

Permittee: Cornell University
Facility: Lake Source Cooling (LSC) Facility
SPDES Number: NY0244741

Date: May 26, 2020
Permit Writer: Brian Baker
Discharge Class: 01 Industrial
NPDES Class: USEPA Non-Major

**SPDES Permit Fact Sheet
Cornell University
Lake Source Cooling (LSC) Facility
NY0244741**



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Summary of Permit Changes

A State Pollutant Discharge Elimination System (SPDES) Department-initiated permit modification has been finalized for the Lake Source Cooling (LSC) Facility. Over the past few years, the permittee has requested three modifications of the interim effluent limitation for Total Phosphorus (TP) due to the Cayuga Lake Total Maximum Daily Load (TMDL) not yet being finalized in accordance with Footnote 1 of the Schedule of Compliance. The final permit was developed as a Department Initiated Modification (DIM) pursuant to 6 NYCRR 621.13(a)(4) and 750-1.18(a). This modification is being proposed as the result of a review of lake and discharge monitoring data, which identified increasing phosphorus levels in the LSC discharge. The increased phosphorus levels in the discharge are from increasing phosphorus levels in the deep portion of the lake where the LSC intake is located. The following is a summary of the changes. The details of these changes are specified below and in the permit:

- Inclusion of 6.4 lb/day as the TP final effluent limitation;
- Inclusion of reopener footnote if the final approved Cayuga Lake TMDL specifies a Waste Load allocation (WLA) for the LSC Facility that would require a permit limitation other than 6.4 lb/day;
- Deletion of Schedule of Compliance for TP;
- Inclusion of Best Management Practices - Optimization Program, previously required in Schedule of Compliance, into Special Condition 6;
- Addition of Phosphorus Offset Program;
- Added a map identifying subwatersheds tributary to the impaired waterbody segment areas where offset BMPs should be prioritized;
- Elimination of completed Cayuga Lake Water Quality Model Plan and Outfall Redesign schedules and conditions; and,
- Inclusion of eReporting and NetDMR compliant first and last pages.

This factsheet summarizes the information used to determine the effluent limitations and other conditions contained in the permit. General background information about the regulatory bases for the effluent limitations and other conditions contained in this permit are in the [Appendix](#) linked throughout this factsheet.

Administrative History

The SPDES permit was originally issued effective 3/1/1998, modified on 5/1/2002, and subsequently administratively renewed effective 3/1/2003 and 3/1/2008.

- | | |
|-----------|---|
| 1/11/2008 | Department issued a Request for Information (RFI) to modify and renew the SPDES permit due to the facility's EBPS score ¹ . At the time of the RFI, the facility had an EBPS score of 205. |
| 5/1/2013 | Modified and renewed SPDES permit (2013 permit) became effective with a five-year term. This permit included a 6.4 lbs/day interim TP effluent limitation, immediately effective, and a 4.8 lbs/day final TP effluent limitation, which would become effective in the future. |
| 1/22/2018 | Cornell University submitted a request to modify the permit to extend the interim TP effluent limitation beyond June 1, 2018 due to the TMDL not yet being finalized. This request was made in accordance with Footnote 1 of the Schedule of Compliance. |

¹ Pursuant to 6 NYCRR 750-1.18 and NYS Environmental Benefit Permit Strategy (EBPS)

- 5/1/2018 2013 permit was administratively renewed with a five-year term and included the extension of the interim TP effluent limitation to June 1, 2019 or date of TMDL issuance. Permit has an expiration date of April 30, 2023. This permit, along with all subsequent modifications, as listed below, represents the current permit that has formed the basis of this permit modification.
- 4/1/2019 Cornell University submitted a request to modify the permit to extend the interim TP effluent limitation beyond June 1, 2019 due to the TMDL not yet being finalized. This request was made in accordance with Footnote 1 of the Schedule of Compliance.
- 4/26/2019 Permit was modified to extend the interim TP effluent limitation to June 1, 2020 or date of TMDL issuance.
- 2/26/2020 Cornell University submitted a request to modify the permit to extend the interim TP effluent limitation beyond June 1, 2020 due to the TMDL not yet being finalized. This request was made in accordance with Footnote 1 of the Schedule of Compliance.
- 4/8/2020 The Department published a notice of complete application in the Environmental Notice Bulletin (ENB)
- 4/9/2020 The Department provided notice in the Ithaca Journal. The public comment period commenced.
- 5/11/2020 Comment period closed. Timely comments were received from the following:

	Affiliation	Name	Date
1	USEPA Region 2 Water Division	Virginia Wong, Chief, NPDES Section	5/5/2020
2	Cornell University (Permittee)	Rick Burgess, PE, Vice President, Facilities and Campus Services	5/7/2020
3	Tompkins County Water Resources Council	Roxanna Johnston, Chair -Monitoring Partnership	5/11/2020

- 5/20/2020 Department received late comments from Cayuga Lake Environmental Action Now (CLEAN). As required by 6 NYCRR 621.10(e), NYSDEC has prepared this Responsiveness Summary to address the comments that were received on the draft permit during the public comment period.
- 5/27/2020 Department issued the SPDES permit with an effective date of 6/1/2020. All substantive comments were addressed in a response to comments (as part of the fact sheet upon finalization).

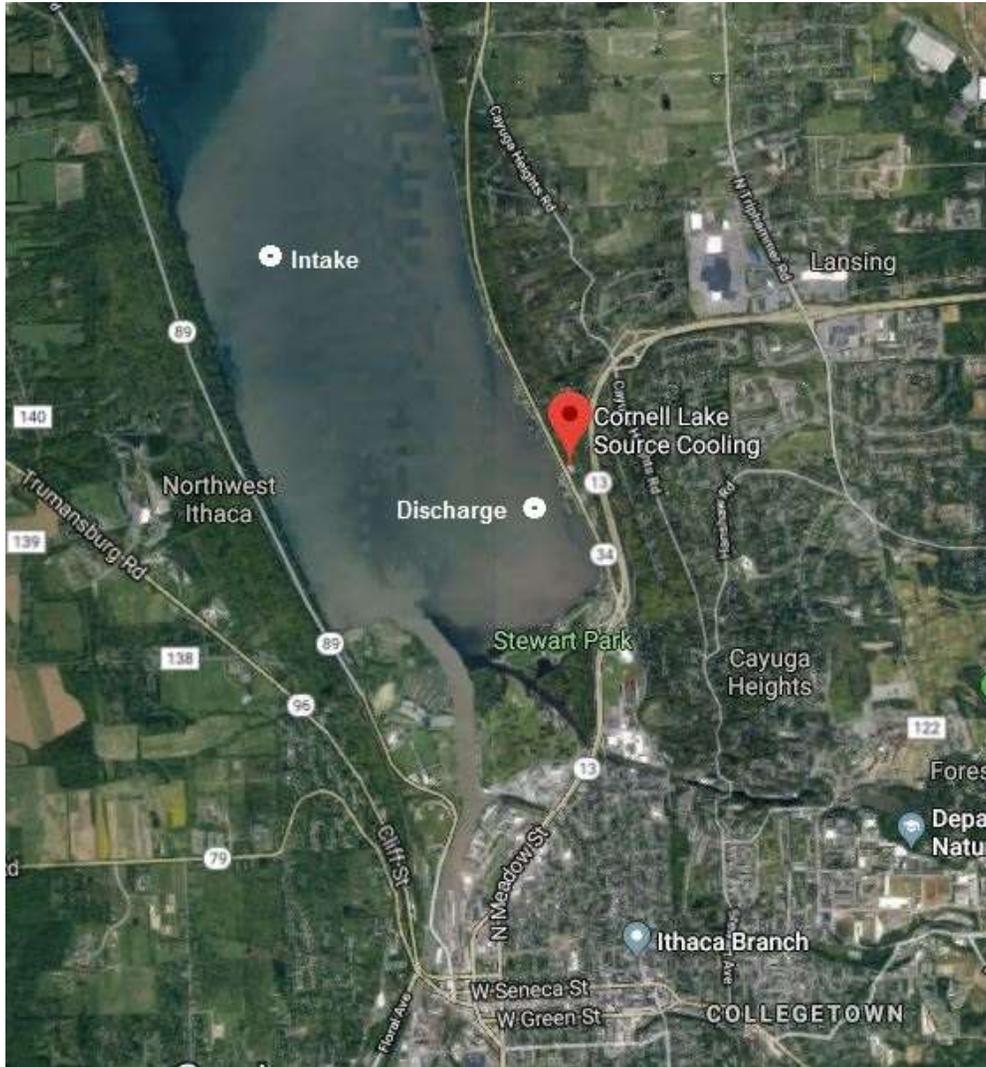
The Notice of Complete Application, published in the Environmental Notice Bulletin and newspapers, provides information on the public notice process.

Facility Information

The permitted facility provides cooling water to the Cornell University campus. Water is removed from the Class AA (deep) segment of Cayuga Lake through a cooling water intake structure and returned, untreated, to the Class A (shallow) southern basin of the Lake as shown

in the Site Overview. Water is circulated through the cooling system with no admixture of water treatment chemicals or other chemistry.

Site Overview



Enforcement History

Environmental regulatory compliance and enforcement information for this facility can be found on the Enforcement and Compliance History Online at <https://echo.epa.gov>.

Receiving Water Information

The facility discharges via the following outfall:

Outfall No.	SIC Code	Wastewater Type	Receiving Water
001	9999	Non-Contact Cooling Water	Cayuga Lake, Southern End [Ont 66-12-P296 (portion 4)]

Impaired Waterbody Information

In 2002, Cayuga Lake, Southern End (PWL No. 0705-0040, Ont-66-12-P296, Portion 4)) was listed on the [New York State Section 303\(d\) List](#) of Impaired/TMDL Waters as impaired due to Phosphorus, silt, and sediment from municipal and nonpoint source discharges. The segment continues to be listed on the 2016 NYS Section 303(d) List. A TMDL is currently being developed to address the impairment, and therefore, there is no applicable TP WLA for this facility at this time. If the final approved Cayuga Lake TMDL specifies a WLA other than 6.4 lb/day, the permit includes a reopener clause whereby the Department will propose a modification to this permit to incorporate an appropriate effluent limitation based on the TP WLA for this facility in the approved TMDL.

Permit Requirements

Effluent Limitations

Total Phosphorus: The permit includes a final water quality-based effluent limitation of 6.4 lb/day as a monthly average. While the previous permit included a final effluent limitation of 4.8 lb/day, that effluent limitation never went into effect

The 6.4 lb/day effluent limitation represents the daily load calculated using the applicable water quality guidance value of 20 µg/l and the 95th percentile statistical average flow rate of 37.5 MGD (~1.6 m³/sec) over the July 2000 – December 2009 period, is equivalent to the currently effective interim effluent limitation and corresponds to existing effluent quality. The previous final effluent limitation listed in the 2013 permit of 4.8 lb/day, which never went into effect, was based upon actual phosphorus loading data from 2000-2009. Monitoring results over the 2009-2019 period show that background levels of both TP and Soluble Reactive Phosphorus (SRP) in the lake, over which the permittee has no control, have been slowly increasing over time and will make the previous final effluent limitation of 4.8 lb/day unachievable.

Attachment A to this fact sheet provides additional supporting information and analyses of data reported since 2013 to support a final effluent limitation of 6.4 lb/d. Attachment B to this fact sheet provides the monitoring results over the 2009-2019 period that show increasing background levels of both TP and Soluble Reactive Phosphorus (SRP) in the intake water. The data used in these Attachments was reported by the permittee on their monthly Discharge Monitoring Reports.

As noted in the [Additional Modifications section](#) of this Fact Sheet, the permittee conducted a study to relocate the discharge from Outfall 001 to a location within the Class AA segment of Cayuga Lake. This study concluded that a relocated outfall would not offer improved water quality conditions in the Lake. As also noted in the [Best Management Practices section](#) of this Fact Sheet, the permittee is required to maximize efficiency of the LSC system to minimize the volume of water used.

Based on all of this information, a less stringent final effluent limitation is allowable and justified.

Anti-backsliding

Anti-backsliding requirements do not apply to the revision to the final effluent limitation because that change is being made before the scheduled date of compliance for that final effluent limitation.

Antidegradation

The permit contains effluent limitations, which ensure that the designated best use of the receiving waters will be maintained. Please see the Environmental Notice Bulletin for information on the State Environmental Quality Review (SEQR)² determination. [Appendix Link](#)

Best Management Practices - Optimization Program

The 2013 permit required the permittee to develop and implement an LSC Best Management Practices (LSC BMP) program to maximize the efficiency of the LSC System and minimize the volume of water used. The permittee submitted the LSC BMP program on January 30, 2014. The permit requires the permittee to continue implementation of this program including practices to reduce chilled water consumption and energy to the degree practical. Under the program, the permittee is required to continuously seek to identify areas of greater efficiency in the use of campus chilled water cooling. The permittee shall submit an annual report, by February 1 of each year. This requirement is continued from the 2013 permit.

Special Conditions

Phosphorus Offset Program:

The permit includes a new Phosphorus Offset program. This program requires the permittee to submit, for review and Department approval, documentation demonstrating that any proposed expansion of the LSC system to add a building,³ not connected to the LSC system at the effective date of permit modification, will be offset by implementation of Offset BMPs. The goal of this program is to hold the expected annual mass load contribution of TP and SRP to current discharge levels by implementation and maintenance of BMPs. The Offset BMPs will be designed to reduce the TP input to Cayuga Lake by an annual mass load of at least 2 times the TP transfer associated with the additional volume of water circulated to meet the cooling demand associated with the newly connected buildings. The estimated mass increase in TP transfer associated with additional cooling water withdrawal and return to Cayuga Lake will be calculated based upon the load during the period of thermal stratification (May 1 – September 30).

A 2:1 TP offset ratio was selected to account for uncertainty in both the estimation of the total annual loads and the variability in ambient concentrations of TP and SRP. In selecting the 2:1 ratio, the Department relied on EPA guidance⁴ which concluded that a 2:1 offset represents an uncertainty ratio that is adequately conservative and protective of water quality while not being unduly restrictive so as to discourage transactions.

Under the Offset Program, the permittee must submit, for Department review and approval 90 days prior to any proposed expansion in the use of the LSC system, an implementation schedule and documentation demonstrating that the proposed expansion of service will be offset by a factor of at least 2:1. Documentation requirements are specified in the permit. An annual report evaluating the effectiveness of the Offset Program is required to be submitted to the Department by February 1 of each year of permit authorization. Compliance with the Offset Program will ensure that the permittee will not cause or contribute to a water quality standard violation (NYSECL section 17-0501).

² As prescribed by 6 NYCRR Part 617

³ Excludes buildings that already have a building permit prior to the effective date of permit modification.

⁴ USEPA, Accounting for Uncertainty in Offset and Trading Programs, EPA Technical Memorandum, February 12, 2014, https://www.epa.gov/sites/production/files/2015-07/documents/final_uncertainty_tm_2-12-14.pdf

Cayuga Lake Water Quality Model

The 2013 permit required the permittee to complete lake nutrient and watershed models for Cayuga Lake, which were used by the Department for the development of a TMDL to address the phosphorus impairment in the southern zone of the Lake. The permittee completed lake-wide sampling and watershed sampling to inform the models' development. The peer-reviewed models were finalized and submitted to the Department in December 2016. Because these one-time requirements have been met, these requirements have been removed from the permit.

Additional Modifications

The 2013 permit included a schedule to evaluate potential alternative sites for relocating the discharge from Outfall 001 to a location within the Class AA segment of Cayuga Lake and submit an approvable report summarizing the results (Outfall Redesign Study). The permittee submitted the final Outfall Redesign Study to the Department on October 31, 2016. The hydrodynamic and water quality modelling performed under the study predicted that relocating the outfall would offer no sustained reduction in Cayuga Lake's phytoplankton. In addition, the study concluded that relocation would result in short term impacts on the benthic community during construction; increase long term energy consumption due to increased pumping requirements due to increased head; and, be cost prohibitive. No further actions are necessary to satisfy this condition. This requirement has, therefore, been removed from the permit.

Schedule(s) of Submittals

A schedule of submittals has been included in the permit for the following:

- Submission of a Best Management Practices - Optimization Program Annual Report
- Submission of Phosphorus Offset Program Notices
- Submission of Phosphorus Offset Program Annual Report; and
- Submission of annual Scheduled Downtime report.

Attachment A: Effluent Data and limit evaluation:

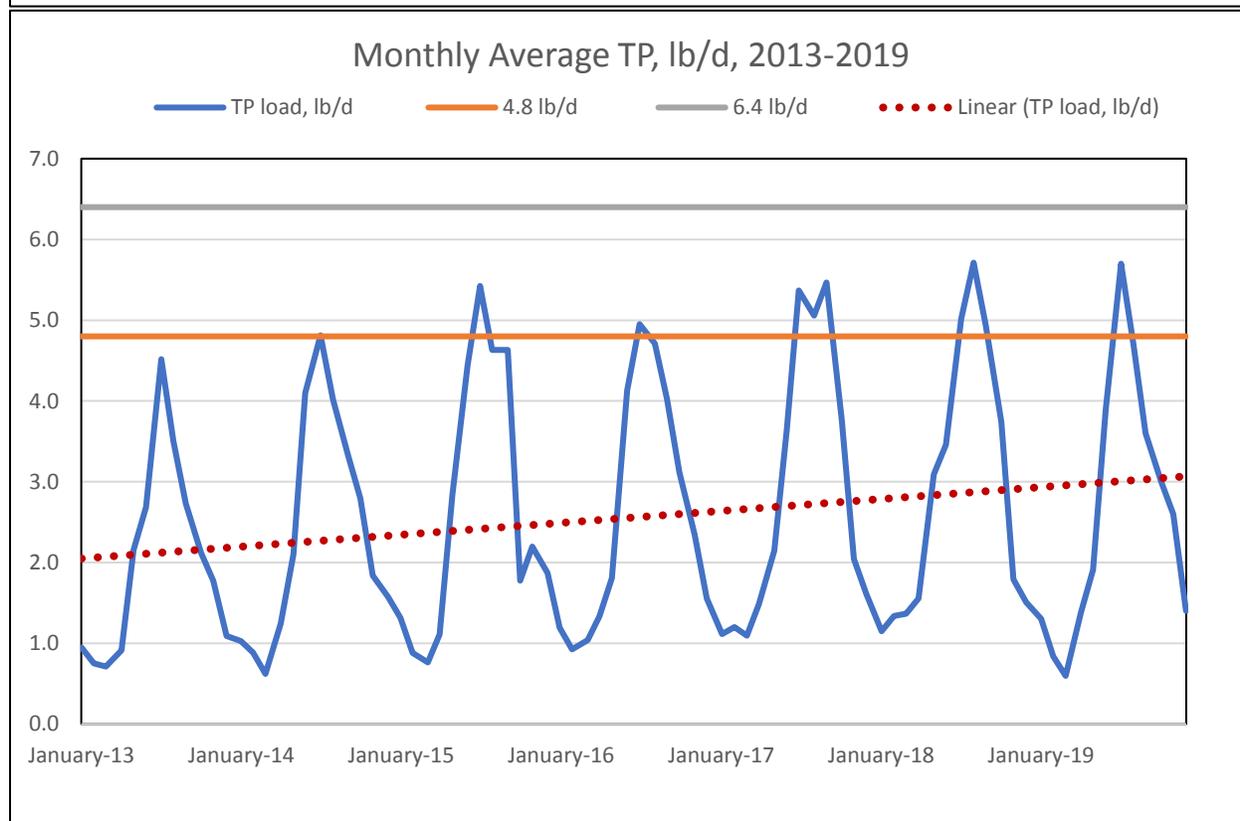
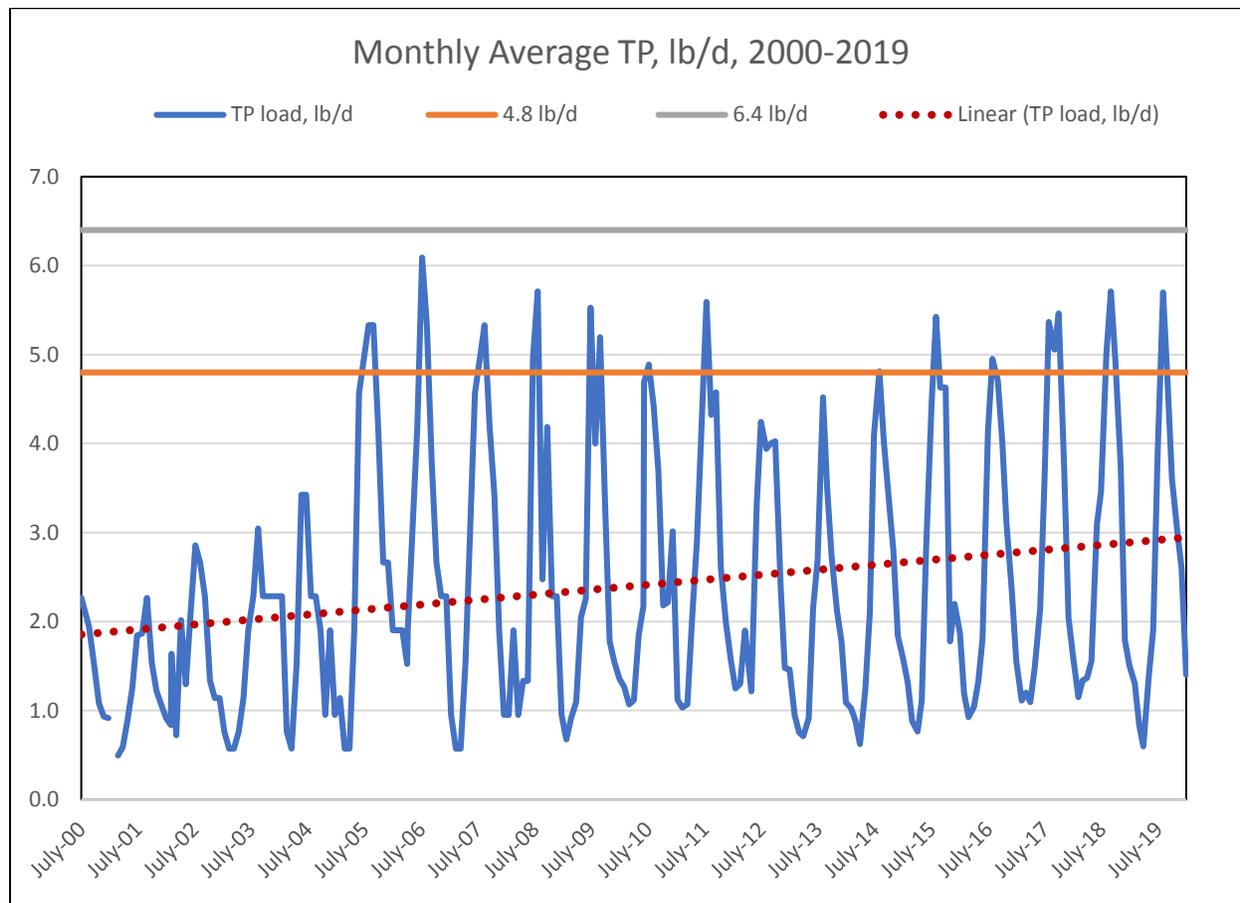
Total Phosphorus (TP) and Soluble Reactive Phosphorus (SRP), January 2013 - December 2019					
	TP lb/d	TP µg/l	TP µg/l	SRP µg/l	SRP µg/l
	Monthly Average	Monthly Average	Daily Max	Monthly Average	Daily Max
January-13	0.9	10.9	12.1	7.5	8.3
February-13	0.8	12.9	13.7	8.3	8.5
March-13	0.7	12.0	12.7	8.2	8.2
April-13	0.9	11.6	12.2	8.0	8.3
May-13	2.2	12.5	14.7	8.5	8.7
June-13	2.7	12.0	12.5	8.0	8.9
July-13	4.5	14.2	16.7	9.0	10.3
August-13	3.5	13.2	15.3	8.8	10.8
September-13	2.7	13.9	16.3	9.6	11.3
October-13	2.1	15.7	16.5	10.5	11.7
November-13	1.8	14.7	18.2	9.3	11.9
December-13	1.1	11.5	13.0	7.5	8.7
January-14	1.0	12.1	14.7	8.0	9.0
February-14	0.9	12.8	15.8	8.5	8.8
March-14	0.6	13.3	13.6	9.0	9.5
April-14	1.2	15.0	17.0	10.0	9.9
May-14	2.1	15.3	17.4	10.5	11.8
June-14	4.1	16.5	17.6	11.0	11.6
July-14	4.8	16.3	16.8	11.2	11.5
August-14	4.0	17.0	18.0	11.9	12.1
September-14	3.3	16.2	17.1	11.4	11.9
October-14	2.8	17.3	20.4	12.9	15.0
November-14	1.8	18.3	22.0	13.1	13.7
December-14	1.6	17.1	24.6	8.6	11.3
January-15	1.3	13.7	14.2	8.4	8.7
February-15	0.9	12.8	13.6	9.8	13.7
March-15	0.8	13.4	15.0	9.4	9.9
April-15	1.1	15.5	18.9	9.7	10.2
May-15	2.8	15.2	16.1	9.8	9.5
June-15	4.4	17.8	21.0	10.2	11.0
July-15	5.4	18.9	21.3	10.7	11.5
August-15	4.6	17.5	19.9	12.4	13.0
September-15	4.6	19.2	20.7	13.0	13.7
October-15	1.8	20.9	22.5	13.2	13.7
November-15	2.2	20.3	21.5	12.7	12.9
December-15	1.9	17.9	19.8	11.6	11.9
January-16	1.2	12.6	14.2	8.1	8.7
February-16	0.9	14.6	16.1	8.6	8.6
March-16	1.0	16.7	18.7	9.1	9.0
April-16	1.3	17.2	18.7	9.1	9.6
May-16	1.8	14.6	15.8	8.9	10.1
June-16	4.1	15.9	18.0	9.6	11.5
July-16	5.0	14.1	14.9	8.8	10.0
August-16	4.7	15.8	16.5	10.0	11.3
September-16	4.0	16.4	18.3	11.2	13.0
October-16	3.1	17.8	19.7	12.2	13.1
November-16	2.3	17.4	18.8	10.5	12.5
December-16	1.6	17.1	21.0	9.6	12.5
January-17	1.1	14.7	16.7	8.6	9.3
February-17	1.2	14.5	16.2	8.9	9.0
March-17	1.1	13.6	14.8	8.3	8.7
April-17	1.5	13.3	13.5	8.7	9.1
May-17	2.1	15.8	17.5	10.8	11.5
June-17	3.6	16.3	18.0	10.6	10.8
July-17	5.4	17.2	19.5	11.7	12.4
August-17	5.1	16.8	16.6	11.8	13.0
September-17	5.5	18.7	20.6	13.0	13.5
October-17	3.8	21.4	23.8	14.0	15.5
November-17	2.0	19.8	21.0	12.9	13.6
December-17	1.6	16.9	20.6	10.9	12.8
January-18	1.2	16.1	20.1	10.0	13.2
February-18	1.3	14.9	15.7	9.9	10.3
March-18	1.4	15.0	16.1	9.9	9.6
April-18	1.6	17.8	25.2	9.6	9.6
May-18	3.1	16.8	18.7	10.5	12.1
June-18	3.5	18.2	20.4	12.4	14.6
July-18	5.0	15.2	18.1	10.5	12.0
August-18	5.7	16.1	19.1	11.3	13.7
September-18	4.9	17.7	18.9	13.3	14.9
October-18	3.7	19.6	22.6	13.8	15.5
November-18	1.8	17.0	17.9	13.4	14.7
December-18	1.5	14.6	16.0	9.4	11.3
January-19	1.3	13.6	15.2	9.9	10.5
February-19	0.8	14.1	15.4	10.8	11.1
March-19	0.6	11.6	14.0	10.4	10.5
April-19	1.4	13.9	14.3	9.9	12.5
May-19	1.9	14.4	16.0	11.8	12.4
June-19	3.9	16.3	21.1	13.5	15.9
July-19	5.7	17.2	18.5	15.5	17.2
August-19	4.7	15.5	18.1	14.3	15.7
September-19	3.6	15.5	17.4	14.6	14.9
October-19	3.0	16.4	18.2	15.8	18.1
November-19	2.6	18.1	19.9	15.7	17.5
December-19	1.4	14.6	18.2	10.5	13.8

Monthly average effluent limit calculations

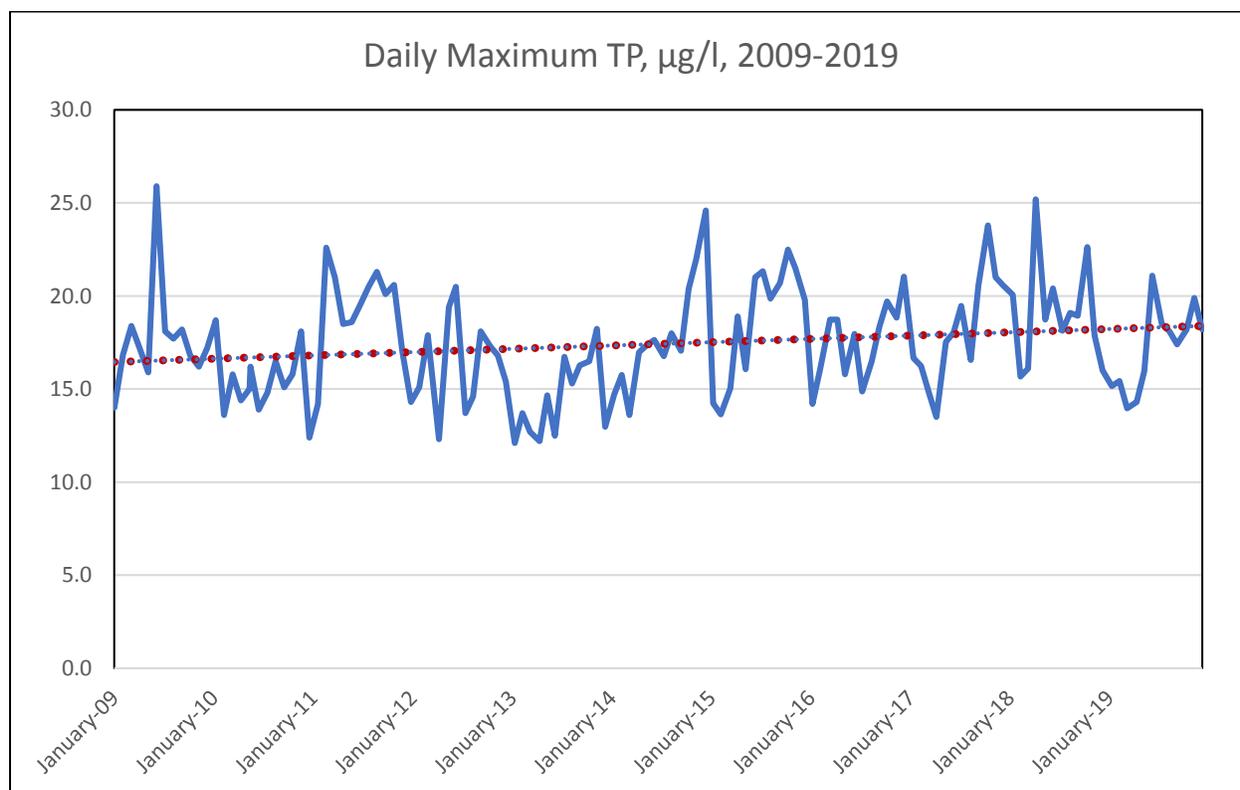
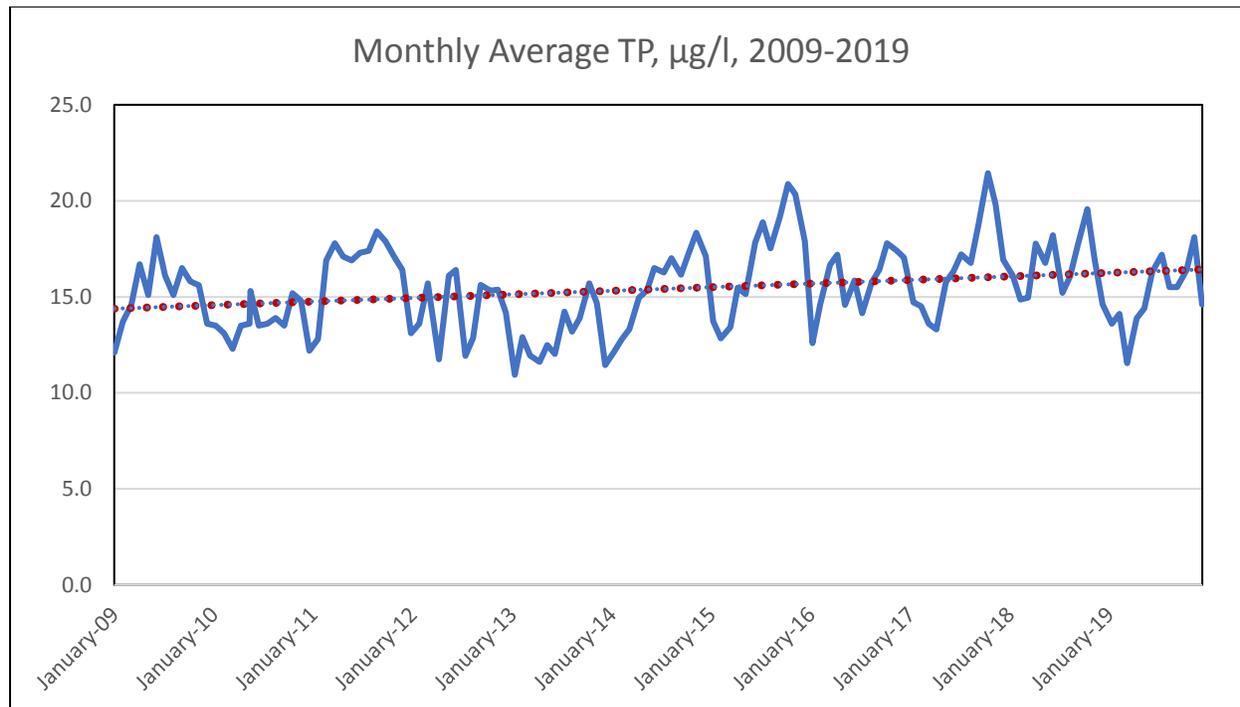
95th percentile lognormal calculations are determined in accordance with the USEPA Technical Support Document for Water Quality Based Toxics Control (TSD). Source: Monthly average Total P loads, in lb/day, as reported to the Department on the monthly Discharge Monitoring Reports (DMRs).

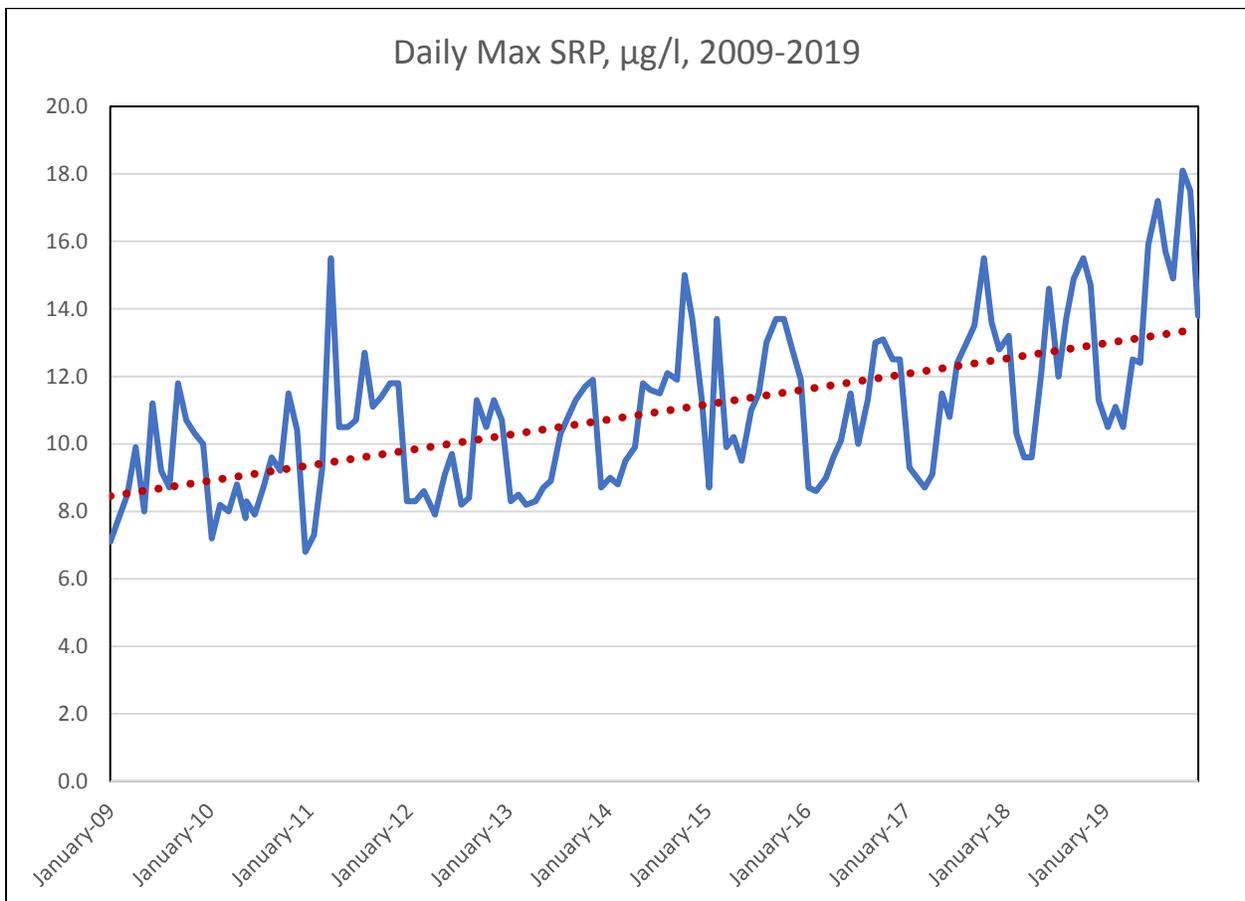
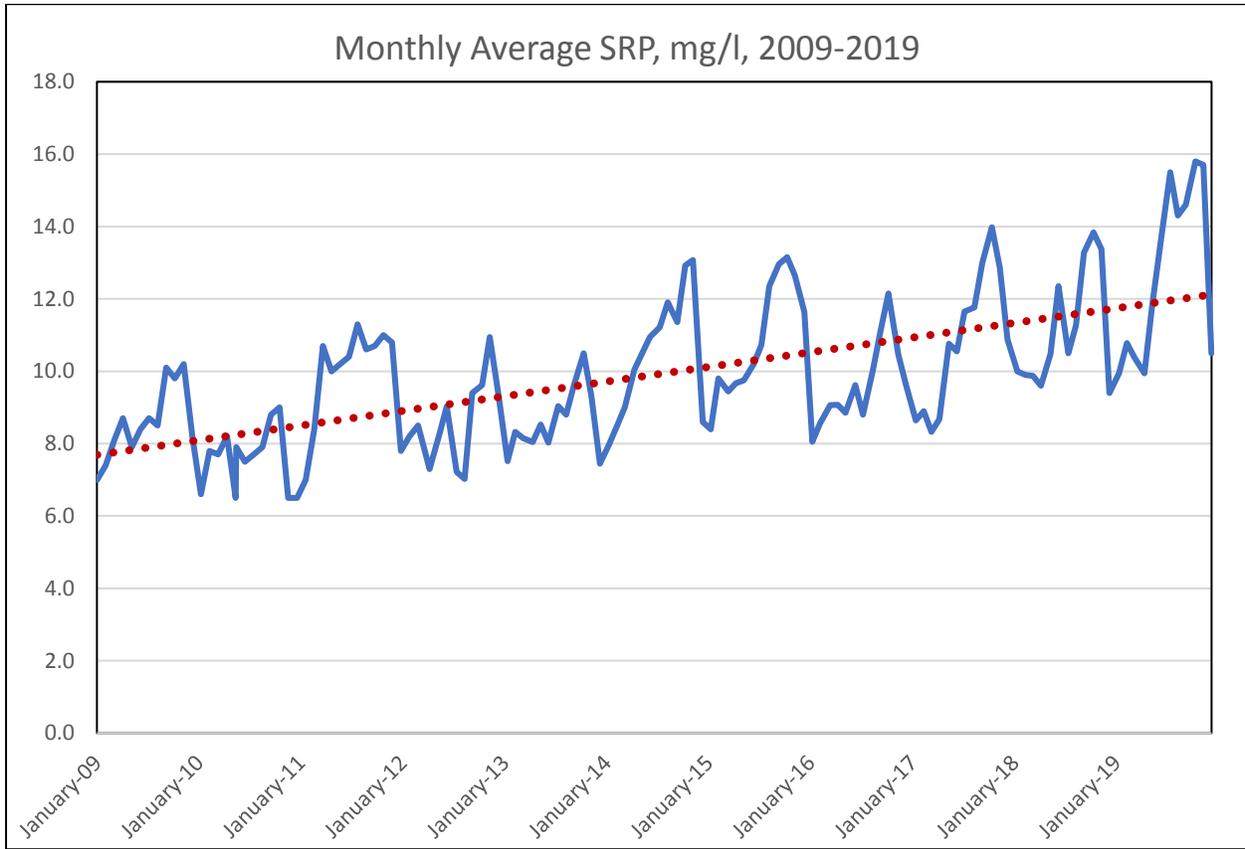
Monthly Average Total P, lb/d		
2013-2019		
	Normal	Lognormal
Average	2.56	0.75
Stds	1.53	0.64
95 %ile	5.07	6.03

Monthly Average Total P, lb/d		
2017-2019		
	Normal	Lognormal
Average	2.77	0.83
Stds	1.63	0.63
95 %ile	5.45	6.50



Attachment B: TP and SRP concentrations and trends, 2009-2019





Appendix: Regulatory and Technical Basis of Permit Authorizations

The information presented in the Appendix is meant to supplement the factsheet for multiple types of permits and may not be applicable to this specific permit.

Regulatory References

The requirements included in SPDES permits are based on both federal and state laws, regulations, policies, and guidance.

- Clean Water Act (CWA) 33 section USC 1251 to 1387
- Environmental Conservation Law (ECL) Articles 17 and 70
- Federal Regulations
 - 40 CFR, Chapter I, subchapters D, N, and O
- State environmental regulations
 - 6 NYCRR Part 621
 - 6 NYCRR Part 750
 - 6 NYCRR Parts 700 - 704 – Best use and other requirements applicable to water classes
 - 6 NYCRR Parts 800 – 941 - Classification of individual surface waters
- NYSDEC water program policy, often referred to as Technical and Operational Guidance Series memos (TOGS)
- USEPA Office of Water Technical Support Document for Water Quality-based Toxics Control, March 1991, Appendix E

The following is a quick guide to the references used within the factsheet:

SPDES Permit Requirements	Regulatory Reference
Anti-backsliding	6 NYCRR 750-1.10(c)
Best Management Practices (BMPS) for CSOs	6 NYCRR 750-2.8(a)(2)
Environmental Benefits Permit Strategy (EBPS)	6 NYCRR 750-1.18, NYS ECL 17-0817(4), TOGS 1.2.2 (revised January 25,2012)
Exceptions for Type I SSO Outfalls (bypass)	6 NYCRR 750-2.8(b)(2), 40 CFR 122.41
Mercury Multiple Discharge Variance	Division of Water Program Policy 1.3.10 (TOGS 1.3.10)
Mixing Zone and Critical Water Information	TOGS 1.3.1 & Amendments
PCB Minimization Program	40 CFR Part 132 Appendix F Procedure 8, 6 NYCRR 750-1.13(a) and 750-1.14(f), and TOGS 1.2.1
Pollutant Minimization Program (PMP)	6 NYCRR 750-1.13(a), 750-1.14(f), TOGS 1.2.1
Schedules of Compliance	6 NYCRR 750-1.14
Sewage Pollution Right to Know (SPR TK)	NYS ECL 17-0826-a, 6 NYCRR 750-2.7
State Administrative Procedure Act (SAPA)	State Administrative Procedure Act Section 401(2), 6 NYCRR 621.11(I)
State Environmental Quality Review (SEQR)	6 NYCRR Part 617
USEPA Effluent Limitation Guidelines (ELGs)	40 CFR Parts 405-471
USEPA National CSO Policy	33 USC Section 1342(q)
Whole Effluent Toxicity (WET) Testing	TOGS 1.3.2
General Provisions of a SPDES Permit Department Request for Additional Information	NYCRR 750-2.1(i)

The provisions of the permit are based largely upon 40 CFR 122 subpart C and 6 NYCRR Part 750 and include monitoring, recording, reporting, and compliance requirements, as well as general conditions applicable to all SPDES permits.

Outfall and Receiving Water Information

Impaired Waters

The NYS 303(d) List of Impaired/TMDL Waters (<http://www.dec.ny.gov/chemical/31290.html>) identifies waters where specific designated uses are not fully supported and for which the state must consider the development of a TMDL or other strategy to reduce the input of the specific pollutant(s) that restrict waterbody uses, in order to restore and protect such uses. SPDES permits must include effluent limitations necessary to implement a WLA of an EPA-approved TMDL (6 NYCRR 750-1.11(a)(5)(ii)), if applicable. In accordance with 6 NYCRR 750-1.13(a), permittees discharging to waters which are on the list but do not yet have a TMDL developed may be required to perform additional monitoring for the parameters causing the impairment. Accurate monitoring data is needed for the development of the TMDL, and to allow the Department to accurately determine the existing capabilities of the wastewater treatment plant to assure that wasteload allocations (WLAs) are allocated equitably.

Anti-backsliding

Anti-backsliding requirements are specified in the CWA sections 402(o) and 303(d)(4), ECL 17-0809, and regulations at 40 CFR 122.44(l) and 6 NYCRR 750-1.10(c) and (d). These requirements are summarized in TOGS 1.2.1. Generally, the relaxation of effluent limitations in permits is prohibited unless one of the specified exceptions applies, which will be cited on a case-by-case basis in this factsheet.

Antidegradation Policy

New York State implements the antidegradation portion of the CWA based upon two documents: (1) Organization and Delegation Memorandum #85-40, "Water Quality Antidegradation Policy" (September 9, 1985); and, (2) TOGS 1.3.9, "Implementation of the NYSDEC Antidegradation Policy – Great Lakes Basin (Supplement to Antidegradation Policy dated September 9, 1985) (undated)." The permit for the facility contains effluent limitations which ensure that the existing best usage of the receiving waters will be maintained. To further support the antidegradation policy, SPDES applications have been reviewed in accordance with the State Environmental Quality Review Act (SEQR) as prescribed by 6 NYCRR Part 617.

Other Conditions

Best Management Practices (BMP) Plans

BMP plans are authorized for inclusion in NPDES permits pursuant to Sections 304(e) and 402(a)(1) of the Clean Water Act, and 6 NYCRR 750-1.14(f). The regulations pertaining to BMPs are promulgated under 40 CFR Part 125, Subpart K. These regulations specifically address surface water discharges.

Schedules of Submittals

Schedules of Submittals are used to summarize the deliverables required by the permit.