Response to Public Comment on the Draft SPDES Permit for the Cornell University Lake Source Cooling Facility (NY-024-4741)

Background

A draft SPDES permit for the Cornell Lake Source Cooling (LSC) facility and 30-day public comment period was announced in the New York State Department of Environmental Conservation (NYSDEC) Environmental Notice Bulletin on Oct 17, 2012. During that comment period, the Department received requests for an extension of the public comment period. As a result, the public comment period was extended for an additional 30 days. The 60-day public comment period ended on December 19, 2012.

NYSDEC received 21 separate comments on the draft SPDES permit. Comments were submitted by USEPA, Cornell University, Sive Paget & Riesel P.C. on behalf of the Cayuga Nation Council and other local parties, Tompkins County Environmental Management Council, Tompkins County Water Resources Council, and other individuals. These included comments both in support of the permit as well as comments opposing the draft permit or certain aspects of it. A number of other comments did not express support or opposition but did offer suggestions to improve the permit or the associated Lake water quality modeling effort. Other comment requested clarification of specific aspects of the draft permit.

A general overview of the major points identified in the comments is presented in the beginning of this Response Summary. More detailed responses to specific individual comments are presented following the Overview.

Overview of Comments on the Draft SPDES Permit

Comments in Support of the Draft SPDES Permit

A number of comments expressed support for the draft SPDES permit as proposed. Various factors were cited for this support. These factors include:

- *The overall environmental benefits of the Cornell University Lake Source Cooling (LSC) facility, specifically the replacement of fossil fuel powered chillers with a renewable source of cooling that result in energy savings and a reduction in greenhouse gas emissions.*
- *The need for more intensive study of the South End of Cayuga Lake in order to better understand water quality problems, better identify contributing sources and support development of a TMDL, and*
- *The benefits of a solution that takes a whole-lake focus and that would better address water quality declines noted in parts of the Lake (and similar declines in other Finger Lakes) outside the immediate influence of the Lake Source Cooling discharge.*

NYSDEC is in agreement with these comments. The obvious environmental benefits of the LSC facility provided the impetus for the Department to seek a discharge permitting solution that would allow for the continued operation of the facility. However, the Department is equally concerned with protecting water quality in Cayuga Lake, and that the benefits of LSC not come at the expense of the water quality of the Lake. The complexity of the situation in the South End of Cayuga Lake – with multiple point sources, urban and agricultural runoff sources, significant tributary loads, in-lake nutrient dynamics, changing conditions in the larger Lake, and potential impacts from invasive species and climate change – strongly support the need for additional focused study. Specifically, that study should be aimed at the development of a TMDL for phosphorus. The development of a TMDL for the South End of the Lake has long been a NYSDEC priority, but agency resource constraints have hindered the effort. The proposed partnership between the Department, Cornell University and the rest of the watershed community presents an opportunity to move forward with a study that will not only inform the development of a TMDL, but should also provide a greater understanding of water quality changes of concern throughout the Lake.

Comments in Opposition to the Draft SPDES Permit

Comments opposing the draft SPDES permit cited various concerns. These concerns include:

- *An overall decrease in the quality of Lake waters, particularly with regard to weeds and algal growth. Some of these comments suggest that the timing of this decline in water quality corresponds to the operation of the Lake Source Cooling facility, and that timing provides justification to significantly reduce, relocate or eliminate the current LSC facility discharge.*
- *Adequate study has already been conducted and that results have shown the Lake Source Cooling facility discharge to be either the primary source of the impairment to the South End of Cayuga Lake, or at minimum a significant enough contributor that requirements to reduce or move the discharge should be put in place without delay.*
- *Proposed discharge limits for phosphorus are not stringent enough (too high). Some of these comments express opposition to the limits because appropriate procedures were not followed in developing the limits. Other comments pointed to past and current operation of the facility to support the contention that lower limits could be met and should be required.*

NYSDEC agrees that there is considerable evidence that water quality in Cayuga Lake is declining. However, available data suggests this decline in water quality extends beyond the Southern End of the Lake and beyond the influence of the Lake Source Cooling discharge. The Department believes that focusing solely on the LSC discharge will be inadequate to resolve the larger water quality issues in the Lake. For this reason, we support the idea of a whole-lake watershed approach – including a monitoring and modeling study of the entire Lake and Lake

watershed/tributaries to support a TMDL – to gain a better understanding of water quality problems, the relative contributions of all the sources of pollutant loadings, and the most effective means to restore the Lake. This watershed approach presents an opportunity to more comprehensively address Lake water quality problems that have long pre-dated the LSC facility.

DEC recognizes that there has been considerable monitoring data collected in Cayuga Lake over the past ten-plus years. These efforts include, but are not limited to, the Before-After-Control-Impact (BACI) Study conducted as a requirement in the existing Cornell LSC facility permit. The results of these sampling efforts provide considerable evidence to support a finding that water quality in the Lake has been declining. However the data is not conclusive regarding the degree to which these water quality declines can be attributed on the whole or in part to the LSC discharge. We recognize that various stakeholders and other parties interpret this data differently. But a number of factors, including 1) the decline in water quality throughout the Lake, 2) the significant reduction in phosphorus loads from other point sources to the South End of the Lake that resulted in no apparent water quality improvement, and 3) the possibility that other phenomena (e.g., naturally occurring upwelling, impacts from zebra mussels or other invasives), all contribute to our opinion that there remain questions that need to be answered. We also stress that the current available data does not necessarily confirm the contention that the LSC discharge has no relationship and/or minimal impacts on water quality in the Lake. There are specific issues – such as the role of soluble reactive phosphorus (as opposed to total phosphorus) and the impacts during the summer when maximum recreational use and maximum LCS use align – that need further exploration. But there is insufficient justification at this time to require Cornell to undertake costly actions the results of which, with regard to water quality improvement in the Lake, are unknown.

With regard to the proposed final and interim permit limits, the Department believes that the proposed permit limits were appropriately developed in accordance with policies the Department typically uses to develop permit limits. In cases such as this where there are multiple sources of pollutants that may be contributing to the impairment of a waterbody, a TMDL – which evaluates all sources (point and nonpoint) and identifies a comprehensive watershed-based loading strategy – is the proper means to establish final permit limits. In the absence of a TMDL limit, the Department has the responsibility to set a permit limit for facilities that are discharging the pollutant causing the impairment. However the Department also has discretion in setting that limit. The Department does not typically set a limit that would require discharge reductions that may not be supported by the eventual TMDL (i.e., the Department does not set limits that presume the outcome of a TMDL analysis before that analysis is complete).

The Department believes the proposed limits are appropriate and adequate to protect water quality until a TMDL is developed. The proposed final limit of 4.8 lb/day represents an interim final water quality-based limit used 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 increases in lakewide 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, including during peak summer usage. This limit is also consistent with the range of values determined as part of a statistical analysis of the past three years of discharge data. In addition to interim and final effluent limits, the Department has included a Best Management Practices requirement for the facility to optimize the use of the Lake Source Cooling plant to maximize the efficiency of the Lake Source Cooling system while minimizing the volume of water used to the degree practical.

Also regarding the approach used to determine the proposed permit limits, NYSDEC notes that the LSC facility is fundamentally different from most wastewater treatment facilities for which SPDES permits are developed. Specifically, the LSC discharge adds no phosphorus or any other chemical pollutants[1] to the water it withdraws from the Lake, it provides no treatment of the return water, and the water is returned to the same lake from which it was withdrawn. It may be determined that moving deep lake water to the shallow South End of the Lake is a significant contributing factor to algal growth and/or other water quality problems in the South End, and that treatment or relocation of the outfall will be determined to be the most appropriate means to restore water quality. But there is insufficient data to support that claim at this time. It is the Department's position that such a determination should await the outcome of the proposed Cayuga Lake Water Quality Model/Study and TMDL development.

Many comments suggested that the permit should not include an interim limit for phosphorus or that the interim limit should be lower because the LSC facility has demonstrated that it is capable of meeting a lower phosphorus level. However, we believe it is inaccurate to state that LSC facility is capable of continuing to meet lower phosphorus levels. As noted previously, the LSC facility adds no chemical pollutants and provides no treatment of the Lake water that passes through the facility. As a result, the amount of phosphorus being discharged by the LSC facility is directly dependent upon the concentration of phosphorus in the Lake at the intake. That the facility was able to generally meet a limit of 4.8 lbs/day of phosphorus during the 2000-2009 period does not mean that this limit is technically achievable at this time if the deep Lake phosphorus concentration at the intake continues to increase.

Some comments also raised issues concerning the issuing of the current permit. To the degree that these comments have direct relevance to the newly proposed draft SPDES permit, the Department will respond to these comments.

[1] No exceedence of water quality standards for temperature.

Comments Suggesting Changes to the Draft SPDES Permit

A number of suggested changes or additional concerns were offered for consideration in developing a final SPDES permit for the Lake Source Cooling facility. These comments, along with the Department response, include:

- *Maintaining the Lake monitoring requirements contained in the current permit.*
  NYSDEC agrees with many of the comments that continuing this monitoring would provide additional data that could be beneficial for Lake monitoring, However the Department also believes that redirecting those efforts toward monitoring for the development of a model to support development of a TMDL for the South End of the Lake is a better use of finite resources.
- *The need for the proposed monitoring and modeling effort to focus on soluble reactive phosphorus, in addition to total phosphorus, since SRP is more available to support algal growth.*
  NYSDEC agrees that soluble reactive phosphorus is an important component that deserves particular attention in the study. We have stressed this need to Cornell and presentations at a recent Quality Assurance Program Plan (QAPP) Workshop reflected an emphasis on SRP monitoring. Additional suggestions regarding SRP were also offered at the workshop and we will give careful consideration to this issue during the QAPP review.
- *The need for the proposed monitoring and modeling effort to include evaluation of the impact of mussels on water quality in the Lake.*
  NYSDEC agrees that some attention should be given to impacts from mussels and the Cayuga Lake Water Quality Modeling Study, as outlined in the QAPP, includes a dressenid mussel monitoring component.
- *The need for the proposed monitoring and modeling effort to include evaluation of sediment inputs and the resulting impact on water quality in the Lake.*
  NYSDEC concurs that sediment loading is an important component of the study. This issue will be evaluated through the watershed model part of the study.
- *The need for peer review and independent verification of the monitoring and modeling work.*
  NYSDEC agrees that establishing an independent Technical Advisory Committee (TAC) for the overall TMDL effort would be beneficial. Peer review of the water quality modeling effort to support a TMDL for Onondaga Lake was led by USEPA. The Department believes a similar role for USEPA in this project would be appropriate. However, we do point out that some components of the project will be using well established and standardized approaches (e.g., the watershed modeling component will be using standardized simulation models such as GWLF and SWAT) where more rigorous review is less critical. Additionally, Cornell University staff is recognized as having expertise in the discipline of watershed modeling and have published extensively in peer-reviewed scientific journals. This capability is expected to enhance the effort, but does

not mean that the project would not benefit from review conducted by an independent TAC.

- *A request that NYSDEC consider a use attainability analysis (UAA) before developing a TMDL for the South End of Cayuga Lake.*
  NYSDEC recognizes that consideration of a UAA as a tool to meet water quality goals is a viable option in some cases. However a UAA, which determines what uses and water quality standards are appropriate for a specific waterbody, is considered only after other measures to meet water quality standards and attain existing uses have been fully explored. Consequently, the UAA approach would not come into play until after the TMDL analysis is complete.
- *Suggested changes to the outfall relocation study requirements in the permit, specifically the timing of completion of this work.*
  NYSDEC believes that although the schedule of outfall relocation requirements could be shortened, there is no reason or benefit in doing so since the decision as to whether outfall relocation will be required will not occur until after the development of the TMDL.
- *Numerous suggestions to enhance the public information and outreach aspects of the project and requests for NYSDEC to take an active and continuing role throughout the process.*
  NYSDEC recognizes the high level of public interest in this project and in the health of Cayuga Lake in general. The Department will commit to working with the public stakeholders during the proposed monitoring efforts and the development of the Lake Water Quality Model. Once the model is complete, the Department will lead the effort to develop a TMDL for the South End of the Lake, a process that will include a considerable public participation component.

Some comments also asked for clarification regarding a number of issues, including the TMDL development process, Quality Assurance Program Plans (QAPPs), compliance due dates for items related to the Lake Water Quality Modeling effort, and the impact of the Lake Source Cooling facility on the Lake fishery. Responses to these specific questions are included in the more detailed response summary section of this document.

Specific Comments on the Draft SPDES Permit

US Environmental Protection Agency (Michelle A. Josilo) provided the following comments needing to be satisfactorily addressed to eliminate objection to the permit.

It is our (USEPA's) understanding that the permit would be modified if a total maximum daily load (TMDL) analysis indicated that the extension of the outfall pipe was necessary.
NYSDEC Response: This is correct. The requirements of a TMDL will be placed into a legally enforceable SPDES Permit following completion of the TMDL. The language in the permit Schedule of Compliance states "The permittee shall comply with the final effluent limit of Phosphorus, Total of 4.8 lb/d. **or such phosphorus allocation as assigned by the TMDL**." (emphasis added) However if the outfall is relocated to a different part of the Lake (as a result of the TMDL, or in the absence of a TMDL), the relocation would require a permit modification.

While the interim limitation does represent the application of the standard at the end of the discharge pipe, the inclusion of an interim limitation and compliance schedule is not consistent with federal NPDES regulations for water quality based effluent limitations at 40 CFR § 122.44(d), nor for schedules of compliance at 40 CFR § 122.47. This is also in conflict with: (1) federal regulations addressing antidegradation at 40 CFR § 131.12; (2) NYSDEC' s own antidegradation policy referenced in the permit fact sheet Water Quality Antidegradation Policy, signed by the Commissioner of NYSDEC, dated September 9, 1985; and, (3) TOGS 1.3.9, Implementation of the NYSDEC Antidegradation Policy Great Lakes Basin Supplement to Antidegradation Policy dated September 9, 1985.
NYSDEC Response: The Department believes the approach taken in the draft SPDES permit is appropriate and conforms to all applicable rules, regulations and policies. Subsequent to receiving and reviewing this comment, Department staff met with USEPA to discuss their specific concerns. After clarifying some points (discussed in more detail in this Summary below) and agreeing to revise the permit fact sheet to clarify some aspects of the development of the permit limits (discussed below) the Department believes the concerns raised by USEPA have been addressed.

Compliance schedules are allowable in the instance that a facility is unable to meet a final water quality based effluent limitation. Given that the facility has demonstrated its ability to comply with a limitation of 4.8 lbs/day as a monthly average, it is not appropriate to grant a compliance schedule with interim relief from that limitation.
NYSDEC Response: As noted previously, the LSC facility currently adds no chemical pollutants to the Lake water, nor does it provide any treatment. The final effluent limit of 4.8 lb/day was developed 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 increases in lakewide phosphorus levels. Therefore, thru no fault of its own, Cornell could exceed a 4.8 lbs/day limit, simply if the background phosphorus level increased in the Lake. As part of this permit, water quality studies and other requirements are being implemented to assist in the development of a TMDL. The TMDL will determine the long term final effluent limit. That number is not yet known, and the Department cannot pre-judge the TMDL. EPA has stated that a final effluent limit must be included in a SPDES permit. The final limit of 4.8 lb/day is therefore included as an interim final water quality-based limit used in the absence of a to-be-determined TMDL-based effluent limit. Correspondingly, a compliance schedule for interim relief is appropriate.

As the facility cannot meet the final effluent limit at this time, an interim effluent limit has been included in accordance with Department and EPA guidance contained in the Department's TOGS 1.1.1, 1.2.1, and 1.3.1, and Appendix E of the USEPA Technical Support Document for Water Quality Based Toxics Control respectively. The Department has included a water quality based interim limit of 6.4 lb/day, which is based upon the applicable water quality guidance value of 20 µg/l at the 95th percentile statistical existing discharge rate and is also consistent with a statistical analysis of effluent data over the past 3 years.

In addition to interim and final effluent limits, and as a result of this and other comments, the department has added to the final permit a Best Management Practices requirement for the facility to optimize the use of the Lake Source Cooling plant to maximize the efficiency of the Lake Source Cooling system while minimizing the volume of water used to the degree practical.

Additionally, the allowance of additional loading is not consistent with NYSDEC's antidegradation policy, which states that for waters in better condition than the applicable water quality standard…

NYSDEC Response: The draft SPDES permit proposes limits on the discharge of phosphorus where the current permit for the facility includes no limits for phosphorus. Therefore the proposed permit is more, not less, restrictive. 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. The added Best Management Practices requirement for the facility to optimize the use of the Lake Source Cooling plant will help reduce loadings towards the final effluent limit of 4.8 lb/day, or as otherwise determined by the TMDL. These limits, which effectively cap the discharge at the current level until such time as the water quality based TMDL is developed, are consistent with the department's antidegradation policy. See also previous response.

NYSDEC's antidegradation policy further states: Water which does not meet the standards assigned thereto will be improved to meet such. The water uses and the level of water quality necessary to protect such uses shall be maintained and protected.
NYSDEC Response: The Department proposes the development of a TMDL as the most appropriate means to improve, protect and maintain water quality standards in Cayuga Lake. We see no inconsistency between the draft SPDES permit that is structured to support an eventual TMDL and the Antidegradation Policy. See also previous response.

Federal regulations governing compliance schedules at 40 CFR §122.47 are only available for relief from water quality-based effluent limits, and only for achieving those water quality standards promulgated after 1977. Technology based requirements represent achievable levels, while compliance schedules are available where a facility has demonstrated that meeting limits based on water quality standards is not achievable. Given that the limit of 4.8 lb/day was calculated based on past data. using statistical calculations that project a maximum projected effluent, this level is achievable and inclusion of a compliance schedule is not appropriate.
NYSDEC Response: See previous responses.

The EPA notes that the permit includes a schedule of compliance to evaluate the extension of the outfall pipe, and if warranted by the TMDL, to extend the pipe upon the effective date of permit modification. …this schedule has no standing and is not in effect unless the permit is modified, which may or may not take place in the future.
NYSDEC Response: The references to the permit modifications used as triggers in the Schedule of Compliance refer to the modification of the current existing and administratively renewed SPDES permit. The referenced permit modification is the one outlined in the draft SPDES permit under consideration. The final permit will include actual dates, rather than references to yet-to-be-determined permit modification dates, which will further clarify these requirements.

Additionally, the extension of the pipe would address the impacts to the Lake in terms of ability to provide mixing, but would not affect the quality of the effluent nor Cornell's ability to meet the final limitation of 4.8 lb/day.
NYSDEC Response: The 4.8 lbs/day represents a water quality limit in lieu of a TMDL-based limit. The discharge will be required to meet a final limit of either 4.8 lbs/day or an alternative TMDL-based limit. The final numeric limit must insure compliance with the applicable narrative water quality standard for phosphorus, which is "none in amounts that will result in growths of algae, weeds and slimes that will impair the waters for their best usages." Extension of the outfall to a portion of the Lake where the discharge is less likely to contribute to the growth of algae, weeds and slimes will better enable the discharge to meet the narrative standard.

This permit should include a requirement to evaluate extension of the outfall pipe and the potential impact of alternatives, because NYSDEC has contemplated this action for several years

and may very well require such mitigation as the result of a TMDL analysis. However, the permit should include milestones triggered by the effective date of the permit. not a schedule of compliance granting an additional loading allowance of phosphorous, triggered only by a future permit modification.
NYSDEC Response: As noted previously, the references to the permit modifications used as triggers in the Schedule of Compliance refer to the modification of the current existing and administratively renewed SPDES permit. The referenced permit modification is the one outlined in the draft SPDES permit under consideration. The final permit will include actual dates, rather than references to permit modification dates, which will further clarify these requirements.

There is no reasonable potential analysis in the permit fact sheet to determine whether there are other pollutants that cause or contribute or have the reasonable potential to cause or contribute to a violation of water quality standards.
NYSDEC Response: The Department has conducted a reasonable potential analysis based upon its knowledge of the facility. 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 add any water treatment chemicals. The Department 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. Given the strong correlation between phosphorus and solids, the regulation of phosphorus discharges in the permit will also serve to control the discharge of solids.

We [EPA] support this condition [requirements for in-lake monitoring to support TMDL development] and recommend that this section be made more specific with respect to deadlines for submittal… EPA recommends that, at a minimum, NYSDEC also establish a due date within the permit for the commencement of monitoring…We also recommend that the permit include final due dates for completion of analytical monitoring and for developing the modeling plan.
NYSDEC Response: Due dates for tasks associated with the Cayuga Lake Water Quality Modeling Study are more appropriately addressed in the study QAPP, which will provide more context and a greater understanding of the relationship between the multiple components of the study. A schedule to complete this work in an appropriately timely manner will be considered during review of the QAPP and included as a requirement for QAPP approval. This schedule will be incorporated as an enforceable part of this permit.

The permit does not address the minimization of adverse impact due to impingement of fish unless the permit is reopened and modified to address additional controls for entrainment… [t]his permit should require a specific definition of what best technology available would be for the impingement of aquatic life at the intake structure. The permit must state the specific

controls. Including existing controls, as an enforceable permit condition, and the fact sheet must document the assumptions that lead to the conclusion that these controls represent BTA.
NYSDEC Response: The Department has determined that the combination of location, i.e., depth (more than 200 feet), and presence of the 2.0 mm panel wedge wire intake screen, i.e. design, effectively minimizes any impingement of fish at this CWIS. Therefore, the CWIS for Cornell's LSC currently meets the impingement mortality performance goals of Department Policy CP-52 and the requirements of 6 NYCRR § 704.5. The Biological Fact Sheet for the SPDES permit addresses this issue (see, Section 2: Ecological Resources). Under the terms of the SPDES permit, Cornell must conduct a biological study to demonstrate that the current location, design, construction, and capacity of the LSC CWIS meets the entrainment performance goals of Department Policy CP-52 and the requirements of 6 NYCRR § 704.5.

The draft permit does not adequately incorporate general permit conditions as required by federal regulations.
NYSDEC Response: This EPA comment is not unique to this permit. The last page of the permit includes language specific to General Conditions to which EPA and NYSDEC have agreed in the interim while negotiations on this issue continue and until agreement on final language is reached.

Sive, Paget and Riesel, P.C. (Michael S. Bogin), writing in opposition to the draft SPDES permit, offered the following comments.

DEC Improperly Excluded Other Interested Parties From Discussions Prior to Issuance of the Draft Permit… the process by which DEC has drafted the Cornell LSC SPDES permit renewal has been, to say the least, exclusionary and falls far short of the open public process envisioned by the Clean Water Act… DEC's failure to include other interested parties in discussions regarding the draft permit is particularly puzzling in light of DEC Commissioner's Policy 42, "Contact, Cooperation and Consultation with Indian Nations" ("CP-42").
NYSDEC Response: The Department values the input of all parties in this matter. In general, we believe the most effective and efficient means to solicit that input is through the established public comment process that was followed in this case, as it is for other SPDES permits. The original 30-day period for commenting on the draft permit was extended to a total of 60 days at the request of Cayuga Nation. This request was made at a consultation meeting between Department staff and the Nation during the original 30-day comment period. In addition, issues regarding the LSC facility and water quality in Cayuga Lake have been the subject of an open and ongoing public dialogue for a number of years.

None of the other interested parties who joined in the Notice Letter were invited by DEC to discuss the Draft Permit terms prior to its issuance, nor were any of them contacted by DEC.
NYSDEC Response: See previous response. There is no requirement that the Department meet with or contact the other parties prior to issuing the draft SPDES permit. That being said, the

Department will consider requests from stakeholders to meet individually as appropriate and as time allows.

Because no discharges from the Cornell LSC had yet commenced at the time South Cayuga Lake was first listed as impaired due to nutrients, the original permit should have been modified to prohibit any discharges of phosphorous.
NYSDEC Response: This comment concerns the SPDES permit issued for the LSC facility in 1998 and does not have direct relevance to the proposed draft SPDES permit.

The draft SPDES permit continues this violation of the Clean Water Act by impermissibly allowing Cornell to continue to unlawfully discharge phosphorous into a water body that does not meet water quality standards and that is listed as impaired for phosphorous. The permit must be revised to require closed cycle cooling, outfall relocation, or some other control technology to ensure that the LSC does not discharge phosphorous into South Cayuga Lake.
NYSDEC Response: We disagree that the LSC facility discharge is an unlawful discharge. The facility is in compliance with its previously issued and administratively renewed SPDES permit. There is no requirement that existing discharges be unilaterally prohibited from discharging to waters that do not meet water quality standards. The LSC facility is one of three large point source dischargers of phosphorus to the Section 303(d) Listed South End of the Lake. The development of a TMDL for this waterbody is the appropriate means to determine the limits for all sources necessary to address the impairment of uses in the Lake. In the permit the Department will require Cornell to obtain the information needed for development of a TMDL. The TMDL will be the vehicle to determine how best to meet water quality standards, and what is the appropriate phosphorus allocation for each discharger.

Cornell's discharges of phosphorous are causing or contributing to a violation of water quality standards and therefore violate CWA §§ 301(a) and 402, 33 U.S.C. §§ 1311 (a) and 1342. Thus, the draft permit's proposal to allow those discharges to continue violates these provisions of the Clean Water Act.
NYSDEC Response: In cases where multiple dischargers and/or nonpoint sources are contributing a pollutant to water impaired by that pollutant, the Clean Water Act recognizes that a TMDL is the most appropriate means to address the multiple sources, and provides the states with the necessary timeframe to establish a suitable TMDL. See also previous responses to comments from USEPA regarding the basis for the permit limits.

The draft permit also violates Clean Water Act anti-degradation requirements by allowing Cornell to increase its discharges of phosphorous over current and historic levels.
NYSDEC Response: See previous responses to comments from USEPA regarding compliance with NYSDEC Antidegradation Policy.

The draft permit also violates TOGS 1.3.6, Phosphorous Removal Requirements for Wastewater Discharges to Lakes and Lake Watersheds, because it fails to impose Best Treatment Technology for phosphorous as required by that TOGS.
NYSDEC Response: TOGS 1.3.6 outlines Department policy regarding the discharge of phosphorus from wastewater treatment facilities in the watershed of ponded waters (lakes, ponds and reservoirs). This TOGS only applies to either new or expanded discharges of wastewater. The LSC facility is not a wastewater discharge as contemplated by the TOGS and so the TOGS does not apply. It is also noted that both the interim and final effluent limits are more stringent than the 0.5 mg/l limit that would be required by TOGS 1.3.6, if applicable.

Rather than addressing the violations of water quality standards in South Cayuga Lake by requiring that the Cornell LSC cease its discharges of phosphorous into that portion of the Lake, the draft permit allows Cornell to increase those discharge over historic and current levels… According to discharge data in the United States Environmental Protection Agency (USEPA) ECHO database, the average contribution of phosphorus from LSC has nearly doubled since it first started operating in July 2000… Thus, the effluent limitations for phosphorous in the draft permit would exacerbate, rather than eliminate, the water quality standard violations caused by the Cornell LSC discharges in violation of CWA §§ 30l(a) and 402, 33 U.S.C. §§ 1311(a) and 1342.
NYSDEC Response: The basis of the interim and final permit limits is discussed in previous responses. These limits provide greater restrictions on phosphorus loadings from the LSC facility than are currently in place (the current SPDES permit includes no limits on phosphorus from the facility). The proposed limits, along with the required optimization requirements added to the permit, represent appropriate controls on the discharge until a TMDL is completed.

Moreover, this effluent limitation violates the Department's own antidegradation policy.
NYSDEC Response: See previous responses to comments from USEPA regarding compliance with the Department's Antidegradation Policy.

This means, at a bare minimum, that the Draft Permit must include a phosphorus effluent limit that is at least as restrictive as the actual average discharge from the facility. In other words, the Draft Permit cannot include any limitation in excess of 4.8 lbs/day as the applicable monthly average limit, and it must impose that limit immediately in order to prevent further degradation of the southern portion of Cayuga Lake.
NYSDEC Response: The basis and justification of the interim permit limit is discussed in previous responses.

CWA §§ 316(b) and 402, 33 U.S.C. §§ 1316(b) and 1342, and 6 NYCRR § 704.5 require that cooling water intake structures "shall reflect the best technology available for minimizing adverse environmental impact." DEC Commissioner Policy #52 ("CP-52"), "Best Technology

Available (BTA) for Cooling Water Intake Structures," establishes that, for existing facilities such as Cornell's LCS… BTA is "[w]et closed cycle cooling or its equivalent." Cornell's LCS is not a wet closed cycle cooling system or its equivalent, and thus violates the BTA requirements of the CWA.

NYSDEC Response: As noted in the Department's Biological Fact Sheet on page 2, the LSC intake structure does reflect BTA for impingement mortality because it "exceeds the impingement performance goals of CP-52 [DEC Commissioner's Policy, Best Technology Available (BTA) for Cooling Water Intake Structures (July 2011)]." Therefore, the Lake Source Cooling intake structure currently meets the performance goals of Department Policy CP- 52 for minimizing impingement mortality. Under the terms of the SPDES permit, Cornell must conduct a biological study to demonstrate that the **current** location, design, construction, and capacity of the LSC CWIS meets the entrainment performance goals of Department Policy CP-52 and the requirements of 6 NYCRR § 704.5. The permit language regarding these requirements is typical of and consistent with language currently being included in other permits.

The draft permit fails to require implementation of BTA for either impingement or entrainment, and thus also violates the Clean Water Act. Instead, the draft permit only requires Cornell to gather more entrainment data, even though DEC already has five years of entrainment data from Cornell collected during 2000-2005. Neither the draft permit nor any of the supporting documentation provided by DEC provides any explanation of why additional entrainment data is necessary, or why BTA cannot be determined and imposed based on the five years of data already collected.

NYSDEC Response: The Department has determined that the combination of location, i.e., depth (more than 200 feet), and presence of the 2.0 mm panel wedge wire intake screen, i.e. design, effectively minimizes any impingement of fish at this CWIS. Therefore, the CWIS for Cornell's LSC currently meets the impingement mortality performance goals (i.e BTA) of Department Policy CP-52 and the requirements of 6 NYCRR § 704.5. The Biological Fact Sheet for the SPDES permit addresses this issue (see, Section 2: Ecological Resources). Under the terms of the SPDES permit, Cornell must conduct a biological study to demonstrate that the **current** location, design, construction, and capacity of the LSC CWIS meets the entrainment performance goals of Department Policy CP-52 and the requirements of 6 NYCRR § 704.5.

Moreover, the compliance schedule in the draft permit includes no deadline for facility compliance with BTA requirements; according to the schedule, installation of BTA compliant technology will likely not occur until 2017, and may not occur until years later.

NYSDEC Response: The Department has determined that the CWIS for Cornell's LSC currently complies with the BTA requirements of 6 NYCRR § 704.5 for impingement and no further compliance action is required. The compliance schedule contains specific requirements and deadlines, some of which are dependent upon Departmental review and approval, consistent with CP-52 and similar to BTA requirements that are being imposed elsewhere in the State. As

per these requirements, Cornell must conduct a biological study to demonstrate that the **current** location, design, construction, and capacity of the LSC CWIS meets the entrainment performance goals of Department Policy CP-52 and the requirements of 6 NYCRR § 704.5.

Compliance Schedules in the Draft Permit Violate the Clean Water Act… none of the compliance schedules comply with § 750-1.2(74) because they either impermissibly delay compliance or fail to include an "enforceable sequence of actions or operations"
NYSDEC Response: As discussed in previous responses, the Department believes the compliance schedules and other permit conditions are appropriate and comply with applicable requirements. The proposed SPDES permit lays out an enforceable path toward the completion of a TMDL, the establishment of a final limit, and interim measures to appropriately limit phosphorus discharges until the final limit is in place.

…there is no justification for delaying compliance with a more stringent effluent limitation; the Cornell LSC is already discharging P at levels well below even the proposed "final" effluent limitation, and is thus capable of achieving a more stringent limitation upon EDPM.
NYSDEC Response: The basis of the interim and final permit limits is discussed in previous responses.

…the plan for the [outfall redesign] study is not due until 9 months after EDPM, and all subsequent "deadlines" are based on actions by the applicant or DEC for which no enforceable timetable or deadline is established.
NYSDEC Response: The inclusion of requirements to complete an Outfall Redesign Study are to ensure that the outfall redesign could move forward expeditiously, if that were deemed the most practical approach to meeting future TMDL-based limits. The timeline to complete the study is appropriate since it will require completion of the study before the TMDL-based limit is established. The only aspect of the timeline that might vary is the time for the Department to formally approve an approvable plan to be submitted within 9 months of the effective date of the permit. We do not expect that the Department review and approval will add any significant time to the schedule.

…the draft permit provides that even these non-existent "deadlines" can be extended at Cornell's request or by DEC. Thus, there are no enforceable deadlines by which Cornell must undertake changes to its discharges to eliminate the current violations of water quality standards.
NYSDEC Response: The permittee may request an extension to comply with the final effluent limit if the development of the TMDL and the TMDL-based limit is delayed by parties other than the permittee. This allowance is appropriate and consistent with SPDES regulations (6 NYCRR Part 750-1.18). Furthermore, any permittee, in any permit issued regardless of the topic, can always request an extension of a permit deadline. The Department always maintains the

discretion, after review, to approve or deny any extension request, including any made pursuant to this Permit.

…the draft permit includes a compliance schedule for BTA that includes no deadline for facility compliance with BTA requirements; according to the schedule, it is likely that installation of BTA compliant technology will not occur until 2017 at the earliest.
DEC Response: See previous response regarding compliance schedule deadlines for facility compliance with BTA requirements.

With respect to any discharge that is not in compliance with applicable limitations, applicable water quality standards, or other applicable requirements, the department shall establish specific steps in a compliance schedule designed to attain compliance within the shortest reasonable time…
NYSDEC Response: The Department believes that the schedule outlined in the draft permit represents an appropriately reasonable timeframe to develop and TMDL and establish a TMDL-based limit designed to attain water quality standards and restore uses in the South End of Cayuga Lake.

The draft permit is legally defective because it further postpones, for an indefinite period, DEC's establishment of a TMDL for phosphorous in South Cayuga Lake and fails to set forth a reasonable, verifiable, and concrete timeline for establishing a TMDL.
NYSDEC Response: The establishment of a TMDL for the South End of Cayuga Lake has long been dependent upon the development of a model and other tools necessary to determine appropriate loadings to meet water quality standards. The permit includes a requirement for the permittee to submit an approvable QAPP. The QAPP is required to include an approvable schedule for the completion of the monitoring and model development necessary for the Department to develop a TMDL. The permit states that the approved schedule for this work will become an enforceable condition of the permit. Since the Department will be responsible for the development of the TMDL, it is not appropriate to include a schedule for the TMDL development in the permit.

The schedule for developing the [water quality model] plan, getting DEC approval of the plan, implementing the plan, analyzing results and developing a TMDL are left completely open-ended in the permit. As is the case with the permit's compliance schedules, establishment of the TMDL is not subject to any enforceable deadlines or milestones. Thus, there continues to be no deadline for development or implementation of a TMDL for phosphorous in Cayuga Lake.
NYSDEC Response: See previous response.
The Department is responsible for the development of the TMDL. It is not appropriate to include in the Cornell LSC Permit commitments that are the responsibility of NYSDEC.

…the draft permit improperly seeks to place the main responsibility for developing a TMDL on Cornell.
NYSDEC Response: See previous responses. The Department is responsible for the development of the TMDL.

The Final SPDES Permit Should Retain the Existing South Cayuga Lake Monitoring Requirements…monitoring has…shown that Cornell's discharges are contributing to the phosphorous problem in the southern end of the Lake, thereby violating water quality standards.
NYSDEC Response: The Department has determined that it would be more beneficial to redirect the finite available resources to a monitoring effort tailored to supporting the needs of the TMDL development. There is no justification for continuing the Cornell LSC permit monitoring requirement that was designed to support the BACI Study, the results of which the Department found to be inconclusive regarding the extent of the impact of the LSC facility on water quality in the Lake.

DEC should maintain the [existing] monitoring program as a condition of the permit because it is the only means by which the contribution of the Cornell LSC to water quality problems in South Cayuga Lake can be identified and assessed on a regular, ongoing basis.
NYSDEC Response: The draft SPDES permit includes requirements for monitoring of the LSC facility for flow, phosphorus and temperature. This requirement will allow for the measurement of the facilities contribution to the Lake.

Tompkins County Environmental Management Council (James McGarry), writing in general support of the draft SPDES permit, offered the following comments.

Entrainment Study - The best available mitigation mechanisms to limit entrainment of organisms should be installed… A characterization of the taxa and estimated numbers of organisms entrained may contribute to an understanding of potential impact on the Lake food web and we request that the entrainment study continue with emphasis on that issue.
NYSDEC Response: The Department has previously required biological monitoring that has characterized the taxa and estimated numbers of organisms entrained through the Lake Source Cooling CWIS. However, the Department defines adverse environmental impact under 6 NYCRR § 704.5 as the number of fish and shellfish of all life stages killed or injured through impingement and entrainment by the operation of the CWIS. Therefore, it is neither required nor necessary to assess potential food web impacts prior to determining BTA (see Department Policy CP-52).

Outfall Design and Location Study – We suggest this separate task be accomplished sooner.
NYSDEC Response: See previous response, regarding Outfall Design.

Sediment Transport - Sediment and phosphorus have an affinity…[and] an understanding of the movement of sediment into the Lake will be important to understanding phosphorus movements into the Lake and we would like some attention to this in the modeling effort.
NYSDEC Response: As noted previously, the Department agrees that sediment loading is an important component of the study. This issue will be evaluated through the watershed model part of the study. Also regarding the impacts of lake sediments, the Department notes that nuisance macrophytes ('weeds") are present in the south end of Cayuga Lake for reasons other than excess phosphorus loading to the Lake. Historical phosphorus loads from the watershed have fertilized the bottom sediment in the Lake and these sediments provide most of the nutrients that the rooted weeds need to flourish. The Department will consult with the project managers to determine the need for comprehensive sampling of the littoral zone sediments. Since most of the fertilization of the bottom sediment is historical in nature, and likely pre-dates the LSC by decades, this issue may be more appropriate to address in the TMDL Implementation Plan.

Hypolinmentic SRP – Levels of soluble reactive phosphorus are rising not only in Cayuga Lake but in other lakes in New York as well. The phosphorus study should attempt to understand and characterize the causes of this rise in SRP. Dressenid mussels have been found to contribute to the alteration of nitrogen and phosphorus cycles and may be connected to these increases in SRP.
NYSDEC Response: As noted previously, the Department agrees that some attention should be given to impacts from soluble reactive phosphorus and dressenid mussels in the Cayuga Lake Water Quality Modeling Study. As outlined in the Quality Assurance Project Plan, the study includes specific SRP and mussel components. The Department will further discuss these aspects of the study issue with the independent consultant (Upstate Freshwater Institute) responsible for the TMDL monitoring and modeling effort during the QAPP review and approval process.

Community Participation - Many in the community are hoping for real engagement not just occasional presentations…we think it is important for DEC representative to be present and involved regularly for discussions regarding this modeling effort… The provision of a short comment period is not a satisfactory substitute for direct engagement of the interested parties and stakeholders from the inception of such a complex proposal. The other point source dischargers in Cayuga Lake were unaware of and did not participate in, the design of, and selection of consultants for, this project. Yet they will be substantially affected by TMDLs which may result from this project. Would NYSDEC be willing to conduct face to face meetings with other stakeholders to discuss both the design and the implementation of this project? We believe that this would help to create meaningful community participation.
NYSDEC Response: As noted previously, the Department recognizes the high level of public interest in this project and in the health of Cayuga Lake in general. The Department will commit to working with the public stakeholders during the proposed monitoring efforts and the

development of the Lake water quality model. Once the model is complete, we will lead the effort to develop a TMDL for the South End of the Lake, a process that will include a considerable public participation component, including the involvement of directly impacted stakeholders.

Phosphorus Limits – The two phosphorus figures of 4.8 and 6.4 lbs/day caused some confusion among the reviewers. It is unclear why these two different limits were calculated and further, why the higher limit was selected.
NYSDEC Response: The fact sheet has been revised to better explain the development and calculation of these limits. The higher number is an interim limit in place during the Cayuga Lake Water Quality Modeling Study and TMDL development, until the lower limit – or an alternative TMDL-based limit – takes effect. See also previous responses to comments from USEPA regarding the basis of the permit limits.

Lake monitoring – Current monitoring under the existing LSC permit should continue until the new permit is adopted and monitoring under the new conditions can begin.
NYSDEC Response: Although the advantages of more data, as opposed to less, are obvious, the Department has determined that it would be more beneficial to redirect the finite available resources to a monitoring effort tailored to supporting to what is needed in the TMDL process. There is no justification for continuing the Cornell LSC permit monitoring requirement that was designed to support the BACI Study.

Peer Review – The proposed modeling plan anticipates that Cornell will utilize in-house staff to conduct the research for the modeling project. Cornell has stated that their work will be peer reviewed. What is the process that has been established for such peer review? Similarly the work of the consultants under contract to Cornell should receive an independent review by an appropriately qualified scientist or review panel. Peer reviewers should be sought who are well outside Cornell's sphere of influence. We view this as absolutely essential to allaying the skepticism that exists regarding conflicts of interest.
NYSDEC Response: As noted previously, the Department agrees that establishing an independent Technical Advisory Committee (TAC) for the overall TMDL effort would be beneficial. Peer review of the water quality modeling effort to support a TMDL for Onondaga Lake was led by USEPA. The Department believes a similar role for USEPA in this project would be appropriate. However, the Department points out that some components of the project will utilize well established and standardized approaches (e.g., the watershed modeling component will be using standardized simulation models such as GWLF and SWAT) where more rigorous review is less critical. Additionally, Cornell University staff has recognized expertise in the discipline of watershed modeling and have published extensively in peer-reviewed scientific journals. Nonetheless, the Department agrees that the project would benefit from review conducted by an independent TAC.

The permit should make clearer than it presently does that a TMDL would only be developed for the southern end of the Lake, not the entire Lake.
NYSDEC Response: The Department will review the language in the draft permit and will clarify the scope of the proposed TMDL in the future.

We also believe that a significant reconsideration needs to be given to the designated "uses" for the south end of the Lake which have resulted in its being listed as an impaired water body for which a TMDL is required.
NYSDEC Response: As previously noted, the Department recognizes that consideration of a use attainability analysis (UAA) as a tool to meet water quality goals is a viable option in some cases. However the UAA approach is considered only after other measures to meet water quality standards and attain existing uses have been fully explored. Consequently, the UAA approach would not come into play until after the TMDL analysis is complete.

Tompkins County Water Resources Council (Frank Proto), writing in general support of the draft SPDES permit, offered the following comments.

We request the DEC take an active leadership role in this community discussion and provide a lead contact person to address questions/concerns and attend local meetings.
NYSDEC Response: See previous response to Tompkins County EMC comments regarding Community Participation. The Department will designate a technical lead/point of contact and a community information contact.

Entrainment Study – The current focus of the entrainment study appears to be on equipment/process optimization. The study should be modified to capture information on aquatic organisms from a food web perspective. If this cannot easily be done within the confines of the permit, we request that DEC perform such a study in advance of development of any new lake or watershed regulation.
DEC Response: Title 6 NYCRR § 704.5 requires that cooling water intake structures (CWIS) reflect the best technology available (BTA) for minimizing adverse environmental impact. Department Policy CP-52: Best Technology Available (BTA) for Cooling Water Intake Structures defines adverse environmental impact as the number of fish and shellfish of all life stages killed or injured through impingement and entrainment by the operation of CWIS. The Department does not require the assessment of food web impacts in determining BTA.

We request the DEC clarify its goals in developing a lake-wide nutrient model.
NYSDEC Response: The Department's goals for the model relate to its use in the development of a TMDL for the South End of the Lake. These align with the goals and objectives proscribed by EPA regarding TMDLs and associated EPA guidance documents. See also *"Guidance for*

Water Quality-Based Decisions: The TMDL Process" at http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/decisions_index.cfm.

We request the DEC meet with the community and explain the possible impacts of a TMDL.
NYSDEC Response: As noted previously, the Department is committed to working with the public stakeholders during the proposed monitoring efforts and the development of the Lake water quality model. Once the model is complete, the Department will lead the effort to develop a TMDL for the South End of the Lake, a process that will include a considerable public participation component, including the involvement of directly impacted stakeholders.

Sampling for the nutrient model development should capture soluble reactive phosphorus (SRP) dynamics in the hypolimnion. DEC should be aware that hypolimnetic SRP levels have been rising in other regional water bodies. Data collected in Cayuga Lake should not be analyzed in a vacuum. The water-sampling regime should be designed such that it may help determine a cause for the rising hypolimnetic SRP concentrations.
NYSDEC Response: See previous responses in the Overview and to comments from Tompkins County EMC.

Zebra and quagga mussel studies should also be designed to capture possible relationships between the organisms and nutrient cycling.
NYSDEC Response: See previous responses in the Overview and to comments from Tompkins County EMC.

Sediment inputs are an important component in the determination of a phosphorus impairment for the south end of Cayuga Lake. Sediment sampling, total phosphorus load estimation and a determination of overall impacts of that loading on the impaired water body should be performed prior to developing any new lake or watershed regulations.
NYSDEC Response: See previous responses in the Overview and to comments from Tompkins County EMC.

How does one develop a Quality Assurance Project Plan (QAPP) for a model?
EPA has published guidance for both monitoring and modeling efforts that relate to environmental quality. These documents can be found at http://www.epa.gov/QUALITY/qs-docs/g5m-final.pdf.

Please make publicly available the statistical analysis that resulted in the two phosphorus limits and any raw data necessary to perform the calculations. Please explain the two limits, the rationale for development of them and any changes that may result in phosphorus discharges through the duration of this proposed five year permit.
NYSDEC Response: The analysis used to develop the phosphorus limits is explained in the SPDES Permit Fact Sheet. In response to this and other comments, the Fact Sheet has been

revised to better clarify the basis of the limits. Department will make data used in this analysis available to any member of public as a PDF file, on request. See also previous response to EPA comments regarding the basis of the proposed interim and final permit limits.

Local entities including but not limited to the Community Science Institute, the Cayuga Lake Watershed Network, the Cayuga l.ake Watershed lntermunicipal Organization, the Water Resources Council, and the Tompkins County Environmental Management Council should be the primary contacts for data collection and/or public outreach.
NYSDEC Response: The Department envisions a public process for this effort that in inclusive and will involve a wide range of local stakeholders. We have already had meetings and discussions with these specific groups regarding the project.

The WRC requests an opportunity for public or stakeholder comment on any plans (and or QAPP's) before their approval by DEC.
NYSDEC Response: The Department envisions a transparent process and an ongoing dialogue with stakeholders. Much of this dialogue will be informal, conducted through web postings, email and telephone exchanges and periodic stakeholder meetings. As an example, Department staff recently participated in a workshop to review the draft QAPP for the Cayuga Lake Water Quality Modeling Project, hosted by the Tompkins County Water Resources Council. The Department will continue to attend such meetings to discuss progress with the project. More formal public comment periods will be held as appropriate and required.

We [WRC] request that a separate QAPP or plan, be developed for Community Involvement. DEC should meet with the community early next year to answer questions about the long range goals for Cayuga Lake implied in the permit.
NYSDEC Response: The Department agrees that it would be beneficial to develop a more formal public participation effort for the entire monitoring/modeling/TMDL effort in order to coordinate and facilitate the communication and outreach efforts associated with this project. The Department will work with the stakeholders to establish such a plan once the final SPDES Permit is in place.

Ms. Dooley Kiefer, Tompkins County Legislator, writing in general support of the draft SPDES permit – but with questions, concerns and suggestions – offered the following comments.

Entrainment Study… A characterization of the taxa and estimated numbers of organisms entrained may contribute to an understanding of potential impact on the lake food web; not enough is known about what goes on in the hypolimnion.
NYSDEC Response: See previous response to comments from Tompkins County WRC and EMC regarding entrainment issues.

Outfall Design and Location Study… I suggest this separate task be accomplished sooner. The scientific/engineering expertise needed for this can be done by persons other than those consultants that Cornell has already identified to focus on other tasks at the outset.
NYSDEC Response: See previous response to comments from Tompkins County WRC and EMC regarding The Outfall Study.
Sediment Transport…An understanding of the movement of sediment into the lake will be important to understanding phosphorus movements into (and within) the lake I request attention to this as part of any modeling effort.
NYSDEC Response: See previous response to comments from Tompkins County WRC and EMC regarding sediment monitoring.

Hypolimnetic SRP and Impact of Mussels… Certain mussels have been found to contribute to the alteration of nitrogen and phosphorus cycles and may be connected to these increases in SRP. Please include this perspective as part of the study to accurately model phosphorus in the lake.
NYSDEC Response: See previous response to comments from Tompkins County WRC and EMC regarding SRP concerns.

Community Involvement/Participation… Many in the community are hoping for real engagement, not just occasional presentations...it is important for a DEC representative to be present and involved regularly for discussions regarding the modeling efforts...The provision of a short comment period is not a satisfactory substitute for direct engagement of the interested parties and stakeholders from the inception of such a complex proposal.
NYSDEC Response: See previous response to comments from Tompkins County WRC and EMC regarding community participation.

Phosphorus Limits…The interim phosphorus limit of 6.41bs/day, specified in the draft permit, seems to have been arrived at by calculating the system's capacity, while the 4.8 1bs/day reflects the system's recent average use. I understand that interim limits are often used to give a permittee time to comply with new conditions. But that rationale is not relevant here...
NYSDEC Response: See previous responses in the Overview and to comments from Tompkins County WRC and EMC regarding the proposed limits.

Cornell's consultant UFI proposes to gather samples from its center-of-lake monitoring sites along its chosen east-west transects for only one growing season (maximum of March-November in 2013). However, as was noted at that same forum, there is a significant difference in testing results in all stratifications for data collected in "wet" cf. "dry" years. We ask that DEC consider how this could affect model development and the model's usefulness.
NYSDEC Response: The comment presupposes that there is no historical water quality information available for Cayuga Lake. The QAPP for the monitoring and modeling effort will

describe how the Lake and watershed models will be calibrated, validated and also how they will be used for forecasting and hindcasting under varying conditions.

The EMC's Nov. 12, 2004, comment letter opposed Cornell's request to reduce its ambient water-quality monitoring from eight to two sites. In that 2004 letter the EMC also noted questions remained about meeting thermal discharge criteria and that DEC had still not defined the "mixing zone". I request an update on those latter two topics and DEC's view of their present-day relevance.
NYSDEC Response: As noted previously, the current ambient monitoring is proposed to be replaced by the Cayuga Lake Water Quality Modeling Study. The modeling effort includes the application of a hydrodynamic model for the Lake that will address mixing zone issues.

...[Regarding] Current monitoring under the existing LSC permit….These data represent the most complete data set we have on the southern shelf. Since UFI's proposed monitoring is only for 2013, it makes sense to continue to collect data from the current southern shelf monitoring during the approximate five years of the development of the lake/watershed models...
NYSDEC Response: See previous responses in the Overview and to comments from Sive Paget & Riesel P.C. regarding the continuation of the current monitoring program.

TMDL development…The permit should make clearer than it presently does that a TMDL would only be developed for the southern end of the lake, not the entire lake.
NYSDEC Response: See previous response to comments from Tompkins County EMC regarding the scope of the TMDL.

…It [the permit] should also make clear that a significant reconsideration needs to be given to the designated "uses" for the south end of the lake that have resulted in its being listed as an impaired water body for which a TMDL is required.
NYSDEC Response: See previous response to comments in the Overview and from Tompkins County WRC regarding use attainability analysis.

Ithaca Area Wastewater Treatment Facility Special Joint Committee (Wade Wykstra), writing in opposition to the draft SPDES permit, offered the following comments.

The conclusions of the modeling plan should be applicable to the development of the TMDL required by NYSDEC and USEPA but not the sole basis for its development.
NYSDEC Response: The Department agrees that there may be other approaches that could be used in parallel to the simulation modeling effort, such as multivariate analysis of the monitoring data. The department will consider these approaches and incorporate them into the TMDL as appropriate.

We propose that the current Lake Source Cooling permit-compliance monitoring protocol be continued and augmented by existing and future data to determine synergistic basin-wide conditions, causes and effects. This request is based on actual sampling data showing increasing concentrations of soluble reactive phosphorus in the hypolimnion of Cayuga Lake, and on NYSDEC analyses showing a possible link between the Lake Source Cooling discharge and changes in water quality in southeast Cayuga Lake. Monitoring ambient water quality is also needed to evaluate the success or failure of the TMDL implementation before Southern Cayuga Lake can be removed from the 303(d) list. Continuation and consistency in the location and frequency of existing monitoring will be important to achieving this objective.
NYSDEC Response: See previous responses in the Overview and to comments from Sive Paget & Riesel P.C. regarding the continuation of the current monitoring program.

The amount and quality of the data used to define the model should be based on EPA's Interim Final Guidance for Planning for Data Collection in Support of Environmental Decision Making Using the Data Quality Objectives Process (EPA QA/G-4)
NYSDEC Response: The Department will take the USEPA guidance into account with regard to the amount and quality of the data being collected to support the modeling effort.

To ensure that designated uses are appropriate, use attainability analysis should be considered for southern Cayuga Lake before a TMDL is developed.
NYSDEC Response: See previous responses in the Overview and to comments from Tompkins County WRC regarding use attainability analysis.

Extension of the Public Comment Period – The IAWTF Special Joint Committee requested an extension of the 30 day public comment period on the proposed Draft SPDES permit to be 60 days.
NYSDEC Response: The Department agreed to this request – which was made by multiple parties – and the public comment period was extended by an additional 30 days to 60 days. The 60-day comment period closed on December 19, 2012.

Mr. Nelson G. Hairston, Jr., faculty member, Cornell University, writing in support of the draft SPDES permit, offered the following comments.

The results [of post-LSC start-up data] are now very clear: LSC is having no discernible effect on the functioning of the lake ecosystem…LSC has not stimulated phytoplankton growth above that already present, nor is there any evidence that it has caused any other detrimental effect.
NYSDEC Response: The Department finds the available data from both the BACI analysis and other sources regarding the extent of the impact of the LSC facility discharge on Cayuga Lake to be inconclusive. These analyses have consistently shown a decline in water quality in the lake. However the Department believes that the data neither definitively links nor dismisses the contribution of the LSC discharge to this decline. The Department believes that the proposed

Cayuga Lake Water Quality Modeling Study and the subsequent development of a TMDL is the best approach to identifying the sources of impacts in the Lake and a strategy to address Lake impairments. See also responses in the Overview to comments in support of the draft SPDES permit.

While phosphorus in a form usable by phytoplankton (SRP) does enter the lake from the LSC outfall, the concentration of phosphorus is very similar to that already present in the lake surface waters. As a result it cannot cause an increase in lake total phosphorus concentration. Furthermore, because water residence time on the southern shelf is so low (on the order of a day or two), whatever the LSC-contributed P does to phytoplankton growth is vastly diluted as it is advected off of the shelf… It is very clear that contributions of P to the southern shelf region of the lake do not control phytoplankton biomass. Rather this part of the lake is a part of a much larger system with water moved on and off the shell by large lake flow patterns
NYSDEC Response: This comment seems to equate total phosphorus to soluble reactive phosphorus, which the Department believes is not appropriate. The importance of SRP to phytoplankton growth has been well established and the relative contribution of LSC to the SRP loading to the lake needs further investigation. Such an investigation must also look at dilution of the discharge and residence time of the discharge on the shelf to determine the impact of the discharge relative to conditions that are the result of other lake dynamics. The proposed lake water quality modeling effort will contribute to better understanding of these dynamics.

… both SRP and chlorophyll have increased in the lake beginning in 2005, a full 5 years after LSC started up. Similar increases have occurred in Seneca Lake. These increases have nothing to do with LSC because the timing of the increase is all wrong for that, and because it is regional.
NYSDEC Response: As noted previously, the Department finds the results of analyses conducted to date to be inconclusive regarding the exact impact of the LSC discharge on conditions in the Lake. Regarding the increases of SRP and chlorophyll that have occurred throughout the Lake beginning in 2005, we agree the scope and timing of these changes suggest that it is unlikely that the LSC facility is the cause. Nonetheless, the water quality impacts of the LSC intake (and discharge) of hypolimnetic water with now higher levels of phosphorus, and particularly higher SRP, need to be evaluated.

Mr. Timothy R. Hinkin, Professor, Cornell University, writing in opposition to the draft SPDES permit, reiterated the following comments he had previously expressed in a 2009 letter to NYSDEC.

An article in the Ithaca Journal dated November 14, 2008 states that Cornell conducted a BACI study submitted in 2004. They found no effect, however, it appears that the study did not include site 7. It then reports that in 2007 the DEC ordered Cornell to include sites 4 and 7 in a follow-

up study. Finally the article states that the DEC had received Cornell's report in November (of 2008)… What is the status of that response?
NYSDEC Response: The Department and Cornell could not come to any agreement on the conclusions of the BACI Study. Some of the uncertainty regarding this study is discussed in previous responses. The Department has proposed development of a TMDL as a far more comprehensive approach for ascertaining the importance of individual phosphorus sources to the Lake and for identifying what technology is appropriate to reduce each source. Cornell has agreed to fund and assist with the monitoring and modeling effort to support the TMDL development.

When we built our home at the same time they were constructing LCS, there was no problem with weeds. If some action is not taken soon, the south end of the Lake will not be navigable for much of the summer.
NYSDEC Response: The Department agrees that weeds in the Lake significantly restrict recreational uses. However, we note that weed issues and their impact on uses in the southern end of the Lake have been raised well before the construction of the LSC facility. The Department believes nuisance macrophytes ("weeds") are present in the south end of Cayuga Lake for reasons other than current excess phosphorus loading to the Lake. See previous responses in the Overview and to comments from Tompkins County EMC and WRC regarding weed growth and sediments in the Lake.

I see many problems with the Cornel [BACI] Study…assumptions that were made in the BACI analysis about the effect of lake currents carrying any effluent north were flawed because of the prevailing wind out of the north which overpowers any current.
NYSDEC Response: Regarding lake currents and prevailing winds, the Department believes that it is not possible to make general statements regarding mixing patterns, without conducting additional simulation modeling. The modeling effort will focus on creating a better understanding of the Lake's hydrodynamics (water motion). This understanding will be incorporated into the TMDL analysis.

..the initial BACI study did not include Site 7… the interpretation of finding of the 2008 study was neither objective or statistically sound…
NYSDEC Response: See also response to previous comment by Mr. Hinkin regarding the BACI study.

Dr. John Halfman, Hobart and William Smith Colleges, writing in general support of the draft SPDES permit, offered the following comments.

First and foremost, the LSC facility is a significantly better environmental option than the coal-fired electrical chillers that it replaced in 2000. I mention this because it underscores the

overall environmental impact of the facility, often overlooked… From this broader look, the LSC project is an environmentally sound plan! In my opinion, the advantages clearly outweigh the disadvantages to the environment.
NYSDEC Response: As discussed previously, the Department recognizes the environmental benefits of the LSC facility. However the Department is equally concerned with protecting water quality in Cayuga Lake, and that the benefits of LSC not come at the expense of the water quality of the Lake.

Spatially, the [Cayuga Lake monitoring] data do not reveal an impact by the LSC outfall, but instead perhaps the WWTP outfalls and tributary inputs overshadowed any impact by LSC.
NYSDEC Response: As discussed previously, the Department agrees that although the results of sampling efforts to date provide considerable evidence to support a finding that water quality in the Lake has been declining, the data is not conclusive regarding the degree to which these water quality declines can be attributed to the LSC discharge.

LSC releases recycled nutrients not new nutrients… Cornell points out that LSC does not increase the amount of phosphorus discharged to the lake. The statement is true but misleading. The facility releases whatever is dissolved in the water drawn at the intake pipe in the hypolimnion and releases it to the epilimnion of the lake… However, the hypolimnion for most temperate lakes is typically enriched in soluble reactive phosphorus (SRP)… The release of this SRP to the sunlit epilimnion enables algal growth (and macrophytes) and decreases water clarity… This issue is more problematic in Cayuga Lake because annual mean hypolimnetic SRP concentrations averaged 7 ppb in Cayuga Lake since 2005, much larger than the 1 to 2 ppb detected in the hypolimnion of the other lakes... However, LSC impact is minimal and in my opinion not large enough to dictate Phosphorus scrubbing, outflow relocation or building a closed-loop system.
NYSDEC Response: As discussed previously, the Department agrees that soluble reactive phosphorus is an important component that deserves particular attention in the study. This comment provides a good summary of the dynamics associated with SRP. We anticipate that the Cayuga Lake Water Quality Modeling Study will better identify the impact of the LSC discharge in these dynamics.

Origin and annual variability in the elevated SRP in hypolimnion… I do not know why elevated SRP concentrations are detected in Cayuga Lake nor why the SRP concentrations varies from year to year but it would be nice to understand for an informed TDML. I have previously hypothesized that phosphorus attached to sediment particles or more tightly bound in calcium phosphates are transported to the hypolimnion from Taughannock and Salmon Creek runoff and the other inputs to the southern shelf area… Bacteria release the phosphorus as SRP into the hypolimnion, and subsequent it is transported to the epilimnion by LSC and other mechanisms. Perhaps the proposed modeling effort can quantify this phenomenon. Nonetheless, the flux of

phosphorus to the southern shelf due to LSC according to the annual LSC reports is less than 10% of the other southern shelf inputs.
NYSDEC Response: See previous response.

Natural transport mechanisms of hypolimnetic water… Wind stimulated seiche activity and internal waves can transport hypolimnetic water to the surface of the lake… This natural transport is not well known in most lakes, even Cayuga Lake, but most likely is significant and in fact could dwarf the contributions from LSC and other sources.
NYSDEC Response: The Department agrees that a better understanding of the natural transport of hypolimnetic water is important to addressing water quality issues in Cayuga Lake. We anticipate that the Cayuga Lake Water Quality Modeling Study will add to this understanding.

Cornell's reports suggest that tributary input provides the largest percentage of phosphorus to the southern end of the lake… I note that tributary flow was higher than normal in 2004/2006 and again in 2011 [DEC note: these years correspond to increased phosphorus, chlorophyll concentrations in Cayuga Lake]… My studies clearly indicate that tributary input dominates the phosphorus budget of numerous Finger Lakes and more importantly the input varies significantly from one year to the next… More importantly, the annual change in loads is huge… Thus, climate induced variability in runoff of nonpoint sources may dictate the change in water quality at the southern shelf. Regardless, the data would be critical for the Cayuga Lake modeling efforts.
NYSDEC Response: The Department agrees that tributary loading is an important contributing source of phosphorus and is critical to understanding and addressing lake water quality issues. We anticipate that the watershed modeling component of the Cayuga Lake Water Quality Modeling Study will add to this understanding.

I would favor applying TMDLs to all P-sources, because only then will P-loading reductions be guaranteed across the board, and allow the initiation of a decade+ process to naturally clean up the lake. If TMDLs will be applied to everyone, I then advise that DEC hold stakeholder meetings, that include representatives from each source and other concerned groups…
NYSDEC Response: The Department agrees that a TMDL approach is the most appropriate and effective means to address water quality issues in the Lake. As noted previously, we are committed to working with the public stakeholders during the proposed monitoring and model development efforts, and once the model is complete the Department-led TMDL development process will also include a considerable public participation component.

Continuation of the lake monitoring is critical… Cornell has generated a powerful, decade-scale, limnological dataset for Cayuga Lake. It is also unfortunate that the permit revisions do not dictate continued data collection, even at a more limited scope… Decade-scale datasets like this one are lacking from most lakes throughout New York State and the entire country.

Continued datasets like this one are useful to monitor water quality trends over time and investigate future threats to water quality in the lake.
NYSDEC Response: See previous response in the Overview and to comments from Tompkins County WRC and EMC regarding the continuation of the existing monitoring program.

Mr. Ezra Cornell, resident, writing in support of the draft SPDES permit, offered the following comments.

After many years of scientific study there is no evidence of any harm done by the operation of the [LSC] facility…
NYSDEC Response: The Department believes that the proposed Cayuga Lake Water Quality Modeling Study and the subsequent development of a TMDL is the best approach to identifying the sources of impacts in the Lake and a strategy to address Lake impairments. See also responses in the Overview to comments in support of the draft SPDES permit.

The concept of re-developing swimming in Stewart Park should be reviewed as a separate matter and denied...
NYSDEC Response: See previous responses in the Overview and to comments from Tompkins County WRC regarding use attainability analysis.

Mr. Clifford Kraft, faculty member, Cornell University, writing in support of the draft SPDES permit, offered the following comments.

I support [lake-wide sampling and development of a lake-wide water quality model] because I recognize that current knowledge of factors influencing water quality at the southern end of Cayuga Lake are inadequate… Two important influences upon water quality at the southern end -- and throughout -- Cayuga Lake have been completely absent from any previous evaluation… l) Watershed contributions of phosphorus and sediments to the lake from tributary sources [and] 2) The regeneration of phosphorus from dreissenid mussels ("quagga mussels").
NYSDEC Response: See previous responses in the Overview and to comments from Tompkins County EMC and WRC regarding use sediment and mussel contributions to the problems in the Lake.

The development of a lake-wide water quality model…will provide an opportunity to identify key influences upon Cayuga Lake water quality…[s]pecifically…why soluble reactive phosphorus increased lake-wide in 2005 and has remained fairly stable since then. Similarly…why recent substantial reductions in phosphorus inputs from sewage treatment plants at the southern end of Cayuga Lake had no discernible influence on water quality.
NYSDEC Response: See previous responses in the Overview and to comments from Tompkins County WRC regarding SRP issues and lack of impact from previous phosphorus reductions.

Mr. Richard P. DePaolo, writing in opposition to the draft SPDES permit, offered the following comments.

NYSDEC and Cornell were aware of impairments in southern Cayuga Lake before the original permit was issued.
NYSDEC Response: This comment does not have direct relevance to the newly proposed draft SPDES permit, which is the subject of the Public Notice.

Soluble Reactive Phosphorus can contribute significantly to the growth of rooted macrophytes under certain conditions. Cayuga Lake sediments have not been evaluated to support Cornell's claim that its cooling facility does not contribute to use impairments caused by excessive weed growth...Until a comprehensive widespread sediment profile is completed, there is no way to exclude LSC as a factor in the proliferation of rooted macrophytes.
NYSDEC Response: See previous responses in the Overview and to comments from Tompkins County EMC regarding SRP concerns and sediment contributions.

Phosphorus effluent limitations in the draft permit do not follow the guidance in TOGS 1.3.6. Anti-backsliding provisions in the NYSDEC Technical Operational Guidance Series 1.3.6 call for evaluating the historical contribution of phosphorus to a ponded waterbody and creating an effluent limitation that does not allow for the discharge to increase over historical values… At a minimum, NYSDEC should propose effluent limitations that are in concert with historical averages and prevent LSC from increasing its phosphorus contribution to the south shelf… NYSDEC should propose meaningful effluent limitations for phosphorus in the spirit of TOGS 1.3.6 and reopen the permit process to include all stakeholders in the development of a modeling plan that will lead to pollution controls that are above reproach.
NYSDEC Response: See previous responses to comments from Sive, Paget and Riesel regarding TOGS 1.3.6.

Cornell employees and consultants have inherent conflicts of interest and conscience and should not be allowed disproportionate roles in studies that will determine the fate of Cornell's discharge and the financial interests of other stakeholders potentially impacted by TMDL development.
NYSDEC Response: Much of the Lake monitoring and modeling effort is being conducted by the Upstate Freshwater Institute (UFI) under the oversight of the Department. Cornell's role is to reimburse UFI for expenses. The watershed modeling component will be using standardized simulation models such as GWLF and SWAT. Cornell staff has recognized expertise in the discipline of watershed modeling and have published extensively in peer-reviewed scientific journals. The Department will be responsible for the development of the TMDL. See also

previous responses in the Overview and to comments from Tompkins County EMC regarding peer review and community participation.

Mr. Kenneth N. Welch, resident, writing in opposition to the draft SPDES permit, offered the following comments.

I wonder why Cornell has been allowed to use the lake for its commercial purpose without paying anything, yet saving thousands of dollars not having to cool the water for A/C…I believe that the lake should not be used for commercial purposes, and that lake source cooling should be stopped immediately. But failing that, Cornell should not only fund the study the DEC has requested but pay to the State an annual fee for their commercial use of Cayuga Lake.
NYSDEC Response: Although State law gives the Department stewardship rights over the waters of the State, there is no legal ownership of the water per se. As long as Cornell University or any other private enterprise is in compliance with all State laws and regulations, they may use the water in Cayuga Lake.

Mr. Steve Beyers, resident, writing in support of the Lake Source Cooling facility, offered the following comments.

The proposed final permit limits, which would curtail LSC when it is needed most, are misguided and damaging to the environment… [NYSDEC policy] requires any new regulatory decision to determine whether it will lead to "an increase or decrease of GHG [greenhouse gas] emissions, and whether an expected increase in GHG emissions can be feasibly mitigated." For Lake Source, this analysis is exceptionally simple: anytime Lake Source Cooling is curtailed, thousands of pounds of additional C02 emissions will result.
NYSDEC response: The Department agrees that any curtailment of the ability of the LSC to function will increase greenhouse gas emissions. However, the relative magnitude of this curtailment on overall global greenhouse gas emissions is debatable. Perhaps more importantly, this laudable reduction in GHG emissions cannot occur at the expense of Cayuga Lake water quality. The goal of the required Water Quality Modeling Study is to determine the best way to protect the Lake. The interim effluent limit, combined with the optimization Best Management Practice, will allow continued use of the LSC facility at its recent levels during the compliance schedule period.

Mr. Edwin A. Cowen, resident and faculty member, Cornell University, writing in support of the draft SPDES permit, offered the following comments.

LSC has had no detectable impact on Cayuga Lake, as shown by both the BACI analysis and the "Ellner" alternative analysis.

NYSDEC Response: As noted previously, the Department finds available data from both the BACI analysis and other sources regarding the extent of the impact of the LSC facility discharge on Cayuga Lake to be inconclusive. These analyses have consistently shown a decline in water quality in the lake. However the Department believes that the data neither definitively links nor dismisses the contribution of the LSC discharge to this decline.

There has been a change in Cayuga Lake — mean summer (July through August) algal concentrations (as measured by chlorophyll-a) in the lake rose 60 percent, from 5.2 micrograms per liter during 2000-05 to 8.5 micrograms per liter during 2006-11. This was preceded by one to two years by an increase in total phosphorus (TP) concentration in the lake's hypolimnion (deep waters). Mean TP went from 12.3 micrograms per liter during 2000-03 to 15.6 micrograms per liter during 2004-09, while mean soluble reactive phosphorus, the form of the nutrient used by algae, increased nearly 80 percent over the same period, going from 4.8 to 8.6 micrograms per liter."

NYSDEC Response: The Department agrees that there have been changes in the Lake. It is these increases in phosphorus (and chlorophyll) throughout the lake that the Department believes need further study in order to develop a comprehensive strategy that fully addresses water quality issues in Cayuga Lake.

Powerful data analyses show that LSC is not the cause of these changes in Cayuga Lake, which occurred four-plus years after LSC's startup, against a backdrop of the two wastewater treatment plants lowering their phosphorus inputs significantly, by amounts many times greater than the amount of phosphorus being recirculated by LSC… This demonstrates clearly that phosphorus from the point sources is not the cause of the lakewide increased phosphorus and chlorophyll levels…. Further, chlorophyll-a concentrations are often higher in the main lake as compared to water in the southern basin, which is also contrary to the existence of a point source of nutrients leading to algal growth on the lake's southern shelf.

NYSDEC Response: This comment seems to equate total phosphorus to soluble reactive phosphorus, which the Department believes is not appropriate. The importance of SRP to phytoplankton growth has been well established and the relative contribution of LSC to the SRP loading to the lake needs further investigation. Such an investigation must also look at dilution of the discharge and residence time of the discharge on the shelf to determine the impact of the discharge relative to conditions that are the result of other lake dynamics. The proposed lake water quality modeling effort will contribute to better understanding of these dynamics.

Powerful data analyses show that LSC is not the cause of these changes in Cayuga Lake, which occurred four-plus years after LSC's startup, against a backdrop of the two wastewater treatment plants lowering their phosphorus inputs significantly, by amounts many times greater than the amount of phosphorus being recirculated by LSC… This demonstrates clearly that

phosphorus from the point sources is not the cause of the lakewide increased phosphorus and chlorophyll levels…. Further, chlorophyll-a concentrations are often higher in the main lake as compared to water in the southern basin, which is also contrary to the existence of a point source of nutrients leading to algal growth on the lake's southern shelf.
NYSDEC Response: As noted previously, the Department agrees that the scope and timing of these changes suggest it is unlikely that the LSC facility is the cause of wider changes that have occurred throughout the lake. However, the water quality impacts of the LSC intake (and discharge) of hypolimnetic water with higher levels of phosphorus need to be evaluated. The proposed lake water quality modeling effort will contribute to better understanding of these dynamics.

Mr. Gary Stewart, resident, writing in support of the draft SPDES permit, offered the following comments.

I would encourage the DEC to listen to the local watershed professionals who have repeatedly said that Lake Source Cooling does not contribute to impairment issues in the southern end of Cayuga Lake… There is a great opportunity at hand to get some real answers on a complex eco-system... I support the spirit of collaboration found in the draft permit, and believe a water modeling study will reap benefits for everyone who cares about Cayuga Lake.
NYSDEC Response: As noted previously, the Department finds available data regarding the impact of the LSC facility discharge on Cayuga Lake to be inconclusive that the proposed Cayuga Lake Water Quality Modeling Study and the subsequent development of a TMDL is the best approach to identifying the sources of impacts in the Lake and a strategy to address Lake impairments. See also responses in the Overview to comments in support of the draft SPDES permit.

Ms. Sarah Zemanick, writing in support of the draft SPDES permit, offered the following comments.

It is interesting to note that despite the IAWWTP phosphorus reduction project, the conditions in the southern end of the lake do not seem to have changed. Does this indicate that phosphorus is not the limiting nutrient? Certainly it seems to indicate that a solution is not as simple as limiting the LSC phosphorus.
NYSDEC Response: The Department agrees that the lack of apparent water quality improvement following the significant reductions in phosphorus loads is puzzling. It is our hope that the water quality model will provide explanations for this and identify the most effective strategy for reducing pollutant loads and addressing the impairment in the lake.

Mr. Manley Thaler, did not express a position supporting or opposing the draft SPDES permit, but offered the following comment:

A panel of Independent – Non-Associated – experts should be appointed to study the application and present situation.…
NYSDEC Response: See previous responses in the Overview and to comments from Tompkins County EMC regarding peer review and community participation.

Mr. James Little, did not express a position supporting or opposing the draft SPDES permit, but offered the following comments:

Would it help to run a pipe to discharge the used cooling water from Cornell to a deeper part of the Lake so there is less warming in the South part of the Lake where it is shallow? This would at least reduce the algae which the phosphorous causes.
NYSDEC Response: An engineering study to better define this option is in included in the draft SPDES permit as a requirement.

Is it possible that some businesses and agricultural runoff are discharging phosphorus into storm sewers? Is it also possible that some storm sewers are discharging into the City of Ithaca sewer system?
NYSDEC Response: These are likely sources of phosphorus, although the magnitude of these sources has not been quantified. It is anticipated that the monitoring and modeling efforts and the Department's subsequent development of a TMDL will identify all the pertinent sources of phosphorus to the Lake and result in a reduction strategy to address the impairment in the Lake.

Mr. George D. Patte, Jr, resident, writing in opposition to the draft SPDES permit, offered the following comments:

The phosphorus limits I understand have been established (interim load at 6.4 lb/day) seem alarmingly high and should not be approved. Should not Cornell be ordered to substantially lessen its discharge and, if it is safe, do so at a point in the lake where it is much deeper?
NYSDEC Response: See previous responses in the Overview and to comments from USEPA and others regarding the basis for the proposed permit limits. Regarding the relocation of the discharge, an engineering study to better define this option is included as a requirement in the draft SPDES permit.

There should be an independent study done by a qualified agency with no connection to Cornell or others.
NYSDEC Response: See previous responses in the Overview and to comments from Tompkins County EMC regarding peer review and community participation.

…DEC has to my knowledge done no study of LSC's effect on migratory fish like salmon and trout species. That run has been off drastically over the last 10 years… Fish and Wildlife other experts should bring to bear their expertise on this issue.
NYSDEC Response: The Department has not conducted any studies on migratory fish in Cayuga Lake that was specific to the LSC project. The Department does conduct other routine monitoring of the Cayuga Lake fishery. That monitoring has shown the annual spring rainbow trout run at the fishway has averaged about 500 fish passed upstream over the last twenty years, with no discernable trend or change. Some years are better than others of course, but those are easily attributable to water temperatures, flows, and lake levels in the spring during the run. We do not conduct similar monitoring on the landlocked salmon or brown trout fisheries; however, all salmonids are included in our angler diary program. Over the last twenty years, anglers have reported catching decreasing numbers of rainbow trout, stable numbers of brown trout, and increasing numbers of landlocked salmon in the tributaries to Cayuga Lake, with average sizes of those fish kept increasing for all except the salmon. There are currently no new or additional studies planned related to the lake source cooling project.

Ms. Carol Farkas, writing in opposition to the draft SPDES permit, offered the following comments:

I strongly oppose Cornell University's being directly involved in a future study of the relationship between the Lake Source Cooling Project and increased phosphorus levels in Cayuga Lake. The conflict of interest should be readily obvious to any fair-minded person.
NYSDEC Response: See previous responses in the Overview and to comments from Tompkins County EMC regarding peer review and community participation.

At very least Cornell ought to be ordered to extend the pipe at least another quarter to a half-mile. That way the warmed return water would be mixing with 42-degree water, thus reducing the phosphorous build-up in the south end of the lake.
NYSDEC Response: An engineering study to better define this option is included as a requirement in the draft SPDES permit.

Mr. Steven Smith, did not express a position supporting or opposing the draft SPDES permit, but offered the following comment:

The 30,000 cows in the Salmon Creek watershed are helping load the lake with phosphorous.
NYSDEC Response: The Department agrees that agricultural activity in the Salmon Creek that is likely contributing phosphorus load to Cayuga Lake. It is our expectation that the watershed monitoring/modeling component of the proposed Cayuga Lake Water Quality Model will help to quantify this load. We further expect that the development of a Total Maximum Daily Load (TMDL) plan to quantify all phosphorus loads to the Lake and identify appropriate load

reductions is the best path to restoring water quality in the Lake. State, federal, local governments and private resources have been used to support the implementation of so-called Best Management Practices (BMPs) that have already reduced the loading of phosphorus to the Lake. The Department supports making the Cayuga Lake watershed a top priority for continued BMP funding.

Cornell University Facilities Services (KyuJung Whang and Robert Bland), writing in general support of the draft SPDES permit, offered the following comments.

While the existence of two non-Cornell wastewater treatment plant outfalls and the dynamic water circulation patterns in the southern zone complicates the analysis, several rounds of BACI statistical analyses have been completed, the most recent of which analyzed monitoring data through 2008. Based on their review of the BACI results, statistical experts agree that the LSC discharge has not caused water quality degradation of southern Cayuga Lake.
NYSDEC Response: As noted previously, the Department finds available data from both the BACI analysis and other sources regarding the impact of the LSC facility discharge on Cayuga Lake to be inconclusive. These analyses have consistently shown a decline in water quality in the lake. However the Department believes that the data neither definitively links nor dismisses the contribution of the LSC discharge to this decline.

So that there is no misunderstanding in the public's mind of the respective roles of Cornell and the Department as to how the information that will be generated by the modeling effort will factor into the Department's efforts to develop a TMDL, the Response to Comments that will accompany the final permit should clarify those roles.
NYSDEC Response: The Department is responsible for the development of the TMDL. See previous responses to comments from Sive, Paget and Riesel regarding the responsibility for developing a TMDL.

…the draft permit, when finalized, will constitute a complete renewal of the permit, rather than just a "modification" to certain sections… However, the Fact Sheet refers to the draft permit just as an "EBPS modification" (Section I. p. 1) or a Department-initiated modification (Section II (A, p.l). This would lead a reviewer to think that the entire permit has not been substantively reviewed and updated…the Response to Comments should clearly state this.
NYSDEC Response: The Environmental Permit Benefit System (EBPS) permit modification constitutes a full permit review in accordance with Department policy and guidance as outlined in TOGS 1.2.2.

The permit's "'interim" numeric total phosphorus limit should be the only phosphorus limit, and it should have a longer averaging period... Cornell does not believe that the 4.8 pounds per day final limit was calculated appropriately. Further, even the 6.4 pounds per day limit is lower than

the limit would be had it been calculated properly using the Department's standard limit calculation methods.
NYSDEC Response: The approach taken in the draft SPDES permit is appropriate and conforms to all applicable rules, regulations and policies. The Fact Sheet has been revised to better explain the process used and justification for the phosphorus limits. See also previous responses in the Overview and to comments from USEPA, Tompkins County WRC and EMC regarding the proposed limits.

The 6.4 pounds per day WQBEL (expressed as a rolling average) should remain in place until the TMDL is completed, at which time the LSC may be assigned a Waste Load Allocation (WLA) for phosphorus that is higher or lower than 6.4 pounds per day or receive no allocation at all if the LSC is determined not to be a significant contributor to the impairment of the southern shelf of the Lake.
NYSDEC Response: The Department agrees that the ultimate water quality-based effluent limit will be determined by the TMDL WLA. However as noted previously, the permit includes a proposed final limit of 4.8 lbs/day which represents a water quality-based limit used in the absence of a TMDL derived limit. The permit also states that: "The permittee may request an extension of the final compliance date…should the final compliance action be delayed as a result of extended review by a federal, state or local government or as a result of public process, resulting in a delay in issuing the TMDL…"

The Department should follow its own practices and procedures when establishing a phosphorus limit… When calculating either a WQBEL or a TBEL, the Department should follow its own (and EPA's) practices and use only recent representative data.
NYSDEC Response: The approach taken in the draft SPDES permit is appropriate and conforms to all applicable rules, regulations and policies. The Fact Sheet has been revised to better explain the process used and justification for the phosphorus limits. See also previous responses in the Overview and to comments from USEPA, Tompkins County WRC and EMC regarding the proposed limits.

All phosphorus limits should be expressed as twelve month, or least seasonal, rolling averages… EPA allows and encourages the use of extended averaging periods for permit limits applicable for discharges into nutrient-impaired waters… Consistent with…similar EPA guidance, recent New York TMDLs and draft TMDLs have stated that WLA-based permit limits will be based on a 12 MRA… Use of anything shorter than a 12 MRA is unwarranted.
NYSDEC Response: As noted previously, the proposed limits in the draft SPDES permit, including the averaging period used, are appropriate and conform to all applicable rules, regulations and policies. While longer term averages can be used for nutrient impaired waters, the seasonality of both the discharge and the visual impairments in Cayuga Lake are better limited and monitored using monthly average limits.

The purpose and objective for potentially relocating the outfall must be accurately and consistently stated in both the permit and the Industrial SPDES Permit Fact Sheet/Response to Comments… Because the premise behind outfall relocation is to eliminate the possibility that the LSC discharge might contribute to the impairment of a §303 water body, relocating it would obviate the need for a phosphorus limit on the LSC discharge… These statements [in the draft permit] should be corrected in the Response to Comments.

NYSDEC Response: The Department recognizes the point being made in this comment; that is, if the outfall is relocated off the shelf, then there is no longer any basis for the final phosphorus limit of 4.8 lbs/day. That concern is addressed by the language in the permit Schedule of Compliance which states: "The permittee shall comply with the final effluent limit of Phosphorus, Total of 4.8 lb/d. **or such phosphorus allocation as assigned by the TMDL**." (emphasis added) If the outfall is relocated to a different part of the Lake in the absence of a TMDL a permit modification would be required, through which the issue of an appropriate limit (if any) would be addressed.

The Response to Comments should state that the draft permit appropriately implements federal and state cooling water intake requirements.
NYSDEC Response: See previous response to comments from Tompkins County WRC and EMC regarding cooling water intake issues.

The reference to annual reports in Special Condition 2 (page 4), which likely is an artifact of a requirement in Cornell's current permit that is being eliminated, should be removed.
NYSDEC Response: The Department agrees with this comment and will remove this reference from the final permit.