NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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February 28, 2017

Ms. Cheryl A. Brown, Environmental Project Manager
Cornell University - Environmental Health and Safety
395 Pine Tree Road, Suite 210
Ithaca, NY 14850

Re: NYSDEC Comments on the
Final Report – Lake Source Cooling Outfall Redesign

Dear Ms. Brown:

The New York State Department of Environmental Conservation (NYSDEC) received the above referenced report in October 2016. While the majority of our effort in the time since we received the report has focused on the use of the Cayuga Lake model and the development of the Draft Phosphorus TMDL for the Lake, we have had an opportunity to conduct an abbreviated review of the Outfall Redesign Report (a more extensive review of the engineering, costs, schedule has been deferred). Outlined below are our initial comments on the report. We expect that the water quality issues surrounding this project will be explored in greater detail during the TMDL development process.

The primary objective and rationale for including the Outfall Redesign requirement in the Cornell University Lake Source Cooling discharge permit was to identify a suitable location and depth for an extended outfall, should that be the selected alternative at the conclusion of the TMDL study. The report appears to meet that objective. However the specifics of the relocation proposal will have to be more fully evaluated in the context of the larger water quality analysis and lake modelling tools currently being used to develop the Cayuga Lake Phosphorus TMDL.

The Outfall Redesign Report goes beyond that primary objective to render opinions regarding water quality benefits – or lack of benefits – based on the concurrent Cayuga Lake water quality modelling work. While the conclusions are interesting, final decisions regarding water quality issues will be based on DEC's use of the completed model to develop a Cayuga Lake TMDL rather than through the Outfall Redesign Study. Consequently we will defer a full discussion of these water quality and impairment issues until the evaluation and application of the model to develop the TMDL is complete.

That being said, we feel compelled to flag a few of the findings in the Outfall Study that we will want to return to as part of the water quality discussion. Specifically:

- The statement regarding the "return flow of cool, clear water low in phosphorus from the LSC heat exchange facility" is confusing, and perhaps misleading. The return flow is low in *total* phosphorus, but the concentration of bioavailable soluble phosphorus – which it is agreed is a more significant contributor to algal growth and use impairment – is higher in the return water than in the ambient waters of the shelf.

- The conclusions regarding residence time are interesting, but may not be all that consequential. There is little evidence that residence time is a limiting factor with regard to algal growth. It may very well be that the discharge of the additional bioavailable phosphorus load from the outfall to the photic zone on the shelf for a period of 2 days has a more significant impact on water quality than a 3 day residence time for water that is not subject to that additional bioavailable load.

- The Outfall Study's conclusion that "an outfall extension would not provide any environmental benefit to Cayuga Lake" appears to be narrowly focused on meeting the total phosphorus criteria (as well as the silt/sediment impairment). The water quality goal must also meet the narrative standard: *No nutrients in amounts that result in algal growths that impair waters for their best usages*. This is where bioavailable phosphorus – particularly during the growing season, see below – is a more significant concern. DEC's position is that the appropriate way to reduce the concentration of total phosphorus in the south end of the Lake is through reduction of the total phosphorus load (the goal of the TMDL), rather than lowering the total phosphorus concentration by dilution and mixing. The dilution and mixing approach is additionally problematic in this case because the return water, though lower in total phosphorus than the ambient, is higher in bioavailable phosphorus and is therefore more likely to contribute to algal growth and violation of the narrative water quality standard.

- There is a seasonal component to the evaluation of loads and contributing sources that will be critical to addressing water quality issues in the Lake. Annual, or even April to October, loading averages can mask more refined seasonal variation. In this case, the most critical time for algal growth is during the period of lake stratification, typically July through August. This period also coincides with typically lower tributary loads and the time when the LSC discharge is at its maximum.

- Lastly, regarding the environmental/regulatory compliance benefits of an outfall extension, the Outfall Redesign Report does not take into account the current and likely future limits on the LSC discharge and the resulting constraints on facility operations if the discharge remains in its current location. It is our understanding that the current interim phosphorus limits on the discharge restricts use of the facility at times during the summer. Although it is too early in

the TMDL process to determine final discharge limits, it is highly unlikely that the final TMDL limit would allow an *increase* in the LSC discharge of phosphorus, which would shift even greater reductions on to the remaining sources. So long as the facility is drawing water from one regulatory-defined portion of the lake and discharging to another impaired segment, there will be a discharge limit that constrains operation. However should the outfall be relocated to a discharge point nearer to where the cooling water is withdrawn, this would result in no net increase in phosphorus load to the receiving waterbody segment and could – depending upon the appropriate siting of the discharge – negate the need for *any* phosphorus limit. NYSDEC shares the view that the facility provides tremendous environmental sustainability and greenhouse gas reduction benefits, and we support maximizing those benefits through increased use. The relocation of the outfall could realistically allow for unrestricted use of the facility; this benefit of outfall relocation is not reflected in the report.

As noted above, a full discussion of these issues needs to be deferred until the evaluation and application of the model to develop the TMDL is complete. But we wanted to notify you of some of the Outfall Redesign Report conclusions that caught our eye and that we think warrant further consideration as this process moves forward.

Sincerely,

Jeffrey A. Myers
Bureau Director

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