxicity, carcinogenic potential, bioaccumulation factor, etc.) were considered when developing the Draft Permit (2003 Comment Response 4).

Due to analytical limitations when collecting instream samples, no practical method is known to consider background metal pollutant concentrations to develop permit limits. Specifically, at 7Q10 flow conditions, when there is no runoff or sediment transport in a river environment due to the absence of rainfall, the analytical results from the instream sampling have indicated that the metals are below the level of detection (2003 Comment Response 6).

A review of historical metals analyses conducted on this facility and downstream discharges, indicates that low concentrations of Total Copper and Total Zinc have been consistently detected. All other metals were consistently at or below the level of detection. While individually the discharge of Total Copper and Total Zinc from these sources is not significant, the Secretary believes that cumulatively these constituents in downstream discharges

should be reflected in the permit (2003 Comment Response 6). The cumulative contribution of these metals was assessed to ensure loadings over the permit term do not have the potential to violate the VWQS in the Winooski River, specifically for Total Copper and Total Zinc. Limits were formulated in consideration of the loads cumulatively discharged from downstream sources.

Limited sediment studies have been conducted at the mouth of the Winooski River and in Lake Champlain for various toxic pollutants including heavy metals. In 1992, the US Geological Survey conducted metals and nutrient analyses on sediment screening samples in all tributaries of Lake Champlain (2003 Comment Response 7). The results of this study showed typical accumulations of metals in the sediments in the Winooski River. In the early 1990s, the University of Vermont conducted a multiphase sediment quality study in Lake Champlain. During Phase I of the study, sediment in 30 locations in Lake Champlain, including the mouth of the Winooski River, were sampled to determine if excessive pollutant accumulation was present in the sediments. The samples were analyzed for metals, PCBs, PAHs and chlorinated pesticides. The results of the study indicated that the sediment sampled at the mouth of the Winooski River did not have excessive concentrations of these pollutants when compared to the National Oceanic and Atmospheric Administration guidelines for sediment quality. However, the study did identify several sites in Lake Champlain, (Inner Burlington Harbor, Cumberland Bay, St. Albans Bay, and Malletts Bay) that had excessive accumulation of metals and/or organic pollutants in the sediment when compared to the National Oceanic and Atmospheric Administration guidelines for sediment quality. It should be noted that these areas of the lake are not hydrologically connected to the Winooski River and therefore the level of pollutants in these areas cannot be attributed to the discharge from the facility or other discharges in the Winooski River (2003 Comment Response 7).

To properly study pollutant accumulation in sediments, the sediment must be exposed to a discharge for a long period of time to allow for a measurable change in sediment quality from background conditions to occur (2003 Comment Response 8). Due to flow dynamics of rivers in Vermont, which can have very high springtime flows and low summertime flows, sediment loads are transported downstream in a very unpredictable manner. Widely fluctuating flows often result in bottom scouring and unpredictable sediment transport. Therefore, establishing representative sampling stations which allow for the monitoring of sediments receiving long term exposure to the discharge is extremely difficult and would yield scientifically questionable results. This problem is compounded in the lower Winooski River since there are five municipal wastewater treatment facility discharges and one industrial discharge (Burlington Electric – McNeil Generating Station) downstream of the facility discharge. Also, this reach of river receives agricultural land runoff and urban runoff. Since heavy metals are naturally occurring, all these discharges would contain trace amounts of these pollutants which will accumulate in sediment over time. Consequently, it would be difficult to attribute the accumulation of these pollutants to a specific discharge. There are no regulatory standards for defining an acceptable concentration of heavy metals in sediment (2003 Comment Response 8). The background sediment quality can vary greatly between watersheds due to different soil types and surficial geology in each watershed.

- a. **Cadmium (Cd)**—The current permit contains a Cd limitation of 1.93 lbs./day daily maximum and 0.69 lbs./day, monthly average. These limitations are based on the VWQS which were more restrictive than the mass effluent limitations based on 40 CFR 433.16. The VWQS for Total Cadmium have changed since the last permit. An updated monthly average limit of 0.42 lbs/day and daily maximum limit of 0.62 lbs/day should be included in the permit. The existing concentration limits of 0.11 mg/l maximum day and 0.07 mg/l monthly average should be retained, although it should be noted that a very low effluent flow rate would be required to achieve these concentrations while also staying in compliance with the mass based limits. The monitoring frequency in the Draft Permit was originally proposed as monthly but based on comments received during the public noticing period, the frequency was changed back to semi-annually in the Final Permit. Monitoring shall occur during the months of February and July. Results shall be submitted for each specified month's discharge

monitoring reports and WR-43s. February reports are due by March 15th and July reports by August 15th of every year.

The comment responsiveness summary is attached to this Fact Sheet.

- b. **Chromium (Cr) III**—The current permit contains a Cr limitation of 184.81 lbs./day daily maximum and 114.09 lbs./day monthly average. These limitations are based on the 40 CFR 433.16 which are more restrictive than the mass effluent limitations based on the VWQS. The existing permit states that Cr was not used significantly at the IBM operated facility, but show Cr is detected in the discharge. The VWQS for Total Chromium III have changed since the last permit. An updated monthly average limit of 45.7 lbs/day and daily maximum limit of 66.7 lbs/day were included in the permit. The existing concentration limits of 2.77 mg/l maximum day and 1.71 mg/l monthly average were retained. The monitoring frequency in the Draft Permit was originally proposed as monthly but based on comments received during the public noticing period, the frequency was changed back to semi-annually in the Final Permit. Monitoring shall occur during the months of February and July. Results shall be submitted for each specified month's discharge monitoring reports and WR-43s. February reports are due by March 15th and July reports by August 15th of every year.

The comment responsiveness summary is attached to this Fact Sheet.

- c. **Copper (Cu)**— The current permit contains a Cu limitation of 7.18 lbs/day daily maximum and 5.14 lbs/day monthly average. These limits were originally based on the 2000 VWQS which have since changed. The current 2017 VWQS are more restrictive than the 2000 VWQS and the 40 CFR 433.16 criteria.

In 2003 the effluent limits for metals were challenged during the public comment period for not considering the instream assimilative capacity, or otherwise contribution of metals, specifically Copper and Zinc from the six NPDES direct discharge permitted facilities downstream from GLOBALFOUNDRIES, in the Lower Winooski: Essex Junction, South Burlington Airport Parkway, Winooski, Burlington East/Riverside, McNeil Generating Station, and Burlington North. The permit limits were revised to account for copper loading from the six facilities by subtracting them from the load originally calculated for the facility. Due to the lack of data available in 2003 for each facility downstream, these six facilities received monitor only permit conditions for Copper and Zinc and IBM, now GLOBALFOUNDRIES, received metals monitoring limits. This method was re-evaluated for each downstream facility for the permit renewal.

Reports submitted or stored via ANROnline, generated the effluent data analyzed for each facility under critical conditions. Some downstream facilities appeared to be discharging more copper than estimated in 2003 and determined potential concern for the copper assimilative capacity in the Lower Winooski to exceed VWQS. The Secretary presented these findings to stakeholders on August 19th, 2020. After meeting, the stakeholders crosschecked facility laboratory bench sheets with the data used for analysis to confirm accuracy. Revaluation of the data showed the copper discharged was closer to the 2003 estimates than originally believed and proved there is sufficient assimilative capacity in the receiving water for the seven facilities.

A new Cu limit of 3.5 lbs./day, daily maximum, and 2.6 lbs./day, monthly average limitation, is included in the Draft Permit. The new max day mass limit was based on multiplying the facility design flow and the maximum observed Total Copper concentration for each downstream direct discharge facility, then subtracting by the allowable daily load estimated for the Lower Winooski, 7 lbs/day. The new monthly average mass limit was calculated by multiplying the maximum observed flow from the facility by the maximum observed Cu concentration for each of the downstream WWTFs, then subtracting from the allowable monthly average load for segment of the Winooski River of 5 lbs/day. The existing concentration limits of 2.07 mg/L monthly average and 3.38 mg/L daily maximum are to be retained because the mass-

based limits are more protective of VWQS at full design flow. The monitoring frequency for Cu remains unchanged from the current permit and remains twice monthly.

- d. **Lead (Pb)**—The current permit contains a Pb limitation of 36.86 lbs./day, daily maximum and a 1.44 lbs./day, monthly average. These limits were based on the VWQS being more restrictive than the effluent limitations based on 40 CFR 433.16. The VWQS for Total Lead have changed since the last permit. An updated monthly average limit of 1.05 lbs./day and daily maximum limit of 1.81 lbs./day should be included in the permit. The existing concentration limits of 0.69 mg/l maximum day and 0.43 mg/l monthly average were retained, although it should be noted that a very low effluent flow rate would be required to achieve these concentrations will also staying in compliance with the mass based limits. The monitoring frequency for Pb remains unchanged from the current permit and remains twice monthly.
- e. **Nickel (Ni)**— The current permit contains a Ni limitation of 265.55 lbs./day daily maximum and 91.89 lbs./day monthly average. A new Ni limit of 39.66 lbs./day, daily maximum, and 22.95 lbs./day, monthly average limitation, has been incorporated into the Draft Permit. The daily maximum limitation was based on the 40 CFR 433.16 which are more restrictive than the mass effluent limitations based on the VWQS. The monthly average limitation was based on the VWQS which are more restrictive than the mass effluent limitations based on 40 CFR 433.16. The existing concentration limits of 3.98 mg/l maximum day and 2.38 mg/l monthly average should remain. The sampling frequency remains as twice monthly.
- f. **Silver (Ag)**— The current permit contains an Ag limitation of 1.4 lbs./day monthly average and 28.69 lbs./day daily maximum. New Ag limits of 0.97 lbs./day, daily maximum, and 0.66 lbs./day, monthly average limitation, have been included in the Draft Permit. The daily maximum limitation was based on the VWQS which are more restrictive than the mass effluent limitations based on the 40 CFR 433.16. The monthly average limitation was based on the 40 CFR 433.16 which are more restrictive than the mass effluent limitations based on VWQS. The VWQS for Total Silver have changed since the last permit. The existing permit states that Ag was not used significantly at facility. Based on monitoring history, Ag is present in the discharge. The existing concentration limits of 0.43 mg/l maximum day and 0.24 mg/l monthly average should be retained. The monitoring frequency in the Draft Permit was originally proposed as monthly but based on comments received during the public noticing period, the frequency was changed back to being semi-annually in the Final Permit. Monitoring shall occur during the months of February and July. Results shall be submitted for each specified month's discharge monitoring reports and WR-43s. February reports are due by March 15th and July reports by August 15th of every year.

The comment responsiveness summary is attached to this Fact Sheet.

- g. **Zinc (Zn)**—The current permit contains a Zn limitation of 52.68 lbs./day daily maximum and 52.68 lbs./day monthly average. VWQS for Total Zinc have changed since the permit was issued.

A new Zn limit of 37.97 lbs./day monthly average is proposed for the Draft Permit. The existing concentration limits of 2.61 mg/l maximum day and 1.48 mg/l monthly average should be retained, although it should be noted that a low effluent flow rate would be required to achieve these concentrations while staying in compliance with the mass based limits. The existing maximum day mass limit of 52.68 lbs./day should be retained because it is more protective than the newly calculated value. These limits were based on the VWQS being more restrictive than the effluent limitations based on 40 CFR 433.16. Sampling frequency remains the same, at twice monthly.

- h. **Cyanide**— The current permit contains a Total Cyanide limitation of 21.35 lbs./day daily maximum and 5.0 lbs./day monthly average. The 2017 VWQS have changed regarding the specification that the standards apply

to free cyanide. Revised limits of 6.97 lbs/day maximum day and 4.77 lbs/day monthly average should be included in the permit. The concentration limits of 1.2 mg/l maximum day and 0.65 mg/l monthly average should be retained. These limitations are more restrictive than the mass effluent limitations based on the 40 CFR 433.16. Sampling frequency has changed from semi-annually as required by the current permit, to monthly as proposed in the Draft Permit.

Condition I.A.1 was amended to correct the spelling for “Cyanide” as it was “Cynide”. This was misspelled in the permit effective July 1, 2021.

- i. **Iron (Fe)**—The Draft Permit contains a monthly “monitor only” requirement for Fe and is unchanged from the current permit.

The iron effluent limitation for this facility was eliminated in 1995. Permits issued prior to 1995 contained an effluent iron limitation of 0.1 mg/l daily maximum and 0.3 mg/l monthly average. These limitations were based on informal recommendations from the Secretary to protect aquatic life that were not formally adopted in the VWQS. During the revisions to the VWQS in May 27, 1991, an instream iron criteria of 1000 ug/l (or 1 mg/l) was formally adopted as part of the VWQS (2003 Comment Response 17). The anti-backsliding requirements would be triggered if there was a relaxation of technology based effluent limitations and would be potentially triggered if there was relaxation of water quality based effluent limits. In this case, the prior iron limit was neither technology based, nor water quality based. Anti-backsliding provisions of Section 402 of the Clean Water Act, 40 CFR 122.44 and 40 CFR 122.62 have not been violated.

8. Total Fluoride

The Draft Permit limitations for Total Fluoride remain unchanged from the existing permit and remain as 17.4 mg/L, monthly average, and 28.0 mg/L, maximum day. These limitations were based on the 40 CFR 469.15 (Semiconductor subcategory). Sampling frequency remains twice monthly.

9. Hydrogen Peroxide

The Draft Permit limitations of 10 mg/L monthly average, and 15 mg/L maximum day for Hydrogen Peroxide remain unchanged from the existing permit. These limitations are based on the information collected during a Toxic Reduction Evaluation (TRE) conducted on this discharge in 1995. Results indicated Hydrogen Peroxide as the source of toxicity in the effluent below 10 mg/L monthly average, and 15.0 mg/L daily maximum, was sufficient to prevent instream toxicity. Sampling frequency remains weekly.

10. Total Toxic Organics (TTO)

The existing permit limitation for 1.37 mg/L TTO, maximum day, remains unchanged (see Attachment D for the specific list of TTOs). This limitation is based on 40 CFR 469.15 (Semiconductor subcategory). Sampling shall continue to occur on a quarterly basis.

11. Oil and Grease

The federal TBELs for oil and grease effluent concentration limitations have been included in the Draft Permit. These concentration limitations have been converted into mass limitations (1,734.72 lbs./day, monthly average, and 3,469.44 lbs./day, maximum day) and are included in the Draft Permit and the facility must comply with whichever limitation is more restrictive (2003 Comment Response 19). The facility does not utilize petroleum in their wastewater generating processes and have analyzed their discharge for oil and grease in the past. This data

indicates that oil and grease is extremely low in this discharge, therefore monitoring is required twice per year, once from January 1st to February 28th and once from August 1st to October 31st.

12. Whole Effluent Toxicity (WET) Testing

40 CFR Part 122.44(d)(1) requires the Secretary to assess whether the discharge causes or has the reasonable potential to cause or contribute to an excursion above any narrative or numeric water quality criteria. Per these federal requirements, the Permittee shall conduct WET testing and toxic pollutant analyses according to the schedule outlined in the Draft Permit. If the results of these tests indicate a reasonable potential to cause an instream toxic impact, the Secretary may require additional WET testing, establish a WET limit, or require a Toxicity Reduction Evaluation.

The current permit contains a WET limitation of > 7% NOEL-C, No observed (Chronic) effect which is based on the instream waste concentration of this discharge in the receiving water. This limit was established in the mid-1990's when WET testing revealed the discharge could have the potential to cause instream toxic impact (2003 Comment Response 18). This limitation is unchanged from the current permit. One, two-species chronic WET tests (*Pimephales promelas* and *Ceriodaphnia dubia*) are required once per year between the time of August to October, which reflects the most critical time in the receiving water due to low flows and high temperatures, and one species (*Ceriodaphnia dubia*) chronic WET test being required in annually in January or February.

13. Per- and Polyfluoroalkyl Substances (PFAS)

PFAS are a group of synthetic chemicals that have been in use since the 1940s. PFAS are found in a wide array of consumer and industrial products. PFAS manufacturing and processing facilities, facilities using PFAS in production of other products, airports, and military installations can be contributors of PFAS releases into the air, soil, and water. Due to their widespread use and persistence in the environment, most people in the United States have been exposed to PFAS. Exposure to some PFAS above certain levels may increase risk of adverse health effects. VT Agency of Natural Resources and Department of Environmental Conservation is collecting information to evaluate the potential impacts that discharges of PFAS from wastewater treatment plants may have on downstream drinking water, recreational and aquatic life uses.

On March 17, 2020, a revised Vermont Water Supply Rule was adopted to establish a Maximum Contaminant Level (MCL) as well as routine public drinking water monitoring frequencies for the five regulated PFAS: perfluorohexanesulfonic acid (PFHxS), perfluoroheptanoic acid (PFHpA), perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), and perfluorononanoic acid (PFNA).

To assess the concentration of the five PFAS above in the discharge and support source reduction potential, monitoring for PFAS is required. The Draft Permit includes new monitoring conditions for the five Regulated PFAS substances with a Maximum Contaminant Level in the Vermont Water Supply Rule. These substances shall be monitored at a minimum frequency of once per quarter within the first 12 months from the permit effective date. Additionally, monitoring shall be conducted annually during the month of December and reported in the December monthly DMR beginning in 2022. **Results shall also be reported on reporting form WR-43.** Concentrations are detectable at parts per trillion and may need conversion to micrograms per liter which is the lowest unit available for reporting on ANROnline. The Secretary will notify the Permittee when the online selectable units are updated to include nanograms per liter.

While the EPA's multi-lab validated method is under development, the facility shall use EPA method 537 Version 1.1, solid phase extraction and liquid chromatograph/tandem mass spectrographic methods. **The test method shall incorporate isotope dilution, in accordance with Department of Defense (DoD) Quality Systems Manual (QSM)**

5.2. This multi-lab validated method shall be used until a sufficiently sensitive test procedure (i.e., method) has been approved under 40 C.F.R. Part 136. The laboratory used should document all method modifications and provide to the end data user for their consideration. The Permittee shall report results for the PFHxS, PFHpA, PFNA, PFOS, and PFOA on DMR form WR-43.

EPA expects these methods will be available by the end of 2021. This approach is consistent with 40 CFR § 122.44(i)(1)(iv)(B) which states that in the case of pollutants or pollutant parameters for which there are no approved methods under 40 CFR Part 136 or methods are not otherwise required under 40 CFR chapter I, subchapter N or O, monitoring shall be conducted according to a test procedure specified in the permit for such pollutants or pollutant parameters.

Discharge Point S/N 007 (potential groundwater seepage, condensate from cooling coils from dehumidifying incoming building air, stormwater from roof/parking lot drains, and truck unload/load stations):

- 1. Volatile organic compounds (VOCs): Tetrachloroethylene, Trichloroethylene, Dichloroethene, Vinyl Chloride, Ethyl Benzene, and Xylene**— Necessary changes were made to account for discharges from the groundwater treatment system now permitted under 3-1559 for IBM. S/N 007 is permitted under Condition I.A.2. in the Draft Permit. Monitoring reports collected over the permit term indicate samples collected in 2016 and 2018 were reported above the detection limit for at least one of the constituents. This outfall is not connected to a groundwater treatment facility permitted under 3-1559, so any detection of the VOCs may indicate groundwater is seeping into the system. Detection may mean the structural integrity of the pipe may be in question and should be inspected by the Permittee. Continued quarterly “monitor only” requirements for VOCs are recommended in the Draft Permit.

The anti-backsliding provisions of Section 402 of the Clean Water Act, 40 CFR 122.44 and 40 CFR 122.62 may be triggered when water quality based or technology based effluent limitations are revised and made less stringent. Dichloroethenes have been detected at Discharge Point S/N 002 and 007. Dichloroethenes result from the breakdown of trichloroethylene and tetrachloroethylene and are present in contaminated groundwater entering the treatment system. An effluent limitation of 12 mg/1 Total Dichloroethenes was established in 1986 as part of 1272 Order No. 7-8605 (2003 Comment Response 21). This effluent limitation was based on a Health Advisory in effect at that time and was subsequently incorporated into past permits. The Health Advisory is no longer in effect. The VWQS have never contained a criterion for Total Dichloroethenes and was not a water quality based effluent limitation or technology-based limitation to qualify as anti-backsliding (2003 Comment Response 21).

Units for constituent monitoring in Condition I.A.2, except for pH, were adjusted to be ug/L from mg/L. These were changed in the permit effective July 1, 2021 and should have remained as ug/L as it was in the previous permit.

- 2. pH** – The pH limitation remains at 6.5 - 8.5 Standard Units as specified in Section 29A-303(6) in the Vermont Water Quality Standards. Monitoring remains at quarterly. If sampling results exceed limitations, the Permittee is required to sample the receiving water upstream and 50 feet downstream from the **outfall within 24 hours of receiving results**. If the downstream shows no measurable difference, then the discharge will be considered in compliance with the permit limitations.

The Discharge Points S/N 002 and S/N 011 (condensate from cooling coils from dehumidifying incoming building air, and stormwater from roof/parking lot drains, building underdrains, truck unload/load stations, and controlled secondary containment basins).

S/N 002 is covered under Condition I.A.3. of the current permit, authorized discharges for reverse osmosis reject water, contaminated groundwater treatment discharges, and stormwater runoff. Effluent monitoring results for volatile organic compounds (VOCs) indicate there is not a reasonable potential for the discharge of these parameters to cause a violation of the VWQS in the Winooski River. Specifically, ethylbenzene and xylene are present at discharge point S/N 002 from the extracted groundwater in low concentrations. Therefore a "monitor only" requirement with sampling twice per month was established in 1991 to determine the effectiveness of the contaminated groundwater ozone/carbon treatment system. The data collected on this treated waste stream indicated that this system is very effective at removing these parameters and the permit maintains the monitoring requirement to ensure the groundwater treatment system continues to be successful at treating these pollutants (2003 Comment Response 27). Any concerns for volatile organic compounds to negatively impact the receiving water are now best captured by monitoring reports for S/N 002 and S/N 011 under 3-1559 for the treatment of contaminated groundwater.

Since the transfer of ownership of the facility, the Draft Permit only covers the stormwater portion of the discharge commingling with the treated groundwater before discharging to outfalls S/N 002 and S/N 011. No VOCs monitoring is proposed in the Draft Permit for either outfall.

The Discharge Points S/N 004, S/N 006, S/N 008, S/N 012, S/N 013, and S/N 017 (potential groundwater seepage, stormwater from roof/parking lot drains, building underdrains, truck unload/load stations, and controlled secondary containment basins):

The current permit has VOC monitoring requirements for S/N 004, S/N 006, S/N 008, S/N 012, S/N 013, S/N 017 due to past releases of various manufacturing organic chemicals, trace amounts of those chemicals have been detected in the stormwater runoff and groundwater collected and discharged at these locations (2003 Comment Response 27). After review of the discharge monitoring data collected over the permit term, the results for VOCs sampled at each outfall, except for S/N 007, were reported below detection limits and do not pose concern to exceed the Human Health Criteria within the VWQS for VOCs: Tetrachloroethylene, Trichloroethylene, Dichloroethene, Vinyl Chloride, Xylene. Based on the data collected over the permit term and the separation of treatment systems, monitoring for VOCs is no longer required for these outfalls in the Draft Permit.

See Attachment B.3 for the general location of each outfall and Attachment B.2 for the outfall discharge described in a schematic.

All discharges listed in the Draft Permit in Condition I.A.4. are subject to comply with the Stormwater Pollution Prevention Plan as described in Condition I.D. in the Draft Permit.

The Discharge Points S/N 009, S/N 010, S/N 014, S/N 015, S/N 016, S/N 018, and S/N 019 (stormwater from roof/parking lot drains):

The current and Draft Permits lists these outfalls as stormwater only discharges and are not subject to effluent monitoring requirements. All discharges listed in the Draft Permit in Condition I.A.5. are subject to comply with the Stormwater Pollution Prevention Plan as described in Condition I.D. in the Draft Permit.

D. Special Conditions

a. Samples shall continue to be taken at a representative location prior to discharging to the Winooski River.

b. The pH of the discharge described under Permit Condition 1.A.2 shall continue to be between 6.50 and 8.50 standard units or fall within the background range of the receiving water if it exceeds these limitations. Due to pH variations in natural waters, an effluent sample within ± 0.50 S.U. of background shall be deemed acceptable. Background samples shall be collected upstream of the discharge point. All pH monitoring results shall be included on the monthly discharge Monitoring Report, including any upstream receiving water analyses.

c. Any discharge of stormwater shall be subject to Condition I.D.

d. The effluent limitation for Ultimate Oxygen Demand (UOD) is based on the Lower Winooski River Wasteload Allocation Order and shall be applicable from June 1st to October 31st annually. Results from the five-day Biochemical Oxygen Demand (BOD5) and Total Kjeldahl Nitrogen (TKN) monitoring collected from June 1st to October 31st shall continue to be used to calculate UOD with the following formula:

$$\text{UOD (lbs/day)} = [(\text{BOD5 (lbs/day)} \times 1.43) + (\text{TKN (lbs/day)} \times 4.57)]$$

e. Total Annual Pounds of Phosphorus shall continue to be defined as the sum of all the Total Monthly Pounds of Phosphorus discharged for the calendar year and shall be calculated as follows:

$$[(\text{Monthly Average Phosphorus Concentration}) \times (\text{Total Monthly Flow}) \times 8.34]$$

(See required Total Phosphorus monitoring report form WR43-TP to report monthly totals)

f. The Permittee shall continue operate the facility to meet the concentration limitations or pounds limitation, whichever is more restrictive.

g. NOEL-C is the concentration of the effluent in a sample that causes No Observed (Chronic) Effect (i.e. mortality or reduced growth to the test population at a 7-day exposure interval of observation). This condition remains unchanged from the current permit.

h. The Permittee shall monitor the effluent from the treatment systems for the five regulated per- and polyfluoroalkyl substances (PFAS) substances listed in Condition I.A.1. at a minimum frequency of once per quarter within the first 12 months from the permit effective date. After the first year, monitoring shall be conducted annually. PFAS analyses are further described in Part VII.C.13 of this Fact Sheet.

i. The discharge shall be free from substances in kind or quantity that settle to form harmful benthic deposits; float as foam, debris, scum, or other visible substances; produce odor, color, or turbidity that is not naturally occurring and would render the surface water unsuitable for its designated uses; result in the dominance of nuisance species; or interfere with recreational activities; or which would cause a violation of the Vermont Water Quality Standards. This condition is new from the current permit.

j. **RESERVED**

k. *Escherichia coli* (E. coli) grab samples shall continue to be collected between the hours of 6:00 a.m. to 6:00 p.m.

l. These discharges shall continue to not cause erosion or contain sediment which causes or contributes to a violation of water quality standards of the receiving water.

m. Total Toxic Organics (TTO) (Codified at 40 C.F.R. Part 413, 433, 465, 467, 468, 469) shall continue to mean the summation of all quantifiable results observed that are greater than 0.01 mg/l for the toxic organics listed in Attachment D. The sum of TTOs must meet the effluent limitation in Condition I.A.1.

n. Monthly average flow shall continue to be calculated by summing the daily effluent flow for each day in the given month and dividing the sum by the number of days of discharge in that month.

o. Proposed Total Nitrogen (TN) monitoring shall be reported as pounds TN and calculated as: $TN (mg/L) \times Total Daily Flow \times 8.34$; where $TN (mg/L) = TKN (mg/L) + NO_x (mg/L)$.

p. Composite samples for BOD5, TSS, TP, TKN, NO_x, Total Zinc, Total Copper, Total Cadmium, Chromium Trivalent, Total Iron, Total Lead, Total Nickel, Total Silver, Fluoride, Hydrogen Peroxide, Perfluoro-1-hexanesulfonic acid (PFHxS), Perfluoro-1-octanesulfonic acid (PFOS), Perfluoroheptanoic acid (PFHpA), Perfluorooctanoic acid (PFOA), and Perfluorononanoic acid (PFNA) shall be taken during the hours of 6:00 AM to 6:00 PM unless otherwise specified. Eight hours is the minimum period for the composite. 24 hours is the maximum for the composite. This obligation is unchanged from the current permit.

q. If the effluent discharged for a period of 90 consecutive days exceeds 80 percent of the permitted flow limitation, the Permittee shall continue to submit to the Secretary projected loadings and a program for maintaining satisfactory treatment levels.

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

s. To ensure self-reported data accurately quantifies the amount of copper discharged, effluent copper analyses shall be carried out using a method that assures a Method Detection Limit (MDL) of 0.006 mg/L or lower. This level of detection may be achieved using EPA methods 200.7 and 200.8 listed in 40 C.F.R. Part 136 which have estimated detection limits of 0.0054 mg/L and 0.004 mg/L, respectively. This condition is new.

t. Any action on the part of the Secretary in reviewing, commenting upon or approving plans and specifications for the construction of WWTFs shall not relieve the Permittee from the responsibility to achieve effluent limitations set forth in this permit and shall not constitute a waiver of, or act of estoppel against any remedy available to the Secretary, the State of Vermont, or the federal government for failure to meet any requirement set forth in this permit or imposed by state or federal law. This obligation is unchanged from the current permit.

E. Compliance Schedule Items

1. Waste Management Zone (WMZ)

As defined under 10 V.S.A. §1251(16), a WMZ is “a specific reach of Class B waters designated by a permit to accept the discharge of properly treated wastes that prior to treatment contained organisms pathogenic to human beings. Throughout the receiving waters, water quality criteria must be achieved but increased health risks exist due to the authorized discharge”.

The proposed permit retains the existing waste management zone (WMZ) for Discharge point S/N 001 that extends downstream from the outfall for approximately one mile in the Winooski River.

2. 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.

3. Stormwater Pollution Prevention Plan (SWPPP)

Per 40 CFR Part 122, the Permittee is required to prepare and/or update a SWPPP for stormwater discharges associated with this industrial facility. The SWPPP, referred in Condition I.D of the Draft Permit, shall be prepared within 180 days after the effective date of the permit.

The outfalls subject to this Plan are referenced in Conditions I.D.2.a. in the Final Permit resulting from comments received during the Draft Permit public noticing period requesting clarity for which areas and outfalls are subject to the SWPPP conditions. The comment responsiveness summary is attached to this Fact Sheet.

The goal of this Plan is to eliminate or reduce potential discharge of pollutants introduced via groundwater seepage through the stormwater collection system. This Plan necessitates the Permittee to review under this goal: the physical layout of the site, equipment, operational procedures, operator/employee training, and the stormwater management system. This Plan allows for a BMP approach for mitigating collection system repairs rather than requiring constituent monitoring.

The SWPPP requirement will become an enforceable condition of this permit upon the date the permit becomes effective.

The Permittee shall conduct Routine Facility Inspections of areas listed in Condition I.D.2 and Condition I.D.2.a of the Final Permit, during periods of dry weather, and occur once per month. At least once a year a Routine Facility Inspection must be conducted while a stormwater discharge is occurring, per outfall within the stormwater management system. If for any reason an inspection was not completed per required by the Permit, the Permittee must explain why no inspection had occurred.

The Permittee shall conduct Wet Weather Visual Inspections of the stormwater management system during wet weather (rainfall or snow melt) events on a quarterly basis. During these inspections, the Permittee shall collect a sample of the discharge from the outfall in a clear container to visually assess. Samples shall be collected and inspected in accordance with Condition I.D.6.b of the Final Permit.

The wet weather visual inspection sample needs to be collected within the first 30 minutes of a stormwater discharge event. The first 30 minutes of a rain event captures the first flush of the sediment and other pollutants that had settled on surfaces or landscapes exposed to precipitation during periods of dry weather. This discharge is thought to have the highest pollutant concentration observed during a storm event. Discharges outside of this timeframe would be more diluted and not necessarily capture a best representative sample of what was discharged during that rain event. The 30-minute monitoring is required pursuant to 40 CFR 122.21(g)(7)(ii) for stormwater discharges. The 2009 Industrial Stormwater Monitoring and Sampling Guide EPA 832-B-09-003 includes guidance on sampling methods and practices that the facility can use to collect a representative sample (https://www3.epa.gov/npdes/pubs/msgp_monitoring_guide.pdf).

The Permittee has multiple discharge points/ outfalls, which pose challenges to conduct quarterly Wet Weather Visual Inspections within the first 30 minutes of a discharge, as specified in Condition I.D.6.b of the Draft Permit. The Permittee has the option to develop an inspection plan for how each stormwater outfall will be inspected at least once a quarter. It is up to the Permittee to decide how to coordinate outfall inspections per quarter. The following examples are provided for clarification to the Permittee but are in no way being proposed for the Permit: outfalls nearest to the contaminated ground water plume, by age of piping, based on distance or ease for sampling, or creating a number cap for outfalls to inspect per rain event such that 5 are inspected every wet weather event.

Samples collected in the 30-minute window may be observed for water quality characteristics sometime after collection and back in the building. Sample observation must be completed within 24 hours from collection. If this method is used at the facility the SWPPP Team would need to make sure labeling is clear on sample bottles to properly record observations for the appropriate outfall, within the inspection report.

All inspections, resulting corrective actions, and explanations shall be saved as an attachment to the facility SWPPP.

4. Power Failure

The Permittee shall notify the Secretary of alternative power sources available and/or production controls in place that the Permittee plans to use in the event there is power failure at the facility.

5. Biocide Chemicals

Biocides were originally included in the Draft Permit as monitoring requirements to track usage over the permit term and were to be reported monthly. Resulting from comments received during the public noticing period, this condition was revised in the Final Permit, Condition I.I, to be implemented as a semi-annual report compliance schedule, to track and report the use of biocide chemicals in accordance with 40 CFR 156.10(i)(2)(ii). The comment responsiveness summary is attached to this Fact Sheet. This report will help characterize the amount of chemical used to compare with the amount prescribed for a maximum dosage specified on the chemical label, which is typically only used for a one-time slug feed when the system is fouled or upset. The amount used and treatment durations for the biocide chemical type shall not exceed specific product label, or chemical Safety Data Sheet requirements.

Semi-Annual Reports shall record the active ingredient or type of the biocide chemical used and the amount used in either quantity in pounds or concentration in micrograms per liter or milligrams per liter, whichever is most applicable. Receipts from chemical purchases may be used to identify the chemical amount used in the reportable calendar year. Reports shall indicate whether the doses applied were treated prior to discharging and describe whether dosing or duration the chemical was applied exceeded product label requirements at any time during the reportable calendar year.

The Permittee must notify the Secretary through these reports whether new biocide chemical types were used within the reportable calendar year. Each biocide chemical type included in the report shall have a corresponding chemical Safety Data Sheet (SDS) attachment. If the biocide types used at the facility do not change from the first to any proceeding annual report due dates, then the SDS does not need to be attached to the following report. This has been incorporated to prevent redundant reporting of chemical SDS attachments. Meaning, if the facility uses bleach as a biocide for the entire permit term, then only in the first annual report submission, under the Final Permit term, must the Permittee attach the corresponding chemical SDS for bleach.

6. 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.

7. Noncompliance Notification

As required by the passage of 10 V.S.A. §1295, promulgated in the 2016 legislative session, Condition II.D.3. has been included in the proposed permit. Section 1295 requires the Permittee to provide public notification of untreated discharges from wastewater facilities. The Permittee is required to post a public alert within one hour of discovery and submit to the Secretary specified information regarding the discharge within 12 hours of discovery.

8. 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.

F. 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 there is not a reasonable potential for the discharge to cause or contribute to a water quality violation, and as such, the development of additional WQBELs will not be necessary. Given the dilution (IWC at 7Q10 is = 0.078 (>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 the permit was from **March 19, 2021, through April 19, 2021**. The comments received are addressed in the attached Responsiveness Summary.

The public comment period for receiving comments on this draft amended permit is from **November 10, 2021, through December 10, 2021**, during which time interested persons may submit their written views on the amended sections of this draft permit, per 40 C.F.R. § 124.10.

All written comments received by 4:30 PM on December 10, 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>.

If you wish to make a comment but do not have access to internet, then you may submit written comments by mail. Written Comments should be sent to:

Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
One National Life Drive, Davis Building, 3rd Floor
Montpelier, VT 05620-3522

For additional information, contact Amy Polacyzk at 802-490-6185.

During the notice period, any person may submit a written request via the ENB or 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.

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.

ATTACHMENT A

DRAFT

Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
1 National Life Drive Davis 3
802-828-1535

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: November 17, 2020

Subject: Reasonable Potential Determination for the Global Foundries WWTF Facility

Facility Information:

Global Foundries Wastewater Treatment Facility
Essex Junction, VT
Permit No. 3-1295
NPDES No. VT0000400
Facility Location: 44.48412, -73.1116 (NAD 83)
Approximate Outfall Location: 44.47730, -73.09540 (NAD 83)

Receiving water: Winooski River

Hydrology:

Facility Design Flow: 8.000 MGD = 12.378 CFS
Estimated 7Q10¹ = 146.9 CFS
Estimated LMM² = 481.8 CFS
Instream Waste Concentration at 7Q10 Flow (IWC-7Q10) = 0.078 (>1%)
Instream Waste Concentration at Low Median Monthly Flow (IWC-LMM) = 0.025 (>1%)

Global Foundries owns and operates the Global Foundries Wastewater Treatment Facility which treats domestic wastes in SBRs before combining with the industrial waste stream. Industrial wastes are then treated through a flow equalization tank, chemical precipitation and settling and pH adjustment.

The Winooski River downstream of the Global Foundries WWTF discharge is a Class B (2) water and is designated as Warm Water Fish Habitat. At the point of discharge, the river has a contributing drainage area of 1049.0 square miles.

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.

The existing permit waste management zone (WMZ) in the Winooski River begins at the outfall of the WWTF and extends downstream approximately 1.0 mile pursuant to 10 V.S.A., Section 1252.

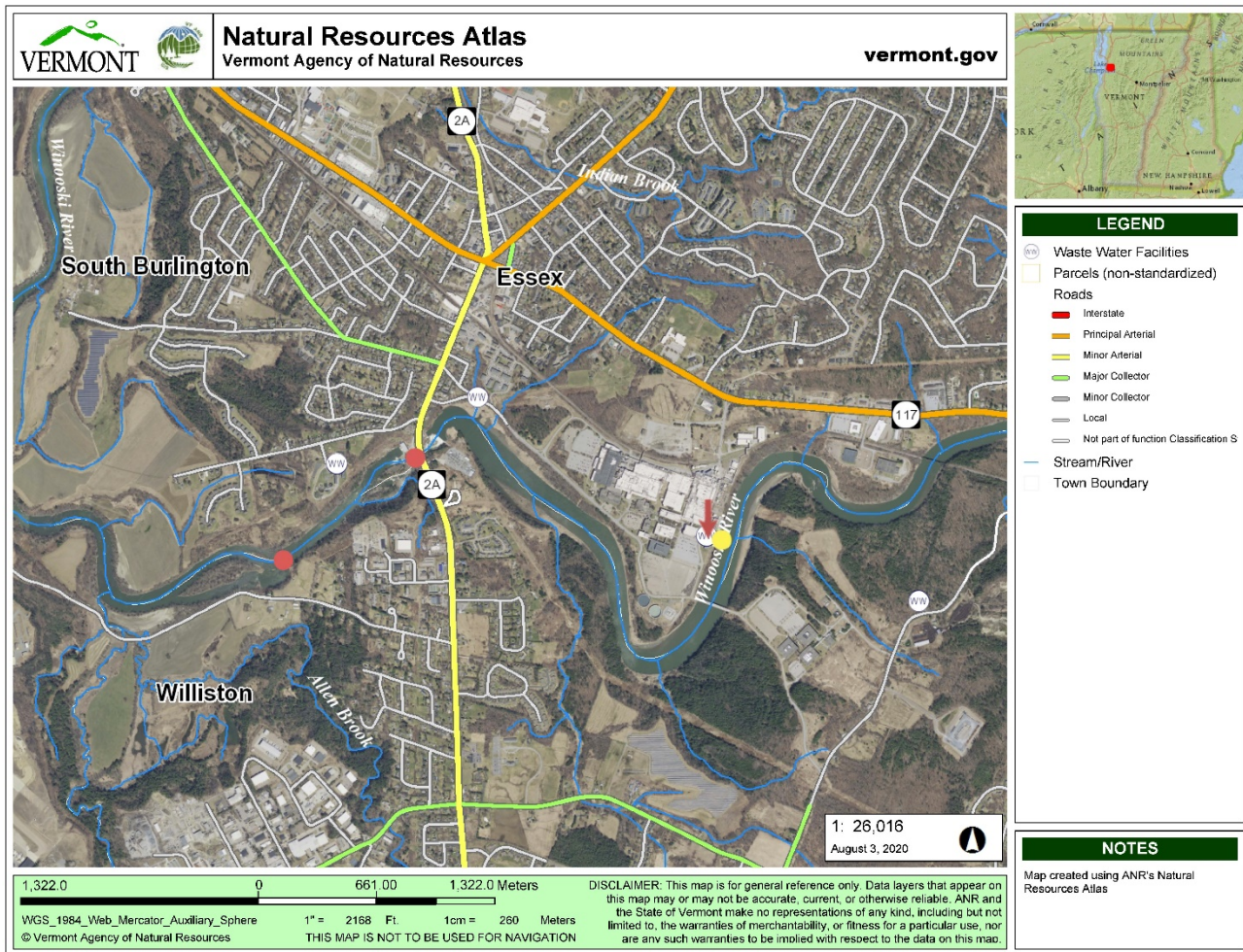


Figure 1. Winooski River near the Global Foundries WWTF. The facility location is represented by a white dot containing “WW” with a red arrow, the outfall location is represented by a yellow dot, and downstream (RM 16.3 and RM 16.7) monitoring locations are represented by red dots. Figure produced with 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 Global Foundries WWTF
- Biological Assessments and Ambient Chemistry Data for the Winooski River above and below the Global Foundries WWTF
- Assessment of Reasonable Potential of the Global Foundries WWTF discharge to exceed Vermont Water Quality Standards (VWQSs)

Effluent Data for the Global Foundries WWTF

Table 1a-1. Effluent Data for the Global Foundries WWTF from 3/31/2015 to 1/31/2020.

Parameter	Current Permit Limit	Minimum Value	Average Value	Maximum Value	n
Annual Flow (MGD)	8.0	2.910	3.14	3.390	60
Ultimate Oxygen Demand (lbs/day)	2300	525.20	1022.18	1505.00	25
Maximum Day Total Suspended Solids (mg/L)	10.5	1.40	1.40	1.40	1
Maximum Day Total Suspended Solids (lbs/day)	437	31.80	31.80	31.80	32
Monthly Average BOD ₅ (mg/L)	Monitor Only	6.10	141.80	256.00	25
Monthly Average Total Kjeldahl Nitrogen (lb/day)	Monitor Only	56.00	128.01	194.60	25
Total Phosphorus (Annual Pounds)	12193	1264.23	1495.05	1797.80	5
Monthly Average Total Phosphorus (mg/l)	0.8	0.08	0.16	0.27	60
E.coli (CFU/100 ml)	77	1.00	3.63	71.00	60
Monthly Average Total Ammonia (as N) (mg/L)	Monitor Only	0.01	5.10	8.70	60
Maximum Day Ammonia (as N) (mg/L)	Monitor Only	0.01	5.91	13.00	60
Monthly Average Iron (mg/l)	Monitor Only	0.04	0.10	0.51	60
Maximum Day Iron (mg/l)	Monitor Only	0.07	0.15	0.62	60
Monthly Average Cadmium (mg/L)	0.07	0.0002	0.0043	0.0560	60
Maximum Day Cadmium (mg/L)	0.11	0.0002	0.0043	0.0560	60
Monthly Average Cadmium (lbs/day)	0.69	0.0020	0.0326	0.0560	60
Maximum Day Cadmium (lbs/day)	1.93	0.0020	0.0326	0.0560	60
Monthly Average Chromium (mg/L)	1.71	0.0050	0.0392	0.5600	60
Maximum Day Chromium (mg/L)	2.77	0.0050	0.0392	0.5600	60
Monthly Average Chromium (lbs/day)	114.09	0.0200	0.2812	0.6180	60
Maximum Day Chromium (lbs/day)	184.81	0.0200	0.2812	0.6180	60
Monthly Average Copper (mg/L)	2.07	0.0130	0.0255	0.0710	60
Maximum Day Copper (mg/L)	3.38	0.0170	0.0347	0.0920	60
Monthly Average Copper (lbs/day)	5.14	0.3460	0.6405	1.7280	60
Maximum Day Copper (lbs/day)	7.18	0.4690	0.8824	2.2100	60
pH	6.5-8.5	6.88	7.57	8.04	60

Table 1a-2. Effluent Data for the Global Foundries WWTF from 3/31/2015 to 1/31/2020.

Parameter	Current Permit Limit	Minimum Value	Average Value	Maximum Value	n
Monthly Average Lead (mg/L)	0.43	0.0001	0.0010	0.0010	59
Maximum Day Lead (mg/L)	0.69	0.0001	0.0010	0.0020	59
Monthly Average Lead (lbs/day)	1.44	0.0220	0.0260	0.0330	59
Maximum Day Lead (lbs/day)	36.86	0.0220	0.0275	0.0490	59
Monthly Average Nickel (mg/L)	2.38	0.0080	0.0164	0.0520	59
Maximum Day Nickel (mg/L)	3.98	0.0110	0.0304	0.1860	59
Monthly Average Nickel (lbs/day)	91.89	0.0458	0.4049	1.3090	59
Maximum Day Nickel (lbs/day)	265.55	0.2450	0.7547	3.5210	59
Monthly Average Silver (mg/L)	0.24	0.0100	0.0152	0.0200	59
Maximum Day Silver (mg/L)	0.43	0.0100	0.0152	0.0200	59
Monthly Average Silver (lbs/day)	1.4	0.2000	0.3808	0.5500	59
Maximum Day Silver (lbs/day)	28.69	0.2000	0.3808	0.5500	59
Monthly Average Zinc (mg/L)	1.48	0.0080	0.0112	0.0230	59
Maximum Day Zinc (mg/L)	2.61	0.0200	0.0205	0.0490	59
Monthly Average Zinc (lbs/day)	52.68	0.2150	0.2857	0.4870	59
Maximum Day Zinc (lbs/day)	52.68	0.4490	0.5378	1.0380	59
Monthly Average Cyanide (mg/L)	0.65	0.0040	0.0168	0.1600	59
Maximum Day Cyanide (mg/L)	1.2	0.0040	0.0168	0.1600	59
Monthly Average Cyanide (lbs/day)	5	0.0100	0.2026	0.2800	59
Maximum Day Cyanide (lbs/day)	21.35	0.0100	0.2120	0.2800	59
Monthly Average Oil and Grease (mg/L)	26	2.0000	2.0700	3.0000	59
Maximum Day Oil and Grease (mg/L)	52	2.0000	2.0700	3.0000	59
Monthly Average Oil and Grease (lbs/day)	1734.72	46.0000	53.6000	72.0000	59
Maximum Day Oil and Grease (lbs/day)	3469.44	46.0000	53.6000	72.0000	59
Monthly Average Fluoride (mg/L)	17.4	6.5000	9.2315	12.2100	59
Maximum Day Fluoride (mg/L)	28	7.2400	10.3215	17.5500	59
Monthly Average Hydrogen Peroxide (mg/L)	10	0.1500	0.5378	1.7100	59
Maximum Day Hydrogen Peroxide (mg/L)	15	0.1500	0.9547	3.6200	59
Maximum Day Total Toxic Organics (mg/L)	1.37	0.01	0.02	0.02	59

Table 1a-3. Effluent Data for the Global Foundries WWTF from 3/31/2015 to 1/31/2020.

Parameter	Current Permit Limit	Minimum Value	Average Value	Maximum Value	n
Stormwater Discharge 004					
Maximum Day Trichloroethylene ug/l	Monitor Only	0.00	0.00	0.00	20
Maximum Day Tetachlorethylene ug/l	Monitor Only	0.00	0.00	0.00	20
Maximum Day 1,1,1-trichloroethane ug/l	Monitor Only	0.00	0.00	0.00	20
Maximum Day Total Dichloroethenes ug/l	Monitor Only	0.00	0.00	0.00	20
Maximum Day Vinyl Chloride ug/l	Monitor Only	0.00	0.00	0.00	20
Maximum Day Isopropyl Alcohol ug/l	Monitor Only	0.00	0.00	0.00	20
pH - Stormwater Runoff	6.5-8.5	Not Reported			
Stormwater Discharge 006					
Maximum Day Trichloroethylene ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day Tetachlorethylene ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day 1,1,1-trichloroethane ug/l	Monitor Only	1.00	1.00	1.00	23
Maximum Day Total Dichloroethenes ug/l	Monitor Only	1.08	2.54	2.70	23
Maximum Day Vinyl Chloride ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day Isopropyl Alcohol ug/l	Monitor Only	20.00	47.27	50.00	23
pH - Stormwater Runoff	6.5-8.5	Not Reported			
Stormwater Discharge 007					
Maximum Day Trichloroethylene ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day Tetachlorethylene ug/l	Monitor Only	0.50	2.42	10.70	23
Maximum Day 1,1,1-trichloroethane ug/l	Monitor Only	0.40	0.94	1.00	23
Maximum Day Total Dichloroethenes ug/l	Monitor Only	1.33	2.98	4.90	23
Maximum Day Vinyl Chloride ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day Isopropyl Alcohol ug/l	Monitor Only	20.00	47.27	50.00	23
pH - Stormwater Runoff	6.5-8.5	Not Reported			

Table 1a-4. Effluent Data for the Global Foundries WWTF from 3/31/2015 to 1/31/2020.

Parameter	Current Permit Limit	Minimum Value	Average Value	Maximum Value	n
Stormwater Discharge 008					
Maximum Day Trichloroethylene ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day Tetachlorethylene ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day 1,1,1-trichloroethane ug/l	Monitor Only	0.40	0.94	1.00	23
Maximum Day Total Dichloroethenes ug/l	Monitor Only	1.08	2.54	2.70	23
Maximum Day Vinyl Chloride ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day Isopropyl Alcohol ug/l	Monitor Only	20.00	47.27	50.00	23
pH - Stormwater Runoff	6.5-8.5	Not Reported			
Stormwater Discharge 011					
Maximum Day Trichloroethylene ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day Tetachlorethylene ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day 1,1,1-trichloroethane ug/l	Monitor Only	0.40	0.94	1.00	23
Maximum Day Total Dichloroethenes ug/l	Monitor Only	1.08	2.54	2.70	23
Maximum Day Vinyl Chloride ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day Isopropyl Alcohol ug/l	Monitor Only	20.00	47.27	50.00	23
pH - Stormwater Runoff	6.5-8.5	Not Reported			
Stormwater Discharge 012					
Maximum Day Trichloroethylene ug/l	Monitor Only	0.20	0.20	0.20	23
Maximum Day Tetachlorethylene ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day 1,1,1-trichloroethane ug/l	Monitor Only	0.40	0.94	1.00	23
Maximum Day Total Dichloroethenes ug/l	Monitor Only	1.08	2.54	2.70	23
Maximum Day Vinyl Chloride ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day Isopropyl Alcohol ug/l	Monitor Only	24.60	54.72	90.00	23
pH - Stormwater Runoff	6.5-8.5	Not Reported			

Table 1a-5. Effluent Data for the Global Foundries WWTF from 3/31/2015 to 1/31/2020.

Parameter	Current Permit Limit	Minimum Value	Average Value	Maximum Value	n
Stormwater Discharge 013					
Maximum Day Trichloroethylene ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day Tetachlorethylene ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day 1,1,1-trichloroethane ug/l	Monitor Only	0.00	0.94	1.00	23
Maximum Day Total Dichloroethenes ug/l	Monitor Only	1.08	2.54	2.70	23
Maximum Day Vinyl Chloride ug/l	Monitor Only	0.00	0.47	0.50	23
Maximum Day Isopropyl Alcohol ug/l	Monitor Only	0.00	47.27	50.00	23
pH - Stormwater Runoff	6.5-8.5	Not Reported			
Stormwater Discharge 017					
Maximum Day Trichloroethylene ug/l	Monitor Only	0.47	0.47	0.50	23
Maximum Day Tetachlorethylene ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day 1,1,1-trichloroethane ug/l	Monitor Only	0.40	0.94	1.00	23
Maximum Day Total Dichloroethenes ug/l	Monitor Only	1.08	2.54	2.70	23
Maximum Day Vinyl Chloride ug/l	Monitor Only	0.20	0.47	0.50	23
Maximum Day Isopropyl Alcohol ug/l	Monitor Only	20.00	47.27	50.00	23
pH - Stormwater Runoff	6.5-8.5	Not Reported			

Whole Effluent Toxicity Data Summary:

Whole Effluent Toxicity (WET) data for this facility is presented below in Table 1b. This facility has a No Observable Effect Concentration limit of >7%.

Table 1b Whole Effluent Toxicity Test Results for the Global Foundries WWTF.

Test Start Date	Pimephales promelas				Ceriodaphnia dubia			
	Acute		Chronic		Acute		Chronic	
	NOEC %	LC50 %	NOEC %	LOEC %	NOEC %	LC50 %	NOEC %	LOEC %
8/2/2016	100	>100	100	>100	100	>100	100	>100
2/2/2016					100	>100	12.5	25
9/29/2015					100	>100	100	>100
3/17/2015					100	>100	12.5	25
1/20/2015					100	>100	<6.25	6.25
8/2/2014					100	>100	25	12.5
1/14/2014					100	>100	6.25	7.5
8/20/2013	100	>100	100	>100	100	>100	100	>100
8/7/2012					100	>100	100	50
1/24/2012					100	36.18	25	50
1/5/2010					100	>100	100	>100

Analysis of the acute WET test data indicates that this facility's effluent does not generally appear to contain toxic substances that cause acute toxicity in the receiving water for either tests species or chronic toxicity for the Pimephales promelas. However, there is a record of chronic toxicity for the Ceriodaphnia dubia. While most of the observed toxicity is at concentrations lower than what would be seen in the receiving water at 7Q10, (IWC = 0.078), tests in January 2014 and 2015 indicate NOEC and LOEC values which would represent a toxic effect in the receiving water at full design flow and 7Q10.

To provide additional data for future assessments of WET reasonable potential, it is recommended that four 2-species (*Ceriodaphnia dubia* and *Pimephales promelas*) 48 hour acute/ 96 hour chronic tests be included in the draft permit, during the summer (August/October) of odd years and during the winter (January/February) of even years. Ammonia and the Appendix J pollutants should be sampled concurrently with the first 3 tests..

Biological Assessments and Ambient Chemistry Data for the Winooski River above and below the Global Foundries WWTF

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 from the mouth up to Alder Brook is on the 2016 Stressed

Waters List and has the problem of stormwater, industry, ag, many sources. The pollutants sediments, nutrients, temperature, stormwater and toxic compounds prohibit the waters from attaining higher water quality.

Biological Assessments:

A Biological assessment was conducted below the facility at RM 16.3 most recently on 9/9/2015. The biological assessment meets VWQS for aquatic biota and aquatic habitat uses for the Class B Warm Water, Medium-Gradient stream type. Macroinvertebrate monitoring data is summarized below in Table 2. It should be noted that this monitoring location is also subject to discharges from the Essex Junction WWTF and while it is appropriate to use it as evidence of satisfactory water quality it would not be possible to use this point to differentiate between the effects of the two discharges.

Table 2. Results of the Biological Monitoring for Macroinvertebrates on the Winooski River, (RM 16.3) downstream of the Global Foundries WWTF outfall.

Macroinvertebrate Site Summary - Winooski River 16.3 - Below Essex WWTF									
Date	Density	Richness	EPT Richness	PMA-O	B.I.	Oligo.	EPT/EPT + Chiro	PPCS-F	Community Assessment
10/12/1986	1718	36.0	16.0	53.8	4.49	5.59	0.92	0.40	Meets VWQS
10/26/1987	1492	34.0	16.5	59.7	4.75	7.03	0.86	0.59	Meets VWQS
8/13/1991	2860	33.5	17.5	68.1	4.87	0.00	0.82	0.40	Meets VWQS
10/3/2005	2280	42.0	24.0	62.0	4.68	0.35	0.90	0.53	Meets VWQS
10/13/2010	5416	51.0	27.0	65.0	4.38	0.00	0.88	0.48	Meets VWQS
9/9/2015	2536	43.0	24.0	77.7	4.99	2.84	0.95	0.42	Meets VWQS
Full Support	≥ 300	≥ 30	≥ 16	≥ 45	≤ 5.4	≤ 12	≥ 0.45	≥ 0.4	
Indeterminate	≥ 250	≥ 28	≥ 15	≥ 40	≤ 5.65	≤ 14.5	≥ 0.43	≥ 0.35	
Non-Support	< 250	< 28	< 15	< 40	> 5.65	> 14.5	< 0.43	< 0.35	

Note: Limited receiving water monitoring data was available. To compensate data from the monitoring site below the Essex Junction WWTF has been included. This data reflects the combined influence of the Global Foundries and Essex Junction WWTF effluent and can not be used to accurately estimate the Global Foundries influence on its own. However, this data is an accurate representation of downstream receiving water conditions and can be compared to VWQS.

Ambient Chemistry Data:

The most recent ambient chemistry data available from VTDEC sampling is from 9/9/2015, when surface waters were sampled below the outfall at RM 16.3. No data was available from LaRosa volunteers. The downstream sampling location is approximately 2.2 miles downstream from the Global Foundries WWTF outfall (Figure 1).

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 3a and 3b.

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 3a. Surface-water quality data below the Global Foundries Wastewater Treatment Facility collected by VTDEC.

Visit Date	See Note	Above or Below (A/ B)	Location	Water Temp (deg C)	pH	Alkalinity (mg/l)	Conductivity (umho/cm)	Hardness	DO (%)	DO (mg/l)	Turbidity (NTU)	Total Color (PCU)	Total Chloride (mg/l)	Total Phosphorus (ug/l)	Total Dissolved Phosphorus (ug/l)	Total Nitrogen (mg/l)	Total Ammonia Nitrogen (mg/l)	Total Nitrate/ Nitrite Nitrogen (mg/l)	Total Sulfate (mg/l)
10/12/1986	*	B	16.3	8.0	7.8	20.0	146.0	-	-	-	-	20.0	-	-	-	-	-	-	-
10/26/1987	*	B	16.3	8.0	7.9	42.0	172.0	-	-	-	-	-	-	-	-	-	-	-	-
8/13/1991	*	B	16.3	22.0	8.0	60.0	160.0	-	-	-	-	-	-	-	-	-	-	-	-
10/3/2005	*	B	16.3	15.3	7.2	44.4	173.0	51.1	-	-	1.6	15.0	17.6	16.1	8.9	-	-	0.22	9.80
10/13/2010	*	B	16.3	10.1	7.4	50.7	169.0	61.4	93.6	10.4	3.2	17.5	14.8	20.6	11.6	0.45	-	0.31	7.92
8/19/2015	*	B	16.3	26.2	7.8	-	248.7	81.6	84.8	6.8	2.9	-	-	16.4	-	0.59	0.090	-	-
9/9/2015	*	B	16.3	-	-	74.0	-	96.7	-	-	2.5	45.0	37.4	15.6	-	0.88	0.068	0.68	15.22
9/9/2015		B	16.7	-	-	72.0	-	98.3	-	-	3.0	35.0	38.2	15.0	-	0.79	0.070	0.59	14.88

Note: Limited receiving water monitoring data was available. To compensate data from the monitoring site below the Essex Junction WWTF has been included and marked with an *. This data reflects the combined influence of the Global Foundries and Essex Junction WWTF effluent and can not be used to accurately estimate the Global Foundries influence on its own. However, this data is an accurate representation of downstream receiving water conditions and can be compared to VWQS.

Table 3b. Surface-water quality (metals) data downstream of the Global Foundries Wastewater Treatment Facility collected by VTDEC.

Visit Date	See Note	Location	Water Temp (deg C)	pH	Hardness	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 Molybdenum (ug/l)	Total Nickel (ug/l)	Total Potassium (mg/l)	Total Selenium (ug/l)	Total Silver (ug/l)	Total Sodium (mg/l)	Total Sulfate (mg/l)	Total Thallium (ug/l)	Total Zinc (ug/l)
10/12/1986	*	16.3	8.0	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/26/1987	*	16.3	8.0	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8/13/1991	*	16.3	22.0	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/3/2005	*	16.3	15.3	7.2	51.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.8	-	-
10/13/2010	*	16.3	10.1	7.4	61.4	99.2	-	<1	-	<1	20.3	<5	<10	378.0	<1	2.6	81.7	-	<5	1.0	<5	-	9.6	7.9	-	<50
8/19/2015	*	16.3	26.2	7.8	81.6	110.2	<10	<1	<1	<1	27.4	<5	<10	232.8	<1	3.2	65.9	<5	<5	1.2	<5	<1	16.8	-	<1	<50
9/9/2015	*	16.3	-	-	96.7	75.5	<10	<1	<1	<1	32.2	<5	<10	148.7	<1	3.9	54.3	<5	<5	1.7	<5	<1	24.0	15.2	<1	<50
9/9/2015		16.7	-	-	98.3	82.6	<10	<1	<1	<1	32.8	<5	<10	168.4	<1	4.0	63.2	<5	<5	1.7	<5	<1	24.0	14.9	<1	<50

Note: Limited receiving water monitoring data was available. To compensate data from the monitoring site below the Essex Junction WWTF has been included and marked with an *. This data reflects the combined influence of the Global Foundries and Essex Junction WWTF effluent and can not be used to accurately estimate the Global Foundries influence on its own. However, this data is an accurate representation of downstream receiving water conditions and can be compared to VWQS.

Assessment of Reasonable Potential of the Global Foundries WWTF discharge to exceed Vermont Water Quality Standards

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 4a, 4b and 5 present this analysis for the Global Foundries WWTF.

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

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).

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_{et5d} is used to represent this value.
- Winter and summer TAN limits were calculated at the highest observed pH and at assumed temperatures of 5°C and 25°C respectively.
- Hardness for determining hardness-dependent metal criteria is based upon the lowest observed downstream concentration.
- The facility achieves disinfection through their industrial treatment and therefore the RP of Chlorine was not assessed

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

Table 4a. Mass Balance for Ammonia, and E. coli around the Global Foundries WWTF

	Total Ammonia Nitrogen - Summer (mg/L)	Total Ammonia Nitrogen - Winter (mg/L)	E.coli (CFU/100 ml)	Notes
Qs (cfs)	146.86			Estimated 7Q10 flow
Qe (cfs)	12.378			permitted effluent discharge
Qr = Qs + Qe (cfs)	159.24			Qs+Qe
7Q10 IWC	0.078			Qe/(Qs+Qe)
Cs	0.00	0.00	0	upstream pollutant concentration
Cetsd	13.00	15.60	77	effluent pollutant concentration adjusted by TSD factor (permit limit for E.coli)
Cr = (CsQs+CetsdQe)/Qr	1.01	1.21	5.99	resultant pollutant concentration in receiving water
Temp (deg C)	25.00	5.00		Values used in analysis.
pH	7.95	7.95		Values used in analysis.
Hardness as CaCO ₃ (mg/L)	51.10			Min. Downstream Value
Fish Habitat	Warm Water			Fishery Type
	Oncorhynchus (e.g., Rainbow trout) Present			Additional Fishery Information
VWQS Criteria (2017)				
Primary Contact Recreation			235	
Protection of Aquatic Biota Acute	2.83	6.17		
Protection of Aquatic Biota Chronic	1.51	4.82		
Exceedance Calculated?				
Primary Contact Recreation			NO	
Protection of Aquatic Biota Acute	NO	NO		VWQS/EPA Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater was updated in 2013.
Protection of Aquatic Biota Chronic	NO	NO		

Table 4b. Mass Balance for Metals of Concern around the Global Foundries WWTF

		Metal (Total)											
	unit	Antimony	Arsenic	Beryllium	Cadmium	Chromium III	Copper	Lead	Nickel	Selenium	Silver	Thallium	Zinc
Hardness as CaCO ₃	mg/L	51.10											
Qe	cfs	12.38											
Cetsd	ug/L				112.0	1120.0	119.60	2.2	1832.6		24.0		53.9
Qs	cfs	146.86											
Cs (Average)	ug/L	5.00	0.50	0.50	0.50	2.50	5.00	0.50	2.50	2.50	0.50	2.50	25.00
Qr = Qs+Qe	cfs	159.24											
Cr = (QeCetsd+QsCs)/Qr	ug/L	4.6	0.5	0.5	9.2	89.4	13.9	0.6	144.8	2.3	2.3	2.3	27.2
Aquatic Biota Acute limit	ug/L	none	340	none	1.0	1040.4	7.4	34.7	265.9	5	1.2	none	67.8
Aquatic Biota Chronic limit	ug/L	none	150	none	0.5	49.7	5.3	1.4	29.6	3	-	none	67.8
Water Quality Standard Exceedances	Cadmium exceeds the Aquatic Biota Acute limit. Cadmium exceeds the Aquatic Biota Chronic limit. Chromium III exceeds the Aquatic Biota Chronic limit. Copper exceeds the Aquatic Biota Acute limit. Copper exceeds the Aquatic Biota Chronic limit. Nickel exceeds the Aquatic Biota Chronic limit. Silver exceeds the Aquatic Biota Acute limit.												

Exceedances of VWQS were calculated for Cadmium, Chromium, Copper, Nickel and Silver as shown in Table 4b. This permit already contains limits for these metals and those limits should be compared to current VWQS and recalculated if necessary.

Nutrients

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

Table 5. Assessment of Nutrients of Concern around the Global Foundries WWTF

	Total Phosphorus (ug/l)	Notes
Qs (cfs)	481.81	<i>Estimated LMM flow</i>
Qe (cfs)	12.378	<i>permitted effluent discharge</i>
Qr = Qs + Qe (cfs)	494.18	<i>Qs+Qe</i>
IWC	0.0250	<i>Qe/(Qs+Qe)</i>
Cs	2.50	<i>upstream pollutant concentration (average)</i>
Cetsd	322	<i>effluent pollutant concentration adjusted by TSD method.</i>
Cr = (CsQs+CetsdQe)/Qr	10.5	<i>calculated resultant downstream pollutant concentration</i>
Stream Type	m Water, Medium-G	
Calculated Instream Contribution from Effluent	8	<i>difference between observed upstream concentration and calculated resultant downstream concentration. Mass Balance Method</i>
VWQS Criteria (2017)		
Threshold Criteria	27	
Exceedence Calculated?	No	

Total Nitrogen:

TN is the sum of nitrate, nitrite, ammonia, soluble organic nitrogen, and particulate organic nitrogen. To gather data on the amount of Total Nitrogen (TN) in this discharge and its potential impact on the receiving water, weekly summer and monthly winter “monitor only” requirements for Nitrate/Nitrite (NO_x), Total Ammonia Nitrogen (TAN) and Total Kjeldahl Nitrogen (TKN) are suggested for inclusion 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:

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 does not report Total Nitrogen data and no VWQS for the receiving water exists. Monitoring for TN should be conducted in support of the Lake Champlain TP TMDL.

Total Ammonia:

The previous permit was issued prior to the promulgation of the 2013 EPA Aquatic Life Criteria for Ammonia – Freshwater. No RP was calculated based upon the reported effluent data and the updated VWQS. TAN monitor only requirements for concentration should remain unchanged in order to continue to evaluate the potential for toxicity in the receiving water and also to collect nutrient information to support further analysis of the Lake Champlain TP TMDL.

Total Phosphorus:

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.

Total Phosphorus Numeric Analysis:

The TP concentrations in the Winooski River are greater than the 2017 nutrient criteria threshold of 27ug/L Total Phosphorus in a Class B Warm Water, Medium-Gradient stream. The calculated change in the in-stream TP concentration attributable to the Global Foundries WWTF is 8 ug/l 0. This calculation is presented above in Table 5.

Total Phosphorus Nutrient Response Conditions Analysis:

The Combined Nutrient Response Conditions for Aquatic Biota and Wildlife in Rivers and Streams at RM 16.3 on 9/9/2015 meets VWQS for pH, meets VWQS for Turbidity, meets VWQS for Dissolved Oxygen and meets VWQS for Aquatic Biota as shown below in Table 6. Therefore, the narrative standard presented in §3-01.B.2 of the VWQS is supported and the receiving waters are in compliance with VWQS for Total Phosphorus but may still be subject to limits proscribed by VSA 1266a or a Phosphorus TMDL.

Table 6. Assessment of Phosphorus Response Variables around the Global Foundries WWTF

Response variable (VWQS reference)	Target Value	River-mile: 16.7 9/9/2015	River-mile: 16.3 8/19/2015
pH (§3-01.B.9)	6.5-8.5 s.u.	<i>Not collected</i>	7.84
Turbidity (§3-04.B.1)	< 25 NTU at low mean annual flow	3.02	2.92
Dissolved Oxygen (min) (§3-04.B.2)	>5 mg/L and 60% saturation	<i>Not collected</i>	6.76 (84.8%)
Aquatic biota, based on macroinvertebrates.	Attaining an assessment of good, or better.	<i>Not collected</i>	<i>Meets VWQS (9/9/2015)</i>
<p>Note: Limited receiving water monitoring data was available. To compensate data from the monitoring site below the Essex Junction WWTF has been included. This data reflects the combined influence of the Global Foundries and Essex Junction WWTF effluent and can not be used to accurately estimate the Global Foundries influence on its own. However, this data is an accurate representation of downstream receiving water conditions and can be compared to VWQS.</p>			

Total Phosphorus Reasonable Potential Determination:

The numeric criteria for TP are not exceeded when calculated at this facility's full design flow and with the receiving water at LMM conditions. The narrative criteria for TP are satisfied and therefore this facility does not have reasonable potential to violate VWQS.

This facility is subject to the 2016 Lake Champlain Phosphorus TMDL. That document assigns a Monthly Average limit of 0.2 mg/L Total Phosphorus and reduces the facility's Annual Waste Load Allocation to 2.210 mt/year or 4872 lbs/year.

Summary of Reasonable Potential Determinations

- Calculations indicate that Cadmium, Chromium, Copper, Nickel and Silver continue to have reasonable potential and the existing limit should be recalculated to be protective of current VWQS.

Recommended Biological and Water Quality Monitoring:

As biological monitoring results indicate attainment of all nutrient response thresholds, the stream complies with VWQS for all identified response variables, and the narrative standard presented in §29A-302(2)(A) of the VWQS is supported (as shown in Table 6), it is not necessary to include biomonitoring in the draft permit.

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:

- 4 2-species (*Pimephales promelas* and *Ceriodaphnia dubia*) 48-hour acute and 96-hour chronic WET tests on composite effluent samples should be conducted in the upcoming permit cycle: during the winter (January/February) of odd years and during the summer (August/October) of even years. Ammonia and Appendix J testing as described below should be conducted concurrently with the WET tests.
- Total Phosphorus should continue to be sampled weekly to ensure compliance with the Monthly Average Total Phosphorus limit of 0.8 mg/l and Annual Waste Load Allocation of 2.2100 mt or 4872 lbs.
- Current metals limits should be revised to reflect the updated VWQS.
- Free Cyanide limit should be revised to reflect the updated VWQS.
- Ammonia and the Appendix J pollutants should be analyzed concurrently with WET testing.

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 additional QBELs will not be necessary. Given the dilution (IWC at 7Q10 is = 0.078 (>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.

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MEMORANDUM



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Date: October 9, 2020

Subject: WQBEL Permit Limit Review and Calculations for the Global Foundries WWTF Facility (3-1295)

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)	Proposed WQBEL Discharge Limitations						Sampling Frequency (per month)
	Annual Average	Annual Limit	Monthly Average	Max Day	Monthly Average	Max Day	
		lbs/year	Mass (lbs/day)		Concentration (mg/L)		
Total Cadmium			0.42	0.62	0.07	0.11	Monthly (1)
Total Chromium III			45.7	66.7	1	2	Monthly (1)
Total Copper			2.6	3.5	2.07	3.38	Twice a Month (2)
Free Cyanide			4.77	6.97	0.65	1.2	Monthly (1)
Total Lead			1.05	1.81	0.43	0.69	Twice a Month (2)
Total Nickel			22.95	39.66	2.38	3.98	Twice a Month (2)
Total Phosphorus		4872			0.8		Weekly (4)
Total Silver			0.66	0.97	0.24	0.43	Monthly (1)
Total Zinc			37.97	52.68	1.48	2.61	Twice a Month (2)

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.

The following constituents were not analyzed as WQBELs: Flow, Ultimate Oxygen Demand, BOD, TSS, Settleable Solids, TKN, TN, E. coli and pH. These constituents are either subject to TBELs 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. Total Cadmium

VWQS for Total Cadmium have changed since the last permit. An updated monthly average limit of 0.42 lbs/day and daily maximum limit of 0.62 lbs/day should be included in the permit. The existing concentration limits of 0.11 mg/l maximum day and 0.07 mg/l monthly average should be retained, although it should be noted that a very low effluent flow rate would be required to achieve these concentrations will also staying in compliance with the mass based limits.

2. Total Chromium III

VWQS for Total Chromium III have changed since the last permit. An updated monthly average limit of 45.7 lbs/day and daily maximum limit of 66.7 lbs/day should be included in the permit. The existing concentration limits of 2.77 mg/l maximum day and 1.71 mg/l monthly average should be retained.

3. Total Copper

VWQS have changed since the last permit and limits have been recalculated. Based upon comments received during previous permit comment period, the assimilative capacity of the Winooski river downstream of this discharge has been taken into account. New max day mass limit of 3.5 lbs/day is based upon subtracting the calculated Design flow x Maximum observed Cu concentration for each of the downstream WWTFs from the allowable daily load for this segment of the Winooski River of 7 lbs/day. The new monthly average mass limit of 2.6 lbs/day is based upon subtracting the Maximum observed flow x Maximum observed Cu concentration for each of the downstream WWTFs from the allowable monthly average load for segment of the Winooski River of 5 lbs/day. The existing concentration limits are to be retained because the mass based limits are more protective.

4. Total Nickel

VWQS for Total Nickel have changed since the last permit. An updated monthly average limit of 22.95 lbs/day and daily maximum limit of 39.66 lbs/day should be included in the permit. The existing concentration limits of 3.98 mg/l maximum day and 2.38 mg/l monthly average should be retained.

5. Total Lead

VWQS for Total Lead have changed since the last permit. An updated monthly average limit of 1.05 lbs/day and daily maximum limit of 1.81 lbs/day should be included in the permit. The existing concentration limits of 0.69 mg/l maximum day and 0.43 mg/l monthly average should be retained, although it should be noted that a very low effluent flow rate would be required to achieve these concentrations will also staying in compliance with the mass based limits.

6. Total Silver

VWQS for Total Silver have changed since the last permit. An updated monthly average limit of 0.66 lbs/day and daily maximum limit of 0.97 lbs/day should be included in the permit. The existing concentration limits of 0.43 mg/l maximum day and 0.24 mg/l monthly average should be retained.

7. Total Zinc

VWQS for Total Zinc have changed since the last permit. An updated monthly average limit of 37.97 lbs/day should be included in the permit. The existing concentration limits of 2.61 mg/l maximum day and 1.48 mg/l monthly average should be retained, although it should be noted that a low effluent flow rate would be required to achieve these concentrations will also staying in compliance with the

mass based limits. The existing maximum day mass limit of 52.68 lbs/day should be retained because it is more protective than the newly calculated value.

8. Free Cyanide

VWQS have changed in regards to the specification that the standards apply to free cyanide. This clarification should be made clear to the permittee. Revised limits of 6.97 lbs/day on the maximum day and 4.77 lbs/day monthly average should be included in the permit. The concentration limits of 1.2 mg/l maximum day and 0.65 mg/l monthly average should be retained.

9. Total Phosphorus

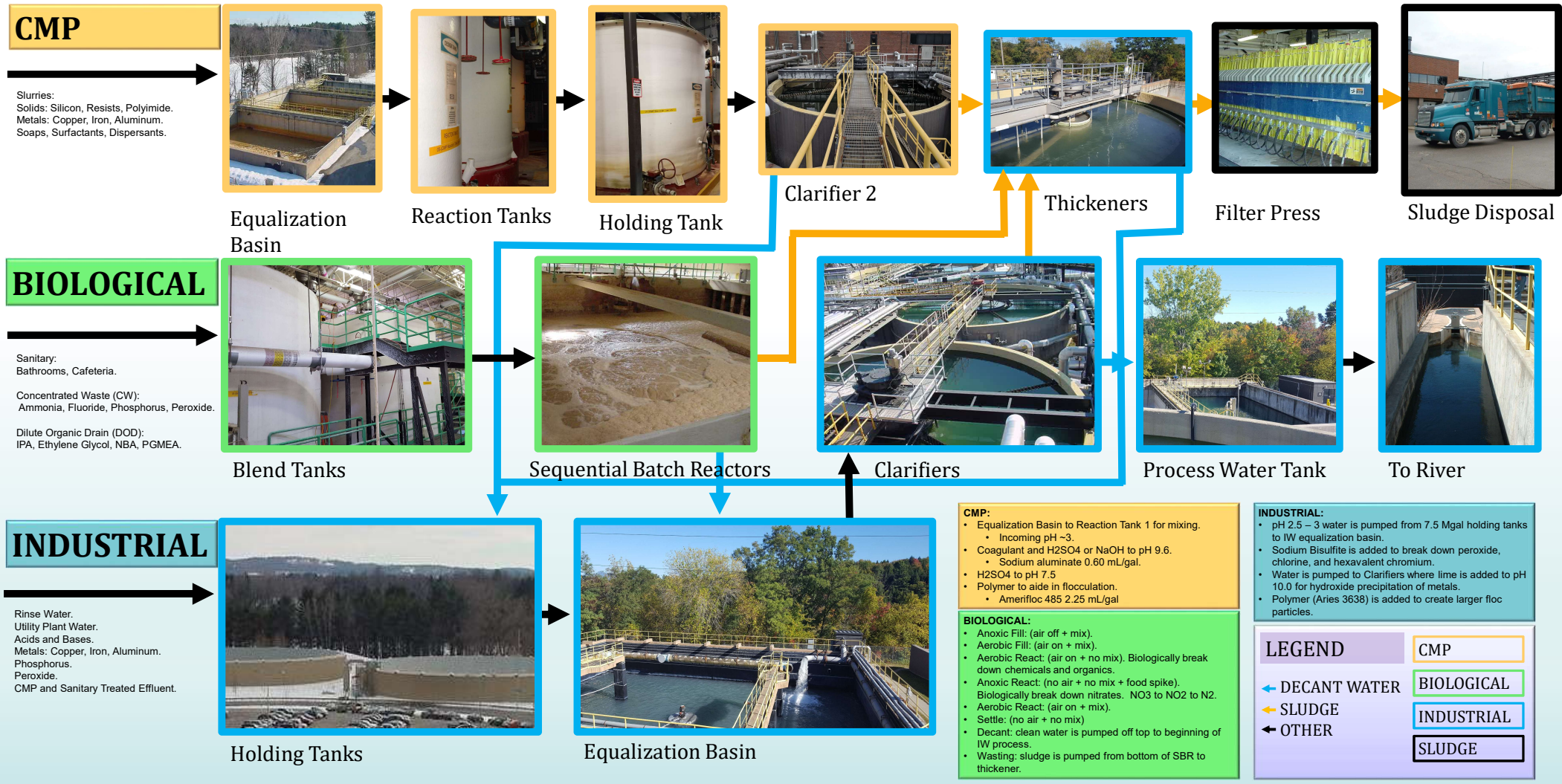
This facility has been assigned an Annual Limit of 4872 lbs of Total Phosphorus in the Lake Champlain Phosphorus TMDL. This facility is subject to 10 VSA 1266a which limits the discharge of Total Phosphorus to a Monthly Average of 0.80 mg/l. These limits should be included in the permit.

ATTACHMENT B.1

DRAFT



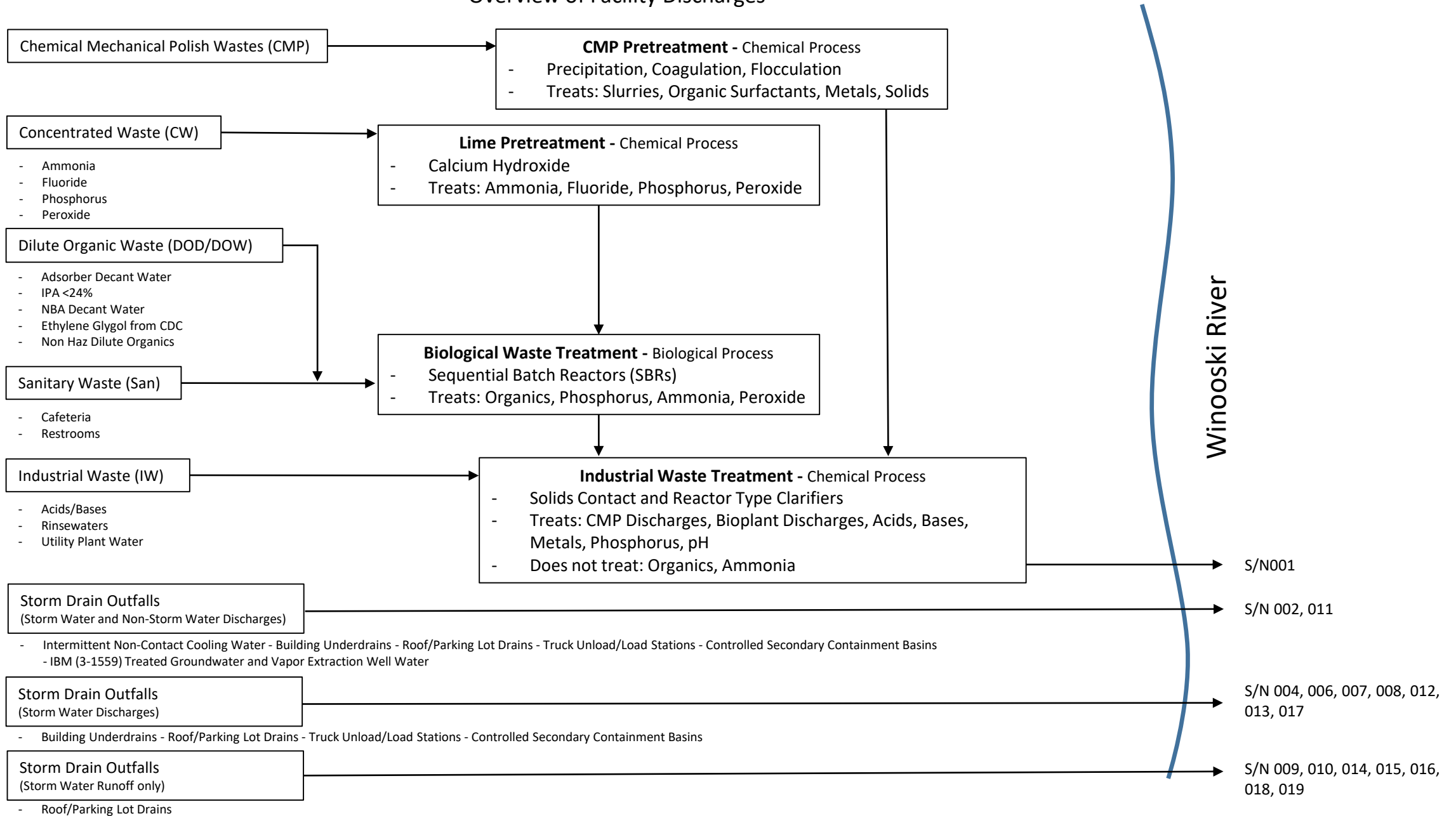
FAB 9 INDUSTRIAL WASTEWATER TREATMENT PLANT



ATTACHMENT B.2

DRAFT

GlobalFoundries Overview of Facility Discharges



ATTACHMENT B.3

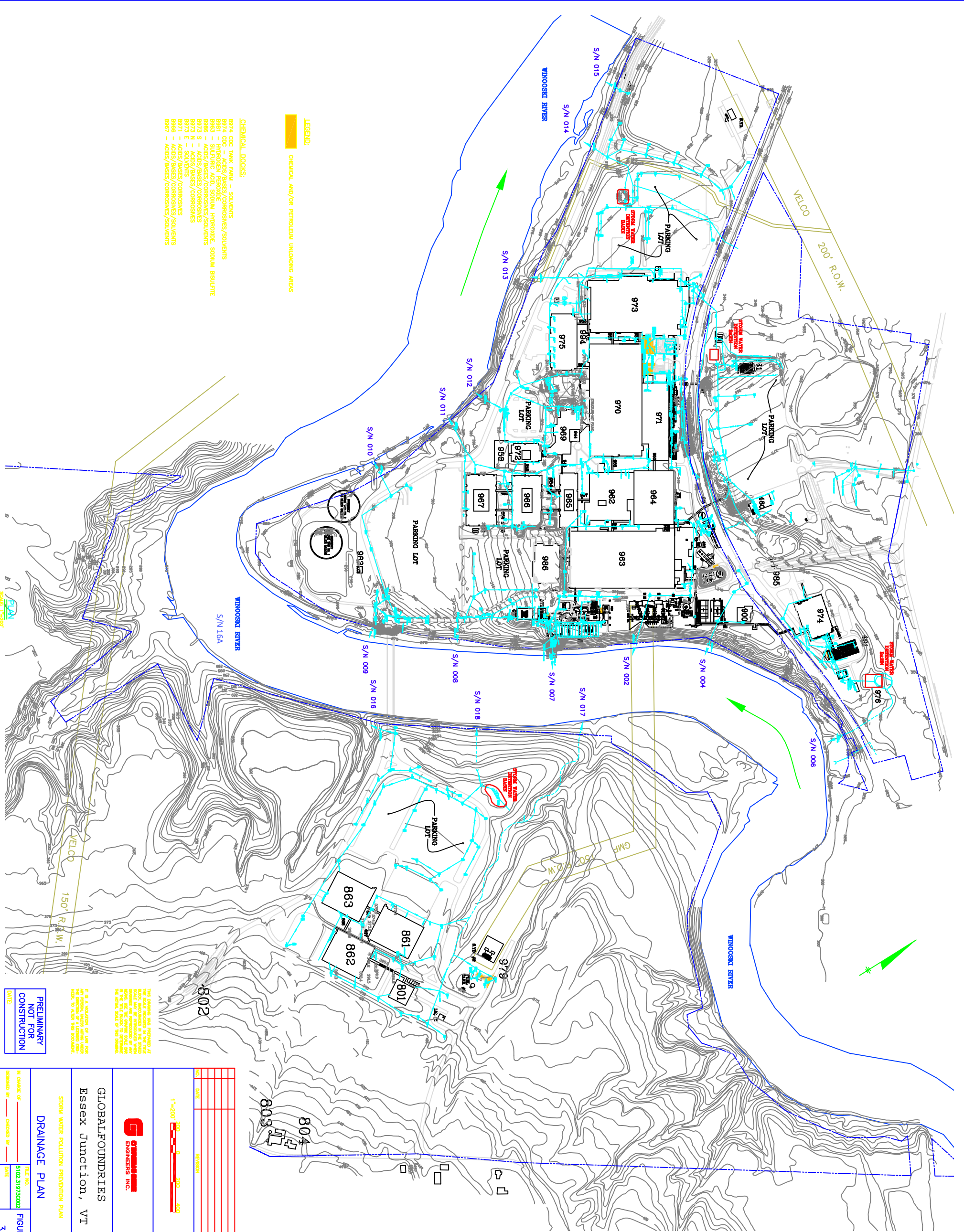
DRAFT

S/N 019
(on Robinson Pkwy near Franklin St)

- CHEMICAL DOCKS:**
- 8974 - DGC TANK FARM - SOLVENTS
 - 8974 - DDC - ACIDS/BASES/CORROSIVES/SOLVENTS
 - 8981 - HYDROGEN PEROXIDE
 - 8983 - SULFURIC ACID, SODIUM HYDROXIDE, SODIUM BISULFITE
 - 8986 - ACIDS/BASES/CORROSIVES/SOLVENTS
 - 8973 - N - ACIDS/BASES/CORROSIVES
 - 8973 - E - SOLVENTS
 - 8971 - ACIDS/BASES/CORROSIVES
 - 8968 - ACIDS/BASES/CORROSIVES/SOLVENTS
 - 8967 - ACIDS/BASES/CORROSIVES/SOLVENTS

LEGEND:

CHEMICAL AND/OR PETROLEUM UNLOADING AREAS



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FILE # 11-0110-0101-01-01
DATE: 11/23/02

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CONSTRUCTION**

NO.	DATE	REVISION	BY



GLOBALFOUNDRIES
Essex Junction, VT

STORM WATER POLLUTION PREVENTION PLAN

DRAINAGE PLAN

IN CHARGE OF	FILE NO.	FIGURE
DESIGNED BY	5102.319730002	3
CHECKED BY	DATE	
DRAWN BY	NOVEMBER 2002	