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Via Electronic Mail

August 23, 2017

Elder Ghigiarelli, Jr.
Deputy Program Administrator, Wetlands and Waterways Program
Water management Administration,
Maryland Department of the Environment
1800 Washington Boulevard, Suite 430, Baltimore, MD 21230
elder.ghigiarelli@maryland.gov.

Re: Application #17-WQC-02, Lower Susquehanna River and Upper Chesapeake Bay, Use I & 2 Waters

Dear Mr. Ghigiarelli,

Thank you for the opportunity to provide comments on this issue. Midshore Riverkeeper Conservancy hereby incorporates by reference the comments of the Chesapeake Bay Foundation and adopts them as our own.

Sincerely,

Matthew Pluta
Choptank Riverkeeper
Midshore Riverkeeper Conservancy

CHESAPEAKE BAY FOUNDATION
*Saving a National Treasure*



Via electronic and first class mail

August 23, 2017

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1800 Washington Boulevard, Suite 430, Baltimore, MD 21230
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**Re: Application #17-WQC-02, Lower Susquehanna River and Upper Chesapeake Bay, Use I & 2 Waters**

**Dear Mr. Ghigiarelli,**

Chesapeake Bay Foundation provides these comments in response to the Maryland Department of the Environment's Public Notice of the Proposed Relicensing of the Conowingo Hydroelectric Project Application for Water Quality Certification (Notice) issued on July 10, 2017. CBF represents over 200,000 members throughout the watershed interested and directly affected by the decision to grant water quality certification to Exelon for a project that will persist over the next 50 years or more. Moreover, we conduct environmental education programs in the Lower Susquehanna and Susquehanna Flats regions, support advocacy and on the ground restoration projects designed to enhance water clarity to the Susquehanna Flats that contribute to the persistence and expansion of submerged aquatic vegetation, a crucial habitat for the bay's blue crabs and many other species.

Thank you for the opportunity to comment on the application for a Water Quality Certification ("WQC") under Section 401(a)(1) of the Clean Water Act for the Conowingo Hydroelectric Project, FERC Project Number 405 ("Conowingo Dam" or "the Dam"). The Chesapeake Bay Foundation (CBF) is committed to fully implementing the Chesapeake Bay Total Maximum Daily Load ("TMDL"), or the Chesapeake Bay Blueprint, to reduce pollution levels by 25 percent for nitrogen, 24 percent for phosphorus, and 20 percent in sediment pollution, Bay-wide[1] by 2025 to make the Bay once more a productive estuary safe for swimming and fishing. This effort requires all six states in the Bay watershed, as well as the District of Columbia, to reduce pollution from every source. CBF recognizes that the Conowingo Dam has played a crucial role in curtailing the sediment pollution that travels down the Susquehanna River and eventually reaches the Bay. However, over time, the Dam's ability to trap pollution has diminished due to sediment build up behind the dam. As discussed below, studies have also shown that the Dam itself has the ability to impact water quality. Therefore, the state of Maryland must ensure that impacts of Conowingo Dam's

[1] U.S Environmental Protection Agency, CHESAPEAKE BAY TMDL, ES-1 (Dec. 2010), *available at* https://www.epa.gov/sites/production/files/2014-12/documents/bay_tmdl_executive_summary_final_12.29.10_final_1.pdf

operations on downstream water quality are addressed and mitigated as part of the new operating permit. This is why CBF has formally intervened as a party to the Federal Energy Regulatory Commission (FERC) relicensing of the Dam, and submits the following comments regarding the impacts of the Dam on Maryland's water quality. CBF also requests inclusion on the "interested persons" and "service" lists to receive timely notice of all applications, public notices, information and studies, and decisions regarding the Conowingo Dam.

We have focused our comments on the WQC on effects relative to achievement of the water quality standards (i.e., dissolved oxygen, water clarity, chlorophyll a) associated with the Chesapeake Bay TMDL for nutrients and sediment.[2] We defer the general scientific basis for defining project Project impacts from flow regulation, impeding fish passage and trapping coarse sands and gravel on from flow regulation, impeding fish passage and trapping coarse sands and gravels on habitat and designated uses incorporating by reference the more detailed discussion submitted by The Nature Conservancy.

Under the Clean Water Act and applicable Maryland state laws and regulations, a federal permit or license to conduct any activity that may result in any discharge to navigable waters may not be issued unless the state certifies that the activity does not violate State water quality standards or limitations.[3] It is fully within the state's authority to impose more stringent water quality standards than those set by the federal Act,[4] and any WQC must comply with all applicable provisions of the Clean Water Act, including the provisions governing TMDLs.[5] Finally, it is well-established that the alteration of water, including the alteration of movement, flow, circulation, or chemical composition, is included in the Clean Water Act's definition of pollution and is within a State's legitimate interests when considering a WQC.[6] To that end, we disagree with Exelon's contention that the Conowingo project, as proposed, is consistent with applicable Maryland Water Quality Standards. While it is true that the origin of the sediment and nutrients from behind the Dam is mostly from upstream of Conowingo, the Dam does alter the form of these sediments and nutrients and the timing by which they enter the Chesapeake Bay.[7] [8] For example, the Dam changes the grain

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[2] https://www.epa.gov/chesapeake-bay-tmdl

[3] 33 USCS §1341; COMAR 26.08.02.10.

[4] 33 USCS §1370.

[5] 33 USCS 1341(1)(a) requiring a WQC to ensure any discharge "will comply with the applicable provisions of sections 301, 302, 303 [TMDLs], 306, and 307 of this Act…"

[6] *See, e.g., S.D. Warren Co. v. Maine Board of Environmental Protection,* 547 US 370 (2006) (finding that a dam's alteration of water movement and flow fell under the Clean Water Act's definitions of pollution and discharge).

[7] Lawrence P. Sanford, Stephanie Barletta, UNCES Horn Point Laboratory, Cambridge, MD, Grace Massey, Kelsey Fall, Virginia Institute of Marine Science, Gloucester Point, VA. The Impacts of Conowingo Particulates on the Chesapeake Bay: Suspended Particle Size, Settling and Transport. UMCES Contribution TS-705-17. Final Report to Exelon Generation and Gomez and Sullivan, July 2017.

[8] Cornwell, J., M. Owens, H. Perez, and Z. Vulgaropulos. 2017. The Impact of Conowingo Particulates on the Chesapeake Bay: Assessing the Biogeochemistry of Nitrogen and Phosphorus in

size profile of downstream sediments, preferentially passing finer sediments that tend to stay in suspension longer, with potential negative effects on downstream water clarity and underwater grasses. Coarser materials are preferentially retained by the Dam, again with negative downstream impacts as these materials are needed to build and protect desirable habitats, like islands and shorelines, for fish spawning and rearing, mussels and Submerged Aquatic Vegetation, for fish spawning and rearing, mussels and Submerged Aquatic Vegetation. In addition, scouring events caused by high flows mean more nutrients and sediments will flow downstream than are attributed to upstream sources. These are all incremental impacts directly, indirectly, or cumulatively caused by Conowingo Dam's impoundment and artificial release of the Susquehanna River.

Of particular relevance to the WQC are the findings of the Lower Susquehanna River Watershed Assessment[9] (LSRWA). The LSRWA evaluated the impact of scouring events on downstream water quality, namely additional loads of nutrients, as well as effects on dissolved oxygen (DO), water clarity, and chlorophyll a concentrations. These findings were reviewed and confirmed at a more recent workshop sponsored by the Chesapeake Bay Program Scientific and Technical Advisory Committee. [10] As detailed below, modeling results indicate detectable negative effects on these water quality parameters and these effects are more severe if the scour event occurs during the summer. Results also suggest that nutrients from scour events deposit downstream and may contribute to negative water quality impacts for years, though these effects diminish over time.

The study included the coupling of multi-dimensional hydrodynamic and eutrophication models that included estimates of sediment transport for multiple grain sizes and of diagenetic processes in bottom sediments. Both of these features were deemed important in estimating the effect of reservoir scour on downstream water quality. These models were used to run several different scenarios; probably the most relevant to downstream impacts are scenarios 4 through 6 (see Table 4-9 in the Lower Susquehanna River Watershed Assessment report).

Scenario 4 assumed that the Watershed Implementation Plans (WIPs) were not in effect, the reservoirs had all reached dynamic equilibrium and there is a winter scour event. Results of this scenario indicated a scour event would add 7,800 tons of particulate (organic) nitrogen and 2,600 tons of particulate phosphorus, in addition to watershed loads, over a 4-day period.

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Reservoirs and the Chesapeake Bay. UMCES Contribution TS-703-17. Final Report to Exelon Generation and Gomez and Sullivan. July 28, 2017.

[9] Lower Susquehanna River Watershed Assessment, Maryland and Pennsylvania, May 2015 Final. Found at: http://dnr.maryland.gov/waters/bay/Pages/LSRWA/Final-Report.aspx

[10] Linker, L., R. Hirsch, W. Ball, J. Testa, K. Boomer, C. Cerco, L. Sanford, J. Cornwell, L. Currey, C. Friedrichs, R. Dixon. 2016. Conowingo Reservoir Infill and Its Influence on Chesapeake Bay Water Quality. STAC Publication Number 16-004, Edgewater, MD. 51 pp. Found at: http://www.chesapeake.org/pubs/356_Linker2016.pdf

Scenario 5 assumed the WIPs are in full effect, the reservoirs have reached dynamic equilibrium and there is a winter scour event. Additional loads were estimated to be the same as Scenario 4, indicating the amount scoured is not affected by WIP implementation.

Scenario 6 assumes the WIPs are in full effect, the reservoirs are trapping at current condition and there is a scour event that occurs during summer, fall or winter. Additional loads of phosphorus and nitrogen were estimated to be as high as 14,300 tons of nitrogen and 3,180 tons of phosphorus, but these include watershed and scour loads.

It should be noted the additional loads associated with lost capacity and increased scouring are not quantified or offset by any sector under the Chesapeake Bay Blueprint[11] The applicant for the WQC should be held responsible for mitigating loads associated with these scour events, as again, they are proximately caused by the Dam's operation itself.

The water quality effects of these scour events, including effects on water quality standards attainment were also quantified. Scenarios 4 – 6 all indicated increased chlorophyll a concentrations downstream as well as decreases in water clarity. A June storm event had the most impact on water quality, stimulating higher chlorophyll concentrations and decreases in water clarity that extended up to 37 miles downstream of the dam and persisting throughout the summer.
In terms of attainment of the dissolved oxygen standards, the study examined, for each of the 92 TMDL segments and applicable water quality standard, the percent of time and volume that a given water quality criterion (i.e., DO, chlorophyll, water clarity) was outside an allowed exceedance. Attaining DO standards in the volume-time integral represented by deep-channel water from June to September is a main driver of the Bay TMDL.

Scenario 4 indicates that a reservoir scour event occurring in the winter places an additional 1 percent of the volume-time integral outside of DO standards in segments CB4MH (in the mainstem of the Bay) and PATMH (the mesohaline part of the Patapsco River). Scenario 5 indicates an increase of 1% nonattainment in segments CB4MH, EASMH (the Eastern Bay), and CHSMH (the lower part of the Chester River). Scenario 6 indicated that a June high-flow storm event has the most detrimental influence on deep channel DO followed by a storm of the same magnitude in January, and then October. The June event scenario had an estimated increase in deep-channel DO nonattainment of 1%, 4%, 8%, and 3% in segments CB3MH (in the mainstem of the Bay, north of CB4MH), CB4MH, CHSMH, and EASMH, respectively when compared to the No Storm Scenario. The January storm condition had an estimated increase in deep-channel DO nonattainment of 1%, 1%, 2%, and 2% in segments CB3MH, CB4MH, CHSMH, and EASMH, respectively, when compared to the No Storm Scenario.

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[11] U.S. Environmental Protection Agency Chesapeake Bay Program Office, *Lower Susquehanna River Assessment Appendix D: Estimated Influence of Conowingo Infill on the Chesapeake Bay Water Quality*. Spetember 25, 2014. Page 31-32 (finding that TMDL allocations may need adjustment when Conowingo Dam is found to have reached dynamic equilibrium, and identifying further research and analysis needs in order to "advance considerably the understanding of the influence Conowingo Reservoir infill has on Chesapeake water quality").

For the October high-flow event, the estimated deep-channel DO saw increased nonattainment of 2% and 1% in CHSMH and SEVMH (Severn River), respectively, compared to the No Storm Scenario.
Although these percentages may seem small, Clean Water Act regulatory requirements prohibit any increase in nutrient loads that causes diminishment of water quality standard achievement.[12]

More recently, Exelon agreed to fund additional studies at the request of the State of Maryland that, among other things, would lead to better understanding of the form, fate, and effects of nutrients that are scoured from behind the Dam. These studies, conducted by the University of Maryland Center for Environmental Studies (UMCES), were to be used in conjunction with those from the LSRWA to determine the extent and magnitude of downstream water quality impacts. Final reports from these studies were not available for stakeholders to review when the Department initiated public comment for the water quality certification process.

CBF requested an extension to the public comment period based on the missing information, and the UMCES studies were released on July 28, 2017 within the extended comment period. Of particular relevance is the work by Cornwell et al. [13] One key finding is that much of the phosphorus released during scour is, initially, in a form that is not bioavailable (due to binding with iron). However, some particles do settle in the mid-Bay and others will eventually be transported there. Under conditions in the mid-Bay, particularly anoxia, this phosphorus can become available for uptake by phytoplankton and, therefore, can contribute to eutrophic conditions, including depressed DO.

An unexpected result from Cornwell et al. 2017 is the finding of a substantial amount of adsorbed ammonium in sediments in the Conowingo Pond, at concentrations exceeding those in similar sediments downstream. This ammonia could be mobilized during scour events (or during dredging) adding nitrogen loads to downstream waters. Both these findings regarding increased mobilization of nutrients during scour events affirm the findings of the LSRWA study regarding increases in the nonattainment of the DO standard in some segments downstream.

The Maryland Department of the Environment (MDE) should include these findings in their water quality certification. Specifically, we recommend that additional modeling scenarios, similar to those conducted as part of the LSRWA study, be run with the new information from the UMCES study about the fate, transport, form, and concentrations of nutrients and sediments from the Conowingo Reservoir, to assess the impact on water quality standards attainment. In addition, we believe MDE should also consider projected effects of climate

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[12] 40 CFR §122.4.
[13] Cornwell, J., M. Owens, H. Perez, and Z. Vulgaropulos. 2017. The Impact of Conowingo Particulates on the Chesapeake Bay: Assessing the Biogeochemistry of Nitrogen and Phosphorus in Reservoirs and the Chesapeake Bay. UMCES Contribution TS-703-17. Final Report to Exelon Generation and Gomez and Sullivan. July 28, 2017.

change on the water quality response, given the long-term duration of the permit. Of particular interest is the projected increase in the frequency and intensity of storms, as these will mean more scour events, and higher temperatures that could affect DO. [14] The Chesapeake Bay Program is currently working to include climate change into its models and MDE could leverage this ongoing work for this evaluation. The scenarios should include critical conditions such as severe storms during the summer as this is when impacts are likely to be the greatest. The uncertainties of impact noted above are surely sufficient to seek adequate scientific resolution prior to issuing a WQC, and the studies sought are reasonably implemented modeling runs, not the multi-year work of the previous research.
In its application, Exelon does not propose any mitigation for its downstream water quality impacts. They cite the LSRWA findings, but ignore those that specifically address impacts to downstream water quality. As described above, operation of the Conowingo Dam alters the form of nutrients and the timing by which they enter the Chesapeake Bay and these changes cause incremental effects on DO and the achievement of water quality standards. Consequently, appropriate mitigation measures should be required as a condition for a new license to Exelon for the operation at Conowingo Dam in order to provide reasonable protection to Maryland waters.

As part of the WQC process under the Clean Water Act, Maryland is responsible for setting forth any effluent limitations or any other conditions or limitations and monitoring requirements that may be necessary to assure compliance with the Act and the Chesapeake Bay TMDL.[15] Federal regulations explicitly prohibit issuing such certifications where the conditions of the permit do not provide for compliance with water quality standards or where conditions cannot ensure compliance with applicable water quality requirements of affected states.[16] As has been demonstrated, scour events result in violation of downstream water standards and the WQC must ensure that there are sufficient offsets to mitigate these impacts.

These measures could include financial assistance for nutrient reduction projects upstream of the Dam, in Maryland, Pennsylvania, and New York such as agricultural practices, wastewater treatment plant upgrades, green infrastructure, and restoration of the system's "natural filters" such as propagation of freshwater mussels in fresh water and oyster restoration downstream. Such mitigation efforts should result in pollution reductions that are

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[14] Johnson, Z., M. Bennett, L. Linker, S. Julius, R. Najjar, M. Mitchell, D. Montali, R. Dixon. 2016. The Development of Climate Projections for Use in Chesapeake Bay Program Assessments. STAC Publication Number 16-006, Edgewater, MD 52 pp. Available here: http://www.chesapeake.org/pubs/360_Johnson2016.pdf

[15] 33 USCS §1341(d) ("Any certification provided under this section shall set forth any effluent limitations and other limitations, and monitoring requirements necessary to assure that any applicant for a Federal license or permit will comply with any applicable effluent limitations and other limitations, under section 301 or 302 of this Act [33 USCS § 1311 or 1312], standard of performance under section 306 of this Act [33 USCS § 1316], or prohibition, effluent standard, or pretreatment standard under section 307 of this Act [33 USCS § 1317], and with any other appropriate requirement of State law set forth in such certification, and shall become a condition on any Federal license or permit subject to the provisions of this section").

[16] 40 CFR §122.4.