

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
State Pollutant Discharge Elimination System (SPDES)
DISCHARGE PERMIT



First3.99

Industrial Code: **9999** SPDES Number: **NY0244741**
Discharge Class (CL): **01** DEC Number: **7-5099-00009/00001**
Toxic Class (TX): **N** Effective Date (EDP): **05/01/2013**
Major Drainage Basin: **07** Expiration Date (ExDP): **04/30/2018**
Sub Drainage Basin: **05** Modification Dates:(EDPM)
Water Index Number: **Ont. 12-66-P296**
Compact Area: **IJC**

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the Clean Water Act, as amended, (33 U.S.C. §1251 et.seq.)(hereinafter referred to as "the Act").

PERMITTEE NAME AND ADDRESS

Name: **Cornell University** Attention: **Patrick McNally**
Street: **300 Day Hall**
City: **Ithaca** State: **NY** Zip Code: **14853**

is authorized to discharge from the facility described below:

FACILITY NAME AND ADDRESS

Name: **Cornell University Lake Source Cooling Facility**
Location (C,T,V): **Ithaca** County: **Tompkins**
Facility Address: **1000 East Shore Drive**
City: **Ithaca** State: **NY** Zip Code: **14882**
NYTM -E: NYTM - N:
From Outfall No.: **001** at Latitude: **48 ° 28 ' 15 "** & Longitude: **76 ° 30 ' 10 "**
into receiving waters known as: **Southern Basin of Cayuga Lake** Class: **A**

and; (list other Outfalls, Receiving Waters & Water Classifications)

in accordance with: effluent limitations; monitoring and reporting requirements; other provisions and conditions set forth in this permit; and 6 NYCRR Part 750-1.2(a) and 750-2.

DISCHARGE MONITORING REPORT (DMR) MAILING ADDRESS

Mailing Name: **Cornell University**
Street: **395 Pine Tree Road, Suite 230**
City: **Ithaca** State: **NY** Zip Code: **14850**
Responsible Official or Agent: **Timothy Peer** Phone: **(607) 254-8722**

This permit and the authorization to discharge shall expire on midnight of the expiration date shown above and the permittee shall not discharge after the expiration date unless this permit has been renewed, or extended pursuant to law. To be authorized to discharge beyond the expiration date, the permittee shall apply for permit renewal not less than 180 days prior to the expiration date shown above.

DISTRIBUTION:

CO BWP - Permit Coordinator
RWE/RPA
EPA Region II - Michelle Josilo
NYSEFC
IJC
NYSDOH District Office

Deputy Chief Permit Administrator: Stuart M. Fox	
Address: Division of Environmental Permits 625 Broadway Albany, NY 12233-1750	
Signature: <i>Stuart M. Fox</i>	Date: 3/ 27/ 13

PERMIT LIMITS, LEVELS AND MONITORING DEFINITIONS

OUTFALL	WASTEWATER TYPE	RECEIVING WATER	EFFECTIVE	EXPIRING		
	This cell describes the type of wastewater authorized for discharge. Examples include process or sanitary wastewater, storm water, non-contact cooling water.	This cell lists classified waters of the state to which the listed outfall discharges.	The date this page starts in effect. (e.g. EDP or EDPM)	The date this page is no longer in effect. (e.g. ExDP)		
PARAMETER	MINIMUM	MAXIMUM	UNITS	SAMPLE FREQ.	SAMPLE TYPE	
e.g. pH, TRC, Temperature, D.O.	The minimum level that must be maintained at all instants in time.	The maximum level that may not be exceeded at any instant in time.	SU, °F, mg/l, etc.			
PARA-METER	EFFLUENT LIMIT	PRACTICAL QUANTITATION LIMIT (PQL)	ACTION LEVEL	UNITS	SAMPLE FREQUENCY	SAMPLE TYPE
	Limit types are defined below in Note 1. The effluent limit is developed based on the more stringent of technology-based limits, required under the Clean Water Act, or New York State water quality standards. The limit has been derived based on existing assumptions and rules. These assumptions include receiving water hardness, pH and temperature; rates of this and other discharges to the receiving stream; etc. If assumptions or rules change the limit may, after due process and modification of this permit, change.	For the purposes of compliance assessment, the permittee shall use the approved EPA analytical method with the lowest possible detection limit as promulgated under 40CFR Part 136 for the determination of the concentrations of parameters present in the sample unless otherwise specified. If a sample result is below the detection limit of the most sensitive method, compliance with the permit limit for that parameter was achieved. Monitoring results that are lower than this level must be reported, but shall not be used to determine compliance with the calculated limit. This PQL can be neither lowered nor raised without a modification of this permit.	Action Levels are monitoring requirements, as defined below in Note 2 which trigger additional monitoring and permit review when exceeded.	This can include units of flow, pH, mass, temperature, or concentration. Examples include µg/l, lbs/d, etc.	Examples include Daily, 3/week, weekly, 2/month, monthly, quarterly, 2/yr and yearly. All monitoring periods (quarterly, semiannual, annual, etc) are based upon the calendar year unless otherwise specified in this Permit.	Examples include grab, 24 hour composite and 3 grab samples collected over a 6 hour period.

Note 1: DAILY DISCHARGE: The discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for the purposes of sampling. For pollutants expressed in units of mass, the ‘daily discharge’ is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the ‘daily discharge’ is calculated as the average measurement of the pollutant over the day. **DAILY MAX:** The highest allowable daily discharge. **DAILY MIN:** The lowest allowable daily discharge. **MONTHLY AVG (daily avg):** The highest allowable average of daily discharges over a calendar month, calculated as the sum of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month. **RANGE:** The minimum and maximum instantaneous measurements for the reporting period must remain between the two values shown. **7 DAY ARITHMETIC MEAN (7 day average):** The highest allowable average of daily discharges over a calendar week. **12 MRA (twelve month rolling avg):** The average of the most recent twelve month’s monthly averages. **30 DAY GEOMETRIC MEAN (30 d geo mean):** The highest allowable geometric mean of daily discharges over a calendar month, calculated as the antilog of : the sum of the log of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month. **7 DAY GEOMETRIC MEAN (7 d geo mean):** The highest allowable geometric mean of daily discharges over a calendar week.

Note 2: ACTION LEVELS: Routine Action Level monitoring results, if not provided for on the Discharge Monitoring Report (DMR) form, shall be appended to the DMR for the period during which the sampling was conducted. If the additional monitoring requirement is triggered as noted below, the permittee shall undertake a short-term, high-intensity monitoring program for the parameter(s). Samples identical to those required for routine monitoring purposes shall be taken on each of at least three consecutive operating and discharging days and analyzed. Results shall be expressed in terms of both concentration and mass, and shall be submitted no later than the end of the third month following the month when the additional monitoring requirement was triggered. Results may be appended to the DMR or transmitted under separate cover to the same address. If levels higher than the Action Levels are confirmed, the permit may be reopened by the Department for consideration of revised Action Levels or effluent limits. The permittee is not authorized to discharge any of the listed parameters at levels which may cause or contribute to a violation of water quality standards. **TYPE I:** The additional monitoring requirement is triggered upon receipt by the permittee of any monitoring results in excess of the stated Action Level. **TYPE II:** The additional monitoring requirement is triggered upon receipt by the permittee of any monitoring results that show the stated action level exceeded for four of six consecutive samples, or for two of six consecutive samples by 20 % or more, or for any one sample by 50 % or more.

PERMIT LIMITS, LEVELS AND MONITORING

OUTFALL No.	WASTEWATER TYPE	RECEIVING WATER	EFFECTIVE	EXPIRING
001	Non-Contact Cooling Water	Cayuga Lake	05/01/2013	04/30/2018

PARAMETER	MINIMUM	MAXIMUM	UNITS	SAMPLE FREQUENCY	SAMPLE TYPE	FOOTNOTES (FN)
pH	6.5	8.5	SU	Weekly	Grab	

PARAMETER	COMPLIANCE LIMIT		MONITORING ACTION LEVEL		UNITS	SAMPLE FREQUENCY	SAMPLE TYPE	FN
	Monthly Avg.	Daily Max.	TYPE I	TYPE II				
Flow	Monitor	2.0			m ³ /s	Continuous	Instantaneous	
Dissolved Oxygen	Monitor	Monitor			mg/l	Weekly	Grab	
Phosphorus, Total	4.8	Monitor			lb/d	Weekly	Grab	1
Phosphorus, Total	Monitor	Monitor			mg/l	Weekly	Grab	1
Phosphorus, Soluble Reactive	Monitor	Monitor			mg/l	Weekly	Grab	
Temperature (effluent)	Monitor	21.1			°C	Continuous	Instantaneous	

FOOTNOTES:

1. During the period of the Schedule of Compliance on pages 7 and 8 of this Permit, the enforceable effluent limit for Phosphorus, Total from Outfall 001 shall be **6.4 lb/d**. Following the conclusion of the compliance schedule period, the effluent limit of 4.8 lb/day shall become effective unless the final effluent limit is otherwise determined in the approved phosphorus TMDL for Cayuga Lake.

SPECIAL CONDITIONS

1. Discharge Notification Requirements: No discharge sign is required.
2. Data Retention: The permittee shall retain records for a minimum period of 5 years in accordance with 6NYCRR Part 750-1.12(b)(2) and Part 750-2.5(c)(1). These records, which include discharge monitoring reports (DMRs), must be retained at a repository accessible to the public. This repository shall be open to the public, at a minimum, during normal daytime business hours. The repository may be the business office, wastewater treatment plant, village, town, city, or county clerk's office, the local library, or other location approved by the Department.
3. No biocides, algaecides or other chemical treatment for biological activity or any other water treatment chemicals may be used without express permission of the Department.
4. No chemical methods for Zebra/Quagga mussel control shall be allowed without express written permission of this Department. Evaluation of mussel control alternatives must include a complete available technology review. Application for chemical control of Zebra/Quagga mussels must be made no less than sixty (60) days prior to the proposed date of treatment.
5. An annual report of scheduled downtime shall be provided to this Department by April 1 for the following twelve months.

CAYUGA LAKE WATER QUALITY MODEL PLAN

The permittee shall oversee the development of the lake nutrient model and watershed model for Cayuga Lake. This model shall be suitable for the development of a Total Maximum Daily Load (TMDL) by the Department to address the phosphorus impairment for the southern zone of Cayuga Lake as listed in the most recent 303(d) list. The development of the model shall include, but not be limited to, the following components:

- **Lake-wide sampling and water quality model:** The permittee shall develop a Quality Assurance Project Plan (QAPP) and collect samples along Cayuga Lake as well as at the mouths of selected significant tributaries, analyze the samples and develop the nutrient model of Cayuga. The water quality model shall also include sampling and analysis to enable an assessment of the impacts of plankton of various types and Zebra and Quagga mussels on water quality in Cayuga Lake.
- **Watershed sampling and model development:** The permittee shall gather appropriate watershed data to enhance an existing watershed model, for use as an input to the lake model. This work includes analysis of synoptic samples along selected significant lake tributaries. Work may also include the development of a more sophisticated model if necessary.
- **Model development community outreach:** The permittee shall assist the Department to engage stakeholders as the model is developed and foster their input and feedback.

Schedule of Quality Assurance Program Plan (QAPP) Submittal

The permittee shall submit the following QAPP to the Regional Water Engineer at the address listed on the Recording, Reporting and Monitoring page of this Permit, and to the Bureau of Water Permits, 625 Broadway, Albany NY 12233-3505 for Departmental review and approval:

Outfall	Required Action	Due Date	FN
001	<p><i>Cayuga Lake Water Quality Model Plan</i> The permittee shall submit an approvable QAPP to develop the monitoring, data analysis and simulation modeling program for Cayuga Lake and selected significant tributaries in accordance with the Model Plan on Page 5 of this Permit, including an approved implementation schedule for the proposed activities. Upon receipt of Department approval, the permittee shall conduct the proposed plan in accordance with the approved QAPP. The QAPP and approved schedule will become an enforceable condition of this SPDES permit.</p>	11/01/2013	1

1. The above actions are one time requirements. The permittee shall submit the results of the above actions to the Department’s satisfaction once. When this permit is administratively renewed by NYSDEC letter entitled “SPDES NOTICE/RENEWAL APPLICATION/PERMIT,” the permittee is not required to repeat the submittal(s) noted above. The above due dates are independent from the effective date of the permit stated in the letter of “SPDES NOTICE/RENEWAL APPLICATION/PERMIT.”

Special Conditions: BIOLOGICAL MONITORING REQUIREMENTS

The permittee shall submit two (2) paper and electronic copy to the Steam Electric Unit Leader, NYSDEC, Bureau of Habitat, 625 Broadway 5th Floor, Albany, NY 12233-4756; One (1) copy of the cover letter to the Division of Water SPDES Compliance Information Section; and one (1) copy of the cover letter to the Regional Water Engineer, unless otherwise noted.

Entrainment Characterization Study

1. **By 02/01/2014**, the permittee must submit an approvable plan for an *Entrainment Characterization Study* at the Cornell University Lake Source Cooling Facility. The study plan must include a schedule for implementation, standard operating procedures for data collection, and a final report. At a minimum, the study must include:
 - a) Duration – April through August during 2014
 - b) Intensity – at least one 24 hour collection made in every seven calendar day period through the study duration
 - c) All samples will be analyzed for ichthyoplankton and juvenile fish
 - d) Concurrent samples shall also be collected in the near shore area so as to provide a baseline density of ichthyoplankton, and basis for comparison with entrainment samples.
 - e) The final report shall be submitted within 9 months of completion of data collection and include a summary table of the total number of fish entrained by species and life stage based upon continuous operation of all pumps at full rated flow and actual operation and cooling water volume over the study period. All data collected during the entrainment study must be provided to the department in an agreed upon electronic format.

Once approved by the Department, the permittee must conduct the *Entrainment Characterization Study* according to the approved schedule. If, based on the results of the *Entrainment Characterization Study*, the Department determines that the performance goals of CP-52 have been met the Department will modify this SPDES permit to: (1) identify the current location, design, construction, and capacity of the cooling water intake structure as BTA thereby meeting the requirements of 6 NYCRR Part 704.5; and (2) remove Biological Monitoring Requirements Nos. 2, 3, 4, 5, and 6.

Design and Construction Technology Review

2. Within nine (9) months after Department notification that based on the results of the *Entrainment Characterization Study* the Cornell LSC intake structure does not meet the performance goals of CP-52, the permittee must submit an approvable *Design and Construction Technology Review* that include an analysis of all feasible technologies and/or operational measures capable of being installed and implemented at Cornell University Lake Source Cooling Facility. For each feasible alternative include:
 - i. A detailed description of the alternative (including preliminary drawings and site maps, if appropriate);
 - ii. A discussion of the engineering feasibility of the alternative;
 - iii. An assessment of the mitigative benefits in reducing impingement mortality and entrainment abundance for all life stages of fish, through utilization of the alternative;
 - iv. A breakdown of all applicable costs including costs associated with capital improvements, operation and maintenance, and construction downtime;
 - v.. An estimate of the time required to implement the alternative; and
 - vi. An evaluation of any adverse environmental impacts to aquatic biota, habitat, or water quality that may result from construction, installation, and use of the alternative.

Proposed Technologies

3. Within 2 months of the Department's approval of the *Design and Construction Technology Review*, the permittee must submit, for Department review and consideration, a proposed suite of technologies or operational measures that meets the requirements of 6 NYCRR Part 704.5, Section 316(b) CWA and the performance goals of Commissioner Policy #52:
 - a. Alone, or in combination, these technologies or operational measures *minimize* entrainment of fish at Cornell University Lake Source Cooling Facility.
 - b. The reductions in entrainment resulting from the proposed technologies and/or operational measures must meet the performance goals of Commissioner Policy #52.

NOTE: Based on this and other relevant information, the Department will select technologies and/or operational measures that meet the requirements of 6 NYCRR Part 704.5, Section 316(b) CWA, and the performance goals of Commissioner Policy #52 and will modify this SPDES permit to require the use of these selected technologies and/or operational measures.

Special Conditions: BIOLOGICAL MONITORING REQUIREMENTS ctd.

Technology Installation and Operation Plan

4. Within 4 months of the effective date of the permit modification requiring technologies and/or operational measures to meet requirements of 6 NYCRR Part 704.5, Section 316(b) CWA , and the performance goals of Commissioner Policy #52, the permittee must submit an approvable *Technology Installation and Operation Plan*. This plan must include:
 - a. a schedule for installing and implementing the technologies and/or operational measures selected to meet requirements of 6 NYCRR Part 704.5, Section 316(b) CWA , and the performance goals of Commissioner Policy #52; and
 - b. the methodology for assessing the efficacy of these technologies and operational measures.

Upon receipt of Department approval, the permittee must implement the *Technology Installation and Operation Plan* in accordance with the approved schedule. The *Technology Installation and Operation Plan* and approved schedule will become an enforceable condition of this SPDES permit.

Verification Monitoring Plan

5. Within 3 months of Department approval of the *Technology Installation and Operation Plan*, the permittee must submit an approvable *Verification Monitoring Plan*. This plan must include details of procedures to confirm that the necessary reductions in entrainment required by this permit are being achieved, and must include the following:
 - a. At a minimum, two years of in-plant entrainment monitoring to verify the full-scale performance of BTA measures.
 - b. A description of the frequency and duration of monitoring, the parameters to be monitored, and the basis for determining the parameters and the frequency and duration for monitoring.
 - c. A schedule of implementation.
 - d. A draft proposed Standard Operation Procedure (SOP) that describes the sampling protocols for these monitoring studies.

The plan and SOP must be updated as required by the Department. Upon receipt of Department approval the permittee must complete the *Verification Monitoring Plan* studies in accordance with the approved schedule. The *Verification Monitoring Plan* and approved schedule will become an enforceable condition of this SPDES permit.

Demonstration of Compliance

6. Within 6 months of the completion of the *Verification Monitoring Plan* the permittee must submit an approvable report to the Steam Electric Unit Leader that demonstrates compliance with 6 NYCRR Part 704.5 and Section 316(b) CWA .

Additional Reporting Requirements

7. The permittee must maintain records of all data, reports and analysis pertaining to compliance with 6 NYCRR Part 704 and Section 316(b) CWA for a period no less than 10 years from the Effective Date of the Permit.
8. The permittee must submit status reports **by 11/01/2015**. At a minimum, these status reports must include a description of the operational status of the facility during the preceding two years and compliance with Biological Requirements 1 through 6 of this permit.
9. **By 11/01/2017**, the permittee must submit a report that includes:
 - a. A description and detailed analysis of the cumulative reductions in entrainment achieved during the first four years of this permit modification, and
 - b. a detailed analysis of technologies and/or operational measures available at that time, which have been demonstrated to, or have the potential to, further reduce fish mortality at Cornell University Lake Source Cooling Facility. The list of technologies and/or operational measures included in this analysis must be selected with the concurrence of the Department.

General Requirement

10. Modification of the facility cooling water intake must not occur without prior Department approval. The permittee must submit written notification, including detailed descriptions and plans, to the NYS DEC Steam Electric Unit; the Director of the Bureau of Water Compliance Program; and both the Regional Permit Administrator and the Regional Water Engineer, Region 7, at least 60 days prior to any proposed change which would result in the alteration of the permitted operation, location, design, construction or capacity of the cooling water intake structure. The permittee must submit with the written notification a demonstration that the change reflects the best technology available for minimizing adverse environmental impacts pursuant to 6 NYCRR Part 704.5, Section 316(b) CWA, and Commissioner Policy #52. As determined by NYS DEC, a permit modification application in accordance with 6 NYCRR Part 621 may be required.

Schedule of Compliance – Biological Monitoring Requirements

The permittee shall comply with the following schedule:

Outfall	Compliance Action	Due Date	FN
N/A	1. Submit an approvable <i>Entrainment Study Plan</i>	02/01/2014	1
	2. Submit an approvable <i>Design and Construction Technology Review</i>	Department notification + 9 months	1
	3. Submit a proposed suite of technologies or operational measures for Department review and consideration	DCTR approval + 2 months	1
	4. Submit an approvable <i>Technology Installation and Operation Plan</i>	EDFPM + 4 months	1, 2
	5. Submit an approvable <i>Verification Monitoring Plan</i>	TIOP approval + 3 months	1
	6. Submit an approvable report to the Steam Electric Unit Leader that demonstrates compliance with 6 NYCRR Part 704.5 and 316(b) of the Clean Water Act	VMP approval + 6 months	1
	8. Submit status reports	11/01/2015	1
	9. Submit report on cumulative reductions in impingement and entrainment and analyses of technologies.	11/01/2017	1

FOOTNOTES:

1. The above actions are one time requirements. The numbers correspond to the items in the preceding Biological Monitoring Requirements section. The permittee shall submit the results of the above actions to the Department’s satisfaction once. When this permit is administratively renewed by NYSDEC letter entitled “SPDES NOTICE/RENEWAL APPLICATION/PERMIT,” the permittee is not required to repeat the submittal(s) noted above. The above due dates are independent from the effective date of the permit stated in the letter of “SPDES NOTICE/RENEWAL APPLICATION/PERMIT.”
2. From the suite of technologies and/or operational measures submitted for review, the Department will select technologies and/or operational measures that meet the requirements of 6NYCRR Part 704, section 704.5, and Section 316(b) of the Clean Water Act. Subsequent to these selections the Department will modify this permit. This date is hereby referred to as the “Effective Date of Future Permit Modification” or EDFPM.

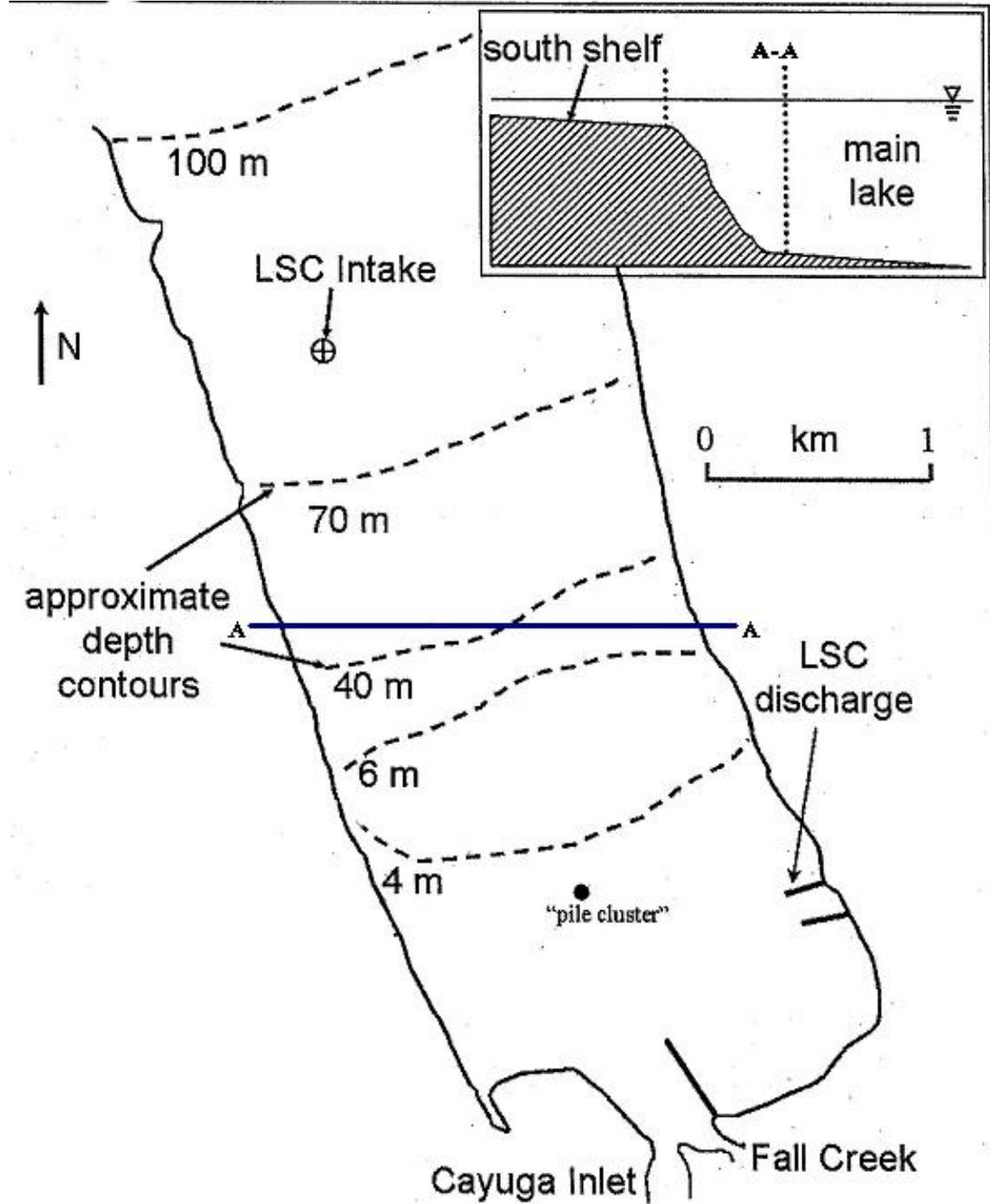
SCHEDULE OF SUBMITTALS – OUTFALL REDESIGN

The permittee shall comply with the following schedule. The permittee shall submit the required information to the Region 7 Regional Water Engineer at the address listed on the Recording, Reporting and Monitoring page of this Permit, and to the Bureau of Water Permits, 625 Broadway, Albany NY 12233-3505:

Outfall	Required Action	Due Date	FN
001	The permittee shall develop and submit an approvable plan for an Outfall Redesign Study to evaluate potential alternative sites for relocating the discharge from Outfall 001 to a location within the Class AA segment of Cayuga Lake (as depicted by transect A-A' on the Monitoring Locations map, and defined in 6 NYCRR Part 898.4, Table I, Item 227). The requirement of this Study shall be to evaluate the current mixing zone of the discharge, identify one or more discharge locations, in waters of sufficient depth to ensure that the discharge plume remains below the photic zone, and to determine that the discharge will not contribute to an impairment of the designated uses of the Lake.	02/01/2014	
001	The permittee shall commence the approved Outfall Redesign Study	Effective Date of Approval (EDA)	
001	The permittee shall submit Outfall Redesign Study status reports to the addresses above.	EDA + 8 months EDA + 16 months EDA + 24 months	
001	The permittee shall submit an approvable report summarizing the results of the Outfall Redesign Study. This report shall identify the recommended location for the outfall, based upon the results of the Study, and include a proposed schedule for implementation. The implementation schedule shall include submittal dates for preliminary and final design reports and a proposed schedule for construction. This report shall be submitted to the addresses listed above.	EDA + 30 months	
001	In the event that an outfall relocation is determined by the permittee to be the most practical approach to ensure that the discharge will not contribute to an impairment (as determined by the Department) of the designated uses of the receiving water, and to comply with the final phosphorus effluent limit or the Cayuga Lake TMDL as listed on the following page, the permittee shall submit preliminary and final design reports and complete construction of the approved redesigned outfall in accordance with the approved implementation schedule in the Outfall Redesign Study.	In accordance with the approved schedule	
<p>The above actions are one time requirements. The permittee shall submit the results of the above actions to the Department's satisfaction once. When this permit is administratively renewed by NYSDEC letter entitled "SPDES NOTICE/RENEWAL APPLICATION/PERMIT," the permittee is not required to repeat the submittal(s) noted above. The above due dates are independent from the effective date of the permit stated in the letter of "SPDES NOTICE/RENEWAL APPLICATION/PERMIT."</p>			

MONITORING LOCATIONS

The Permittee shall take samples and measurements, to comply with the monitoring requirements of this permit, at these locations: Effluent monitoring is done inside the LSC facility.



RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS

- a) 6 NYCRR Part 750 is hereby incorporated by reference and its conditions are enforceable requirements of this permit. The permittee shall comply with all conditions set forth in this permit and with 6 NYCRR Part 750, including, but not limited to: additional monitoring and reporting requirements and conditions, including noncompliance reporting.
- b) In addition to a) above, all **POTWs** shall provide adequate notice to the Department and USEPA of the following: (1) Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of CWA if it were directly discharging those pollutants; and (2) Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit. (3) For purposes of this paragraph, adequate notice shall include information on (i) the quality and quantity of effluent introduced into the POTW, and (ii) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.
- c) The monitoring information required by this permit shall be summarized, signed and retained for a period of three years from the date of the sampling for subsequent inspection by the Department or its designated agent. **Also, monitoring information required by this permit shall be summarized and reported by submitting;**

(if box is checked) completed and signed Discharge Monitoring Report (DMR) forms for each one month reporting period to the locations specified below. Blank forms are available at the Department's Albany office listed below. The first reporting period begins on the effective date of this permit and the reports will be due no later than the 28th day of the month following the end of each reporting period.

(if box is checked) an annual report to the Regional Water Engineer at the address specified below. The annual report is due by February 1 and must summarize information for January to December of the previous year in a format acceptable to the Department.

(if box is checked) a monthly "Wastewater Facility Operation Report..." (form 92-15-7) to the:
 Regional Water Engineer and/or County Health Department or Environmental Control Agency specified below

Send the DMRs with **original signatures** to:

Department of Environmental Conservation
 Division of Water
 Bureau of Water Compliance Programs
 625 Broadway
 Albany, New York 12233-3506
 Phone: (518) 402-8177

Send a **copy** of each DMR page to:

Department of Environmental Conservation
 Regional Water Engineer
 615 Erie Boulevard West
 Syracuse, New York 13204-2400
 Phone: (315) 426-7500

Send an **additional copy** of each DMR page to:

Town of Ithaca
 Director of Planning
 215 N. Tioga Street
 Ithaca, New York 14850

- d) Noncompliance with the provisions of this permit shall be reported to the Department as prescribed in 6 NYCRR Part 750-1.2(a) and 750-2.
- e) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.
- f) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculations and recording of the data on the Discharge Monitoring Reports.
- g) Calculation for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.
- h) Unless otherwise specified, all information recorded on the Discharge Monitoring Report shall be based upon measurements and sampling carried out during the most recently completed reporting period.
- i) Any laboratory test or sample analysis required by this permit for which the State Commissioner of Health issues certificates of approval pursuant to section five hundred two of the Public Health Law shall be conducted by a laboratory which has been issued a certificate of approval. Inquiries regarding laboratory certification should be sent to the Environmental Laboratory Accreditation Program, New York State Health Department Center for Laboratories and Research, Division of Environmental Sciences, The Nelson A. Rockefeller Empire State Plaza, Albany, New York 12201.

Industrial SPDES Permit Fact Sheet

I. SUMMARY OF PROPOSED PERMIT CHANGES

A SPDES permit EBPS modification is proposed. Following is a summary of the proposed changes in the draft permit as compared to the currently effective permit; the details of these changes are specified below and in the draft permit:

- Addition of final (4.8 lb/day) and interim (6.4 lb/day) phosphorus effluent limitations;
- Removal of routine seasonal ambient monitoring requirements in lieu of more extensive monitoring to be provided in the Cayuga Lake Water Quality Model Plan;
- Requirements to develop a Cayuga Lake Water Quality Model Plan suitable for the development of a Total Maximum Daily Load (TMDL) by the Department to address the phosphorus impairment for the southern zone of Cayuga Lake as listed in the most recent 303(d) list;
- A Schedule of Submittals requiring the permittee to complete an Outfall Redesign Study;
- A Schedule of Compliance requiring the permittee to comply with the final effluent limit of Phosphorus, Total of 4.8 lb/d. or such phosphorus allocation as assigned by the TMDL, after 57 months;
- A Schedule of Compliance to submit a Best Management Practices - Optimization Program to maximize the efficiency of the Lake Source Cooling system while minimizing the volume of water used to the degree practical.
- Biological monitoring requirements for the development of an entrainment study and subsequent technology requirements, if necessary, for the determination of best technology available for minimizing adverse impact from impingement and entrainment of aquatic life, in accordance with the requirements of Clean Water Act section 316(b); and
- Updated site diagram, and updated special conditions regarding biocides, operational changes, zebra mussel control, cooling water volume reporting.

Please note that when the Department updates a permit this typically includes updated forms incorporating the latest general conditions.

II. BACKGROUND INFORMATION

As noted throughout this document, SPDES permits are based on both federal and state requirements - law, regulation, policy, and guidance. These can generally be found on the internet. Current locations include: Clean Water Act (CWA) www.epa.gov/lawsregs/laws/index.html#env; Environmental Conservation Law (ECL) www.dec.ny.gov/regulations/40195.html; federal regulations www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR; state environmental regulations www.dec.ny.gov/regulations/regulations.html; NYSDEC water policy www.dec.ny.gov/regulations/2654.html.

A. Administrative History

The current SPDES permit for the facility became effective on March 1, 1998 with an expiration date of March 1, 2003. It has been administratively renewed with expiration dates of March 1, 2008 and currently has an expiration date of March 1, 2013.

The Department has initiated a modification to the facility's SPDES permit, pursuant to 6 NYCRR Part 750-1.18 & 750-1.19, the priority ranking system known as New York State's Environmental Benefit Permit Strategy (EBPS). The facility currently has an EBPS score of 205, and a ranking of 1 out of 607 Regional permits. In response to the Department's May 2007 Request for Information, the permittee provided a SPDES NY-2C permit application and sampling data on August 30, 2007.

B. Outfall and Receiving Water Information

The facility discharges, or proposes to discharge, wastewater and/or stormwater to waters of the state via the following outfall:

Outfall 001: Cooling Water Discharge from the Lake Source Cooling Plant. Treatment is not provided for this outfall. Water is drawn from an intake structure utilizing 2.0 mm wedge wire screens located at a depth of over 200 feet, circulated through the cooling system with no admixture of water treatment chemicals or other chemistry, and subsequently discharged into the shallow portion of Cayuga Lake.

The location of the outfall, and the name, classification and index numbers of the receiving waters are indicated in the *Outfall & Receiving Water Location Table* at the end of this fact sheet. The classifications of individual surface waters are specified in 6 NYCRR Parts 800 – 941. The best uses and other requirements applicable to the specific water classes are specified in 6 NYCRR Part 701.

The 7Q10 and 30Q10 flows for the receiving water do not apply, as the discharge is to Cayuga Lake. A 10:1 available dilution is applied in accordance with Department guidance. Mixing zone analyses are conducted in accordance with the following documents: EPA T.S.D, entitled “Water Quality Based Toxics Control,” dated March, 1991; EPA Region VIII “Mixing Zones and Dilution Policy”, dated December, 1994; NYSDEC TOGS 1.3.1, entitled “Total Maximum Daily Loads and Water Quality Based Effluent Limits.” Other critical receiving water data for Temperature, pH, hardness and/or salinity were based on permittee monitoring. This flow information is listed in the *Pollutant Summary Table* at the end of this fact sheet together with applicable ambient water quality criteria, ambient background data (if available), and outfall pollutant data.

Impaired Waterbody Information – The CWA requires states to identify impaired waters, where designated uses are not fully supported. For these impaired waters/pollutants, states must consider the development of a Total Maximum Daily Load (TMDL) or other strategy to reduce the input of the specific pollutant(s) restricting waterbody uses. In 2002, Cayuga Lake, Southern End (0705-0040) was listed as impaired due to Phosphorus from Municipal and nonpoint sources. A TMDL shall be developed to address the impairment.

C. Discharge Composition

The *Pollutant Summary Table* at the end of this fact sheet presents the existing effluent quality of the facility. Concentration and mass data are presented, based on Discharge Monitoring Report (DMR), permit application, and possibly other data submitted by the permittee for the period January 2000 to December 2009. The statistical methods utilized to calculate 95th and 99th percentiles are in accordance with TOGS 1.2.1 and the USEPA, Office of Water, Technical Support Document For Water Quality-based Toxics Control, March 1991, Appendix E. Statistical calculations were not performed for parameters with insufficient data. Generally, ten or more data points are needed to calculate percentiles (See TOGS 1.2.1 Appendix D).

D. Compliance History

A review of the facility’s current DMRs and other compliance information from 3/31/10 to 3/31/12 shows that the facility had the following excursions:

pH: exceeded maximum of 8.5 SU during 12/2010, 3/2011, and 7/2011. As the facility does not add anything to the source water, the excursions were likely due to the pH in the ambient intake water.

III. PROPOSED PERMIT REQUIREMENTS

Sections 101, 301(b), 304, 308, 401, 402, and 405 of the CWA provide the basis for the effluent limitations and other conditions in the draft permit. The NYSDEC evaluates discharges with respect to these sections of the CWA, New York State ECL, and the relevant federal/state regulations, policy, and guidance to determine which conditions to include in the draft permit.

For existing permittees, the previous permit typically forms the basis for the next permit. Permit revisions are implemented where justified due to changed conditions at the facility and/or in response to updated regulatory requirements.

A. Effluent Limitations

If applicable, the existing permit limits are evaluated to determine if these should be continued, revised, or deleted. Generally, existing limits are continued unless there is justification to do otherwise. Other pollutant monitoring data are also reviewed to determine the presence of additional contaminants that should be included in the permit.

The permit writer determines the **technology-based effluent limits (TBELs)** that must be incorporated into the permit. A TBEL requires a minimum level of treatment for industrial point sources based on currently available treatment technologies and/or Best Management Practices (BMPs). The Department then evaluates the water quality expected to result from technology controls to determine if any exceedances of water quality criteria in the receiving water might result. If there is a reasonable potential for exceedances to occur, **water quality-based effluent limits (WQBELs)** must be included in the permit. A WQBEL is designed to ensure that the water quality standards of receiving waters are being met. In general, the Clean Water Act requires that the effluent limits for a particular pollutant are the more stringent of either the TBEL or WQBEL.

1. TBELs & Anti-Backsliding:

Section 301(b) and 402 of the CWA require technology-based controls on effluents. A TBEL is set based upon an evaluation of New Source Performance Standards (NSPS), Best Available Technology Economically Achievable (BAT), Best Conventional Pollutant Control Technology (BCT), Best Practicable Technology Currently Available (BPT), and Best Professional Judgment (BPJ). BPJ limits may be set using any reasonable method that takes into consideration the criteria set forth in 40 CFR 125.3.

For facilities that are subject to effluent guidelines and have substances in their discharges that are not explicitly limited by the regulations, or for industrial sectors for which there are no applicable effluent guidelines in 40 CFR 402-471, the permit writer is authorized to use BPJ in developing TBELs. The authority for BPJ is contained in Section 402(a)(1) of the CWA, which authorizes the Department to issue a permit containing “such conditions as the Administrator determines are necessary to carry out the provisions of the Act.” The NPDES regulations in 40 CFR 125.3 state that permits developed on a case-by-case basis under Section 402(a)(1) of the CWA must consider: The appropriate technology for the category class of point sources, of which the applicant is a member, based on available information; and, any unique factors relating to the applicant.

Anti-backsliding requirements are specified in the CWA, sections 402(o) and 303(d)(4), and regulations at 40 CFR 122.44(l). These requirements are summarized in TOGS 1.2.1. Generally, the regulations prohibit the relaxation of effluent limits in reissued permits unless one of the specified exceptions applies. In practice, limits in reissued permits will generally be no less stringent than previous permit limits to ensure compliance with anti-backsliding requirements. Otherwise, the specific exceptions that allow backsliding will be cited on a case-by-case basis.

Following is the TBEL & Anti-backsliding assessment for each pollutant present in the discharge(s). A summary of this analysis is provided in the *Pollutant Summary Table* at the end of this fact sheet.

Pollutant-Specific TBEL & Anti-Backsliding Analysis:

Flow: The existing flow limit of 2 cubic meters per second has been carried over from the existing permit.

pH: The existing WQBEL of 6.5-8.5 SU is carried over from the existing permit.

Dissolved Oxygen: The existing limit of “monitor only” has been carried over from the existing permit. A review of monitoring data shows that existing DO levels in the discharge are sufficient to meet water quality standards.

Phosphorus, Total: A final effluent limit of 4.8 lb/day has been developed as a monthly average effluent limit. This limit is based upon the 95th percentile analysis of effluent monitoring data over the 2000-2009 period, and is not currently achievable by the permittee during peak seasonal use due in part to increases in ambient phosphorus levels in the Lake. See also “WQBELS and Anti-Degradation” below for further discussion.

Phosphorus: Soluble Reactive: The existing limit of “monitor only” has been carried over from the existing permit.

Temperature, effluent: The existing limit of 21.1°C has been carried over from the existing permit.

Ambient monitoring for temperature and phosphorus: These routine monitoring conditions have been discontinued and will be replaced by the lake wide monitoring requirements (which include ambient monitoring in the impaired portion of Cayuga Lake) as part of the Cayuga Lake Water Quality Model Plan.

2. WQBELs & Anti-Degradation:

In addition to the TBELs previously discussed, the NYSDEC evaluated the discharge to determine compliance with Sections 101 and 301(b)(1)(C) of the CWA and 40 CFR 122.44(d)(1). These require that permits include limits for all pollutants or parameters which “are or may be discharged at a level which will cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.” The limits must be stringent enough to ensure that water quality standards are met and must be consistent with any available wasteload allocation (WLA).

The procedure for developing WQBELs includes knowing the pollutants present in the discharge(s), identifying water quality criteria applicable to these pollutants, determining if WQBELs are necessary (reasonable potential), and calculating the WQBELs. Factors also considered in this analysis include available dilution of effluent in the receiving water, receiving water chemistry, and other pollutant sources. If the expected concentration of the pollutant of concern in the receiving water may exceed the ambient water quality standard or guidance value then there is reasonable potential that the discharge may cause or contribute to a violation of the water quality, and a WQBEL or WLA for the pollutant is required.

Antidegradation Policy: New York State implements the antidegradation portion of the CWA based upon two documents: (1) Organization and Delegation Memorandum #85-40, entitled “Water Quality Antidegradation Policy,” signed by the Commissioner of NYSDEC, dated September 9, 1985; and, (2) TOGS 1.3.9, entitled “Implementation of the NYSDEC Antidegradation Policy – Great Lakes Basin (Supplement to Antidegradation Policy dated September 9, 1985).” A SPDES permit cannot be issued that would result in the water quality criteria being violated. The permit for the facility contains effluent limits which ensure that the existing beneficial uses of the receiving waters will be maintained.

Following is the WQBEL analysis for each pollutant present in the discharge(s). Anti-degradation analysis which justifies applying water quality standards of a higher classification is noted below, if applicable. Refer to Section II.B above for information on discharge location, receiving water information (class, dilution, chemistry), and the existence of any TMDLs. A summary of this analysis is provided in the *Pollutant Summary Table* at the end of this fact sheet.

Pollutant-Specific WQBEL & Anti-Degradation Analysis:

The Department has conducted a reasonable potential analysis based upon its knowledge of the facility. Typically, this would include a priority pollutant scan to determine the concentrations and loadings of pollutants present in the discharge as a result of facility operations. A priority pollutant scan was not required in this case, as the facility consists entirely of withdrawn lake water that is returned to the lake with no pollutants (with the exception of an increase in temperature) added. The facility does not use or add any water treatment chemicals. DEC therefore believes it is reasonable to conclude that there are no “other pollutants that cause, contribute, or have the reasonable potential to cause or contribute to a violation of water quality standards at the point of discharge.” A priority pollutant scan would therefore yield no additional useful information for the reasonable potential analysis. It is noted that the southern portion of Cayuga Lake is also listed as impaired for silt/sediments. Given the strong correlation between phosphorus and solids, and the relatively low level of solid expected present in the intake water due to the lack of activity at the depth of the cooling water intake structure, the regulation of phosphorus discharges in the permit serves to also control the discharge of solids.

Flow: The existing flow limit of 2 cubic meters per second has been carried over from the existing permit.

pH: The existing WQBEL of 6.5-8.5 SU, based upon the water quality standard for Class A waters, is carried over from the existing permit.

Dissolved Oxygen: The existing limit of “monitor only” has been carried over from the existing permit. A review of monitoring data shows that existing DO levels in the discharge are sufficient to meet water quality standards.

Phosphorus, Total: A final effluent limit of 4.8 lb/day, developed and included in lieu of a TMDL based effluent limit, has been developed as a monthly average effluent limit.

The discharge from the Cornell Lake Source Cooling (LSC) outfall has a maximum permitted flow rate of 2 m³/s (45.6 MGD), and a 95th percentile monthly average flow rate of 1.6 m³/s (37.5 MGD). TOGS 1.3.6 states that, for discharges over 50,000 gpd, Best Treatment Technology should also be required for both surface water and soil discharges and the effluent that is discharged to either the surface water or the soils should not exceed 0.5 mg/l of total phosphorus. The applicable water quality guidance value for total phosphorus, as listed in TOGS 1.1.1, is 0.02 mg/l. This guidance value is DEC's interpretation of the narrative water quality standard for protection of the best use of ponded waters, and applies only where the letter “P” (ponds, lakes and reservoirs) appears in the Water Index Number, excluding Lake Champlain. As the Water Index Number for the southern basin of Cayuga Lake is **Ont. 12-66-P296**, this guidance value applies.

In developing the effluent limit for this discharge, the Department looked at loadings based upon 0.5 mg/l (per TOGS 1.3.6) and 0.02 mg/l (TOGS 1.1.1) at the maximum and 95th percentile monthly average flows, and a statistical analysis of the existing discharge from the LSC over the July 2000 through December 2009 period of record. The statistical analysis was conducted in accordance with the method specified in the USEPA Technical Support Document for Water Quality Based Toxics Control (TSD). This method is generally used when developing Best Available Technology limits for existing discharges. The results for these calculations are as follows:

Loading at design flow of 2 m ³ /s (45.6 MGD), P = 0.5 mg/l:	190.2 lb/day
Loading at 95%ile average flow of 1.6 m ³ /s (37.5 MGD), P = 0.5 mg/l:	156.5 lb/day
Loading at design flow of 2 m ³ /s (45.6 MGD), P = 0.02 mg/l:	7.6 lb/day
Loading at 95%ile average flow of ~1.6 m ³ /s (37.5 MGD), P = 0.02 mg/l:	6.4 lb/day
Loading, 95%ile monthly average, 7/2000 – 12/2009, TSD method:	4.8 lb/day

Please note that, in accordance with TOGS 1.2.1 (Industrial Permit Writing), the more stringent of technology or water quality based effluent limits are proposed for inclusion in permits. In the case of the LSC discharge, the 95%ile monthly average loading of 4.8 lb/day was the most stringent of the limits evaluated, and therefore included in the permit. The final limit of 4.8 lb/day limit is a surrogate limit in the absence of a TMDL based effluent limit, which will be developed using information obtained from the studies and requirements in the draft permit. The 4.8 lb/day limit is based upon effluent data from 2000-2009. The facility would not currently be able to meet this limit on a routine basis during peak uses due to increasing lake wide phosphorus levels.

The proposed 6.4 lb/day water quality based interim limit, which is based upon the applicable water quality guidance value of 20 µg/l at the 95th percentile statistical existing discharge rate, will effectively limit the discharge at current levels, especially during peak summer usage. This limit is also appropriate and consistent with the range of values determined as part of a statistical analysis of the past three years of discharge data

Phosphorus: Soluble Reactive (SRP): The existing limit of “monitor only” has been carried over from the existing permit. The relative contributions of SRP vs. total P, and the impacts on the impaired portion of the lake, will be determined as part of the Cayuga Lake Water Quality Model Plan and subsequent TMDL.

Temperature, effluent: The existing limit of 21.1°C has been carried over from the existing permit.

Whole Effluent Toxicity (WET) Testing - WET tests use small vertebrate and invertebrate species to measure the aggregate toxicity of an effluent. There are two different durations of toxicity tests: acute and chronic. Acute toxicity tests measure survival over a 96-hour test exposure period. Chronic toxicity tests measure reductions in survival, growth, and reproduction over a 7-day exposure. Per TOGS 1.3.2, WET testing may be required when any one of the following seven criteria is applicable:

1. There is the presence of substances in the effluent for which ambient water quality criteria do not exist.
2. There are uncertainties in the development of TMDLs, WLAs, and WQBELs, caused by inadequate ambient and/or discharge data, high natural background concentrations of pollutants, available treatment technology, and other such factors.
3. There is the presence of substances for which WQBELs are below analytical detectability.
4. There is the possibility of complex synergistic or additive effects of chemicals, typically when the number of metals or organic compounds discharged by the permittee equals or exceeds five.
5. There are observed detrimental effects on the receiving water biota.
6. Previous WET testing indicated a problem.
7. Treatment plants which exceed a discharge of 1 MGD. Facilities of less than 1 MGD may be required to test, e.g., POTWs < 1 MGD which are managing industrial pretreatment programs.

A Reasonable Potential analysis was performed, including an evaluation of the discharge against the seven criteria noted above. None of the seven criteria are applicable. Based upon this evaluation, WET testing was not included in the permit

B. Monitoring & Reporting Requirements

Section 308 of the Clean Water Act and federal regulations 40 CFR 122.44(i) require that monitoring be included in permits to determine compliance with effluent limitations. Additional effluent monitoring may also be required to gather data to determine if effluent limitations may be required. The permittee is responsible for conducting the monitoring and for reporting results on DMRs. The permit contains the monitoring requirements for the facility. Monitoring frequency is based on the minimum sampling necessary to adequately monitor the facility's performance. For industrial facilities, sampling frequency is based on guidance provided in TOGS 1.2.1.

C. Other Conditions Specific To This Permit

Compliance Schedules:

Cayuga Lake Water Quality Model Plan: The permittee shall submit an approvable QAPP to develop the monitoring, data analysis and simulation modeling program for Cayuga Lake and selected significant tributaries. This plan includes the development of a lake nutrient model and watershed model for Cayuga Lake. This model shall be suitable for the development of a Total Maximum Daily Load (TMDL) by the Department to address the phosphorus impairment for the southern zone of Cayuga Lake as listed in the most recent 303(d) list. The development of the model shall include, but not be limited to, a lake-wide sampling and water quality model, watershed sampling and model development, and model development community outreach. Sampling and data collection shall be conducted along Cayuga Lake as well as at the mouths of selected significant tributaries, and includes temperature, phosphorus, and other sampling necessary to assess the impacts of these parameters, plankton of various types, and Zebra and Quagga mussels on water quality in Cayuga Lake.

Biological Monitoring Requirements: See attached Fact Sheet for Biological Monitoring Requirements.

Best Management Practices - Optimization Program: The permittee shall submit a program that, to the degree practical, will maximize the efficiency of the Lake Source Cooling system while minimizing the volume of water used. The program shall review all major campus facilities over the five-year permit cycle, including components or systems, to identify areas of cost-effective optimization, and shall implement identified practices. The program may include the implementation of practices such as minimization of the use of campus chilled cooling water in noncritical buildings during times of limited or no occupancy, optimization of building temperatures to reduce cooling needs, optimization of heat transfer equipment, and the use of automated valves and other equipment to minimize campus chilled water use. The program shall continuously seek to identify areas of greater efficiency in the use of campus chilled cooling water so that that additional use of the Lake Source Cooling system may proceed while increases in the volume of water taken from Cayuga Lake are minimized to the degree practical. The permittee shall submit an annual report summarizing any ongoing or additional practices identified and implemented and identify new buildings which use the Lake Source Cooling plant that have been placed online.

Schedule of Submittals:

Outfall Redesign: The permittee is required to develop and submit an approvable plan for an Outfall Redesign Study to evaluate potential alternative sites for relocating the discharge from Outfall 001, which discharges into the Southern Basin of Cayuga Lake, (Water Index Number Ont. 12-66-P296) to a location within the Class AA segment of Cayuga Lake (as defined in 6 NYCRR Part 898.4, Table I, Item 227). The requirements of this Study are to define the existing effluent mixing zone, identify one or more discharge locations in waters of sufficient depth to ensure that the discharge plume remains below the photic zone, and to determine that the discharge will not contribute to an impairment of the designated uses of the Lake. This requirement also includes an approvable report summarizing the results of the Outfall Redesign Study and identification of the

recommended location for the outfall, based upon the results of the Study, and includes a proposed schedule for implementation to comply with the final effluent limit of Phosphorus, Total of 4.8 lb/d. or such phosphorus allocation as assigned by the TMDL.. The implementation schedule shall include submittal dates for preliminary and final design reports and a proposed schedule for construction. During this Schedule, the interim effluent phosphorus limit of 6.4 lb/day shall apply.

Special Conditions: Other special conditions include Discharge Notification Requirement waiver, data retention requirements, a prohibition on the use of biocides, algacides or other chemical treatment for biological activity, or chemical methods of zebra mussel control or any other water treatment chemicals without express permission of the Department

D. General Conditions Applicable To All Permits

The permit contains standard regulatory language that is required to be in all SPDES permits. These permit provisions, based largely upon 40 CFR 122 subpart C and 6 NYCRR Part 750, include requirements pertaining to monitoring, recording, reporting, and compliance responsibilities. These “general conditions” of permits are typically specified, summarized, or referenced on the first and last pages of the permit.

Permittee: **Cornell University**
 Facility: **Cornell University Lake Source Cooling Facility**
 SPDES No: NY0244741

Date: March 27, 2012 - Final
 Permit Writer: Brian Baker, P.E.
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OUTFALL & RECEIVING WATER LOCATION TABLE

Outfall Number	Latitude	Longitude	Receiving Water Name	Water Class	Water Index Number	Major/Sub Basin
001	48° 28' 15"	76° 30' 10"	Southern Basin of Cayuga Lake	A	Ont. 12-66-P296	07/05

POLLUTANT SUMMARY TABLE(S)

Outfall #	001
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Effluent Parameter <small>(concentration in ug/l and mass in lbs/day unless otherwise specified)</small>	Existing Effluent Quality				TBELs				Water Quality Data & WQBELs					Permit Basis (T or WQ or NA)
	concentration		mass					PQL	Ambient Criteria	Ambient Background	WQBEL			
	Avg/Max	95%/99%	Avg/Max	95%/99%	conc.	mass	Type	conc.	conc.	Avg/Max	conc.	mass	Type	
Flow Rate, units = m ³ /s	Average	1.35	Maximum	2.0	Monitor/2.0		DM	NA	7Q10 = NA , 30Q10 = NA , Dilution/Mixing = 10:1					T
pH (su)	Minimum	6.7	Maximum	9.4	6.5-8.5		Range		6.5-8.5					T/WQ
Temperature (C)	8.9/11.8	10.6/12.6			Monitor/21.1		DA/DM		21.1	19.7	21.1		DM	WQ
Dissolved Oxygen	10/23	12.8/16.5			Monitor	-	DA/DM		6.0 (min)		-	-	-	T
Phosphorus, Total	.015/.073		2.1/12.5	4.8/7.4	Monitor	4.8/Monitor	DA/DM		0.02	0.016/0.05	0.02	6.4	DA	T/WQ
Phosphorus, Soluble Reactive	0.009/0.016	0.011/0.014			Monitor		DA/DM		-	0.002/0.012	-	-	-	T

Biological Fact Sheet - Cooling Water Intake Structure
Bureau of Habitat, Steam Electric Unit

Name of Facility: Lake Source Cooling Plant
Owner/Operator: Cornell University
SPDES #: NY- 0244741
Location: Tompkins County, New York
City of Ithaca
Cayuga Lake

1. Description of Facility

The Cornell Lake-source Cooling System (LCS) began operation in 2000. The system is designed to withdraw up to 46 million gallons per day of water from Cayuga Lake at a depth 250 to cool campus buildings. Lake water at that depth is approximately 40 degrees F year round. The cold water pumped from the lake bottom is passed through a heat exchanger, located on shore, which absorbs some of the heat in water used to cool the Cornell Campus and Ithaca High School.

The intake is an octagonal structure made up of 2.0 mm wedge wire screen panels, resting 10 feet above the lake bottom. Each screen panel is 8 feet high by 4 feet wide. The intake has a solid cap so that water is withdrawn from the horizontal plane only. The design intake velocity is 0.50 feet per second (fps) with 50% of the area of the slots plugged (velocity = 0.25 fps when clean). A 63 inch diameter HDPE pipe extends from the structure along the lake bottom for a distance of approximately 2 miles, connecting to the onshore heat exchange facility. Cleaning of the screen panels is done manually, but this has seldom been necessary.

2. Ecological Resource

Cayuga Lake is located in the Oswego River drainage basin. The lake, of glacial origin, is oriented on a northwest-southeast axis and is 39 miles long, and averages 1.7 miles in width. Maximum lake width is 4 miles and maximum depth is 435 feet. The total surface area of the lake is 67 square miles and the total lake volume is 331 billion cubic feet. The lake bottom is steep sided along its east and west shorelines, with the north and south ends being relatively shallow (NYSEG 1975).

Cayuga Lake is considered to be oligotrophic, and has clear well oxygenated water at all depths. The lake is well noted for fine trout and salmon fishing. In the open water of the central lake basin, cold water species such as lake trout, rainbow trout, brown trout, chinook salmon, cisco and whitefish are found. Sculpin and burbot inhabit the deep bottom waters. The littoral region, located along the north and south ends and in a narrow zone along the lake's east and west shores, supports a warm water fishery. Northern pike, chain pickerel, largemouth bass and brown bullhead are important sport fish of the littoral zone. Other important warm and/or cool water species include smallmouth bass, yellow perch and panfish such as rockbass. Alewife, a major forage species in the lake, migrates to these inshore areas to spawn during June and July (NYSEG 1975).

A freshwater crustacean, a mysid shrimp (*Mysis relicta*), is found throughout Lake Cayuga in the deep cold regions (*i.e.*, hypolimnion). Though found near the lake bottom during the day, the species does migrate vertically at night. This species is considered to be an important component of the Lake Cayuga ecosystem and was studied extensively prior to the operation of the LCS. Studies demonstrated that the mysids were found throughout the hypolimnetic region of the lake and were not endemic to the southern lake area were the LCS is operated.

Cayuga Lake in the area of the cooling water outfall is designated a class A water. The best usage of Class A waters are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish, shellfish, and wildlife propagation and survival (NYSDEC 2008a). The south basin of Cayuga Lake is currently on the Federal Clean Water Act Section 303(d) list of Impaired Waters due to excessive levels of phosphorous, silt/sediment and pathogens, originating from both municipal and non-point sources of pollution.

The cooling water intake was constructed with 2.0 mm wedge wire screen panels in order to eliminate the impingement/entrainment of adult and older juvenile fish. This technology exceeds the impingement performance goals of CP-52 thereby meeting the BTA requirements for impingement mortality. Although fish eggs and many larvae can pass through a 2.0 mm slot, it was thought that at that depth they would either not be found or present in such low numbers as to not be of concern. A low intensity light was also installed to keep freshwater mysids (*Mysis relicta*) away from the intake. However, studies have not shown this deterrent system to be effective, and it is no longer in use. In addition, light sources have been shown to attract fish so it was possible that the use of a light deterrent system for the mysids could increase the entrainment of fish eggs and larvae through the LCS.

Biological monitoring for the entrainment of ichthyoplankton (fish eggs and larvae) and mysids occurred from 2000-2005. Based on the results of this study it was estimated that, on average, 35,769 eggs were entrained each year (range: 0 – 134,675). The only species to be identified were alewife with more than 90% of the eggs unidentifiable. In addition, an average of 2,648 fish larvae were estimated to be entrained each year (range: 0 – 4,660). The entrained larvae were made up of yellow perch (36.2%), rainbow smelt (24.5%), alewife (19.8%), and slimy sculpin (14.2%). It was also estimated that several million mysids were entrained annually.

3. Alternatives Evaluated

Feasible technologies such as wedge wire intake screens and behavioral deterrent systems were evaluated at this facility during the State Environmental Quality Review (SEQR) process. If the results of the *Entrainment Characterization Study* demonstrate that the current design, capacity, and location of the CWIS does not meet the entrainment performance goal of CP-52, the current permit requires the submission of a Design Construction Technology Review to assess all feasible technologies and/or operational

measures to minimize adverse environmental impact from operation of the Cornell lake Source Cooling intake.

4. Discussion of Best Technology Available

According to 6NYCRR Part 704.5 - *Intake structures* and Section 316(b) of the federal Clean Water Act, the location, design, construction, and capacity of cooling water intake structures must reflect the “best technology available” (BTA) for minimizing adverse environmental impact. The identification of BTA is a technology driven determination, however, the final decision may also consider cost. For existing facilities with cooling water intake structures, the Department expects that the performance goals of Commissioner Policy #52 will be achieved from the implementation of these permit conditions.

5. Determination of Best Technology Available

After evaluating all of the available alternatives, the Department will determine the technology or combination of technologies and/or operational measures which are BTA for minimizing adverse environmental impacts from the cooling water intake structure(s). This decision may take into consideration those technologies reasonably borne by the facility and determined to be more cost effective in meeting the requirements of 6 NYCRR §704.5, §316(b) CWA, and the performance goals of Commissioner Policy #52.

6. Monitoring Requirements

This permit requires an assessment of ichthyoplankton entrainment and sampling of ichthyoplankton in the near-shore zone in 2014. If additional technology or operational measures are determined to be required, a verification monitoring study will be required to confirm that the reduction in entrainment required by this permit will be achieved.

7. Legal Requirements

The requirements for the cooling water intake structure in this State Pollutant Discharge Elimination System permit are consistent with the policies and requirements embodied in the New York State Environmental Conservation Law, in particular - Sec.1-0101.1.; 1-0101.2.; 1-0101.3.b., c.; 1-0303.19.; 3-0301.1.b., c., i., s. and t.; 11-0107.1; 11-0303.; 11-0535.2; 11-1301.; 11-1321.1.; 17-0105.17.; 17-0303.2., 4.g.; 17-0701.2., and the rules thereunder, specifically 6NYCRR Part 704.5 Section 316(b) CWA, and the performance goals of Commissioner Policy #52.

8. Summary of Proposed Permit Changes

Deletions	
Existing Biomonitoring Special Conditions Sections I and II	Delete and replace with updated conditions and requirements contained in new Biological Monitoring Requirement (BMR) Nos. 1-10 and Cayuga Lake Water Quality Model Plan

Additions

BMR No. 1. Entrainment Characterization Study	Assess the entrainment abundance of fish eggs and larvae.
BMR No. 2. Design Construction Technology Review	Analyze feasible technologies and operational measures to minimize adverse environmental impact.
BMR No. 3. Proposed Suite of Technologies and Operational Measures	Applicant to submit proposal to minimize entrainment and meet requirements of 6 NYCRR Part 704.5 and CP-52.
BMR No. 4. Technology Installation & Operation Plan	Submit approvable plan to install and operate technologies approved to meet requirements of 6 NYCRR Part 704.5 and CP-52.
BMR No. 5. Verification Monitoring Plan	Submit approvable plan designed to confirm reductions in entrainment required by permit are being achieved.
BMR No. 6. Verification Monitoring Plan Report	Submit an approvable report demonstrating compliance with 6 NYCRR Part 704.5 and Section 316(b) of the CWA.
BMR No. 7. Additional Reporting Requirement	Maintain pertinent records for minimum 10 year period.
BMR No. 8. Status reports	Submit status reports at EDP + 2.5 years showing compliance with Biological Requirements 1-6 of permit.
BMR No. 9. Cumulative Reductions Report	Submit a report by EDP + 4.5 years showing cumulative reduction in entrainment over past 4 years and measures that may further reduce fish mortality at Cornell LSC intake.
BMR No. 10. General Requirement	Requirement to obtain Department approval for any changes made to the location, design or capacity of the cooling water intake.

9. References

Commissioner Policy # 52. Best Technology Available (BTA) for Cooling Water Intake Structures. Issued July 10, 2011.

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New York State Electric and Gas Corporation. 1975. Request for Alternate Thermal Effluent Limitations. Milliken Station Units 1 and 2. Volume 1. September 30, 1975.

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Document prepared by Michael Calaban and last revised on 11 October 2012.