



pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

WATERWAYS & WETLANDS PROGRAM

June 3, 2014

Colleen E. Hicks
Manager Regulatory and Licensing – Hydro
Exelon Power
300 Exelon Way
Kennett Square, PA 19346

Re: 401 Water Quality Certification
Exelon Generation Company, LLC
DEP File No. EA 36-033
FERC Project P-2355-018

Dear Ms. Hicks:

Enclosed is the Section 401 Water Quality Certification for the Muddy Run Pumped Storage Facility. Please review the certification so that you are aware of all its terms and conditions. These conditions will become part of the FERC license for this project.

Any person aggrieved by this action may appeal, pursuant to Section 4 of the Environmental Hearing Board Act, 35 P.X. Section 7514, and the Administrative Agency Law, 2 Pa. C.S. Chapter 5A, to the Environmental Hearing Board, Second Floor, Rachel Carson State Office Building, 400 Market Street, PO Box 8457, Harrisburg, PA 17105-8457, 717-787-3483. TDD Users may contact the Board through the Pennsylvania Relay Service, 800-654-5984. Appeals must be filed with the Environmental Hearing Board within 30 days of receipt of written notice of this action unless the appropriate statute provides a different time period. Copies of the appeal form and the Board's rules of practice and procedure are also available in braille or on audiotape from the Secretary to the Board at 717-787-3483. This paragraph does not, in and of itself, create any right of appeal beyond that permitted by applicable statutes and decisional law.

IF YOU WANT TO CHALLENGE THIS ACTION, YOUR APPEAL MUST REACH THE BOARD WITHIN 30 DAYS. YOU DO NOT NEED A LAWYER TO FILE AN APPEAL WITH THE BOARD.

IMPORTANT LEGAL RIGHTS ARE AT STAKE, HOWEVER, SO YOU SHOULD SHOW THIS DOCUMENT TO A LAWYER AT ONCE. IF YOU CANNOT AFFORD A LAWYER, YOU MAY QUALIFY FOR FREE PRO BONO REPRESENTATION. CALL THE SECRETARY TO THE BOARD (717-787-3483) FOR MORE INFORMATION.

Sincerely,

Scott Williamson
Program Manager
Waterways & Wetlands Program

SW/MDP/lmt

cc: Shelia Eyler at USFWS Chesapeake Bay Field Office
Shawn Seaman at MDNR
Joshua Tryniewski at PFBC
Drew Dehoff at SRBC

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**WATER QUALITY CERTIFICATION
FOR MUDDY RUN PUMPED STORAGE PROJECT
AND RELATED MITIGATION
FERC PROJECT NO. P-2355-018**

EA 36-033 : EXELON GENERATION COMPANY, LLC ,

**Colleen E. Hicks
Manager Regulatory and Licensing, Hydro
Exelon Generation Company, LLC
300 Exelon Way
Kennett Square, PA 19346**

**Drumore, Martic and Peach Bottom Townships
York and Lancaster Countys
United States Army Corps Of Engineers, Baltimore District**

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**PENNSYLVANIA WATER QUALITY CERTIFICATION
FOR MUDDY PUMPED STORAGE PROJECT
AND RELATED MITIGATION
FERC PROJECT NO. 2355-018**

I. PROJECT DESCRIPTION

A. EA 36-033:

The Muddy Run Pumped Storage Project (“Muddy Run”) is an existing 800 MW (nameplate capacity) hydroelectric project located on the eastern shore of Conowingo Pond on the Susquehanna River in Lancaster County that has operated since 1966. Muddy Run is owned and operated by Exelon Generation Company, LLC (“EXELON”), a wholly-owned subsidiary of Exelon Corporation. EXELON has filed a Final License Application (“FLA”) for Muddy Run with the Federal Energy Regulatory Commission (“FERC”) seeking to relicense the project for a 46-year term.

Muddy Run is located on the Susquehanna River in Martic and Drumore Townships, Lancaster County. EXELON proposes to continue operation of the facility, including the main dam embankment, east dike, recreation pond dam and spillway, canal dam embankment, upper reservoir spillway, intake structure, powerhouse, primary transmission line, 900-acre Muddy Run Power Reservoir and 100-acre recreation lake (Holtwood, PA Quadrangle; Latitude: 39° 48’ 33.34”N Longitude: -76° 17’ 49.29” W). Continued operation of the facility is expected to have entrainment effects on resident and migratory fish (including bluegill, rock bass, smallmouth bass, white crappie, channel catfish, walleye, American shad, alewife and blueback herring) as well as American eel and other aquatic species.

EXELON will mitigate the impacts on these aquatic resources by implementing a program to trap approximately one million (1,000,000) eels per year from below the Conowingo Dam in Maryland and in the Octoraro Creek and transport them to multiple locations in the Susquehanna Watershed in Pennsylvania. EXELON will also provide five hundred thousand dollars (\$500,000.00) per year for habitat/sediment improvement projects in Lancaster and York Counties. This will include the implementation of agricultural pasture and barnyard best management practices to address sediment introduction, stream improvement projects, riparian buffers and small dam removal projects. This mitigation will continue through 2030 when it will be revisited through a re-evaluation of the water quality certification. Finally, EXELON will assist the SRBC with modeling efforts in the Susquehanna River.

EXELON will also achieve certain fish passage targets for migratory fish and eels passing through the project area, and will take corrective action if the fish passage targets are not achieved. EXELON will conduct dissolved oxygen testing and endangered species evaluation.

This water quality certification will be revised in 2030, as appropriate, to address demonstrated project impacts and subject to the provisions of this certification, to establish requirements consistent with Section 401 of the Clean Water Act, 33 U.S.C Section 1341.

II. PROVISIONS APPLICABLE TO ALL WATER QUALITY CERTIFICATION CONDITONS

A. Final Agency Action. Notwithstanding any other provision of this certification to the contrary, any action taken by the Pennsylvania Department of Environmental Protection (“DEP” or “Department”) in response to any submission

required or authorized under this certification, any action taken by DEP to revise, modify, reopen, or revoke this certification, or any action taken by DEP to require EXELON to undertake any action that affects EXELON's personal or property rights, privileges, immunities, duties, liabilities or obligations including, but not limited to, any action to approve, approve with conditions, disapprove, modify or establish operational or structural changes, plans, schedules, studies or monitoring programs shall constitute a "final agency action" and may be challenged in accordance with applicable law.

B. Operational modifications are a component of the adaptive management system to implement the approved plans, including the performance requirements of this certification. Operational modifications include modifications of seasonal and daily periods of operation of the project detailing how the plant shall be operated during fish passage season and throughout the year including the sequencing of pump and turbine start-up and operation, procedures for monitoring and reporting flows as well as any other necessary provisions for plant operation to meet the provisions of this certification, procedures for monitoring and reporting on the operation of the facility or other provisions of this certification or any measures, procedures for start-up and shut-down, and procedures for use in case of emergencies and project outages affecting the provisions of this certification. No substantial alteration or addition to the Muddy Run Project not in conformity with the plans approved by the FERC shall be made to any project works constructed under the Federal Power Act without the prior approval or authorization of the FERC.

C. Structural modifications are changes to project infrastructure, pursuant to the provisions of this certification. No substantial alteration or addition to the Muddy

Run project not in conformity with the plans approved by the FERC shall be made to any project works constructed under the Federal Power Act without the prior approval or authorization of the FERC.

D. Resource Agencies – “Resource Agencies” shall mean the DEP, Pennsylvania Fish and Boat Commission (“PFBC”), Pennsylvania Department of Conservation and Natural Resources (“DCNR”), Susquehanna River Basin Commission (“SRBC”), Maryland Department of Natural Resources (“MDNR”), and United States Fish and Wildlife Service (“USFWS”).

E. General Requirements

1. The Muddy Run project shall at all times be subject to inspection by representatives of DEP. DEP reserves the right to require such operational and structural changes as may be considered necessary to assure compliance with the Federal Water Pollution Control Act (“Clean Water Act”), the Pennsylvania Clean Streams Law, the Dam Safety and Encroachments Act, and other appropriate requirements of state law. Subject to applicable law, DEP further reserves the right to alter this certification for failure to comply with the Clean Water Act and/or appropriate requirements of the state law, an administrative order of DEP, or a term or condition of this certification.

2. Any additional information or modifications to any plans or schedules required under this certification requested by the DEP shall be submitted within the time frame established by the DEP in writing.

F. Reasonable Assurance of Compliance – DEP supports issuance of a 46 year license for the project. Because certain conditions of this certification expire in 2030, because of changes in the characteristics of the Susquehanna River that will occur

by 2030, and because the FERC licenses for the Holtwood Hydroelectric Facility and the Safe Harbor Hydroelectric Facility expire in 2030, this certification will be revised in 2030, as necessary to address demonstrated project impacts and subject to the provisions of this certification, to establish requirements consistent with Section 401 of the Clean Water Act, 33 U.S.C Section 1341.

III. FISH PASSAGE

A. General Requirements

1. Fish Passage Operating Procedures (“FPOP”)

- a. By January 15, 2015, EXELON shall submit a FPOP to the DEP for review and approval. The FPOP will describe existing baseline operations during fish passage season, including schedules for routine maintenance, procedures for routine operation (including: seasonal and daily periods of operation, pump and turbine operations), sequencing of pump and turbine start-up and operation, procedures for monitoring and reporting flows, procedures for monitoring and reporting on the operation of the facility, procedures for start-up and shut-down, and procedures for use in case of emergencies and project outages significantly affecting the conditions of this certification.
- b. EXELON shall implement the FPOP consistent with the approval of the DEP. EXELON shall provide written documentation to the Resource Agencies that operational

personnel have reviewed and understand the FPOP signed by the operations manager of the Project.

- c. Copies of the approved FPOP and all modifications will be provided to the Resource Agencies.
- d. By December 31 of each year, EXELON shall provide an annual report to the Resource Agencies detailing: the implementation of the FPOP, including any deviations from the FPOP and a process to prevent those deviations in the future; any proposed modifications to the FPOP, or in the case of emergencies or project outages, the steps taken by EXELON to minimize adverse effects on fisheries including any proposed modifications to those steps to further enhance their effectiveness in the future. EXELON shall offer to meet with the Resource Agencies by January 31 of each year unless a different date is mutually agreed upon by EXELON and the Resource Agencies. Any required modifications to the FPOP shall be submitted to the Resource Agencies within 45 days of receipt of a request for the modification unless a longer period is approved by the DEP. The modifications to the FPOP shall be implemented consistent with the approval of the DEP. In the event EXELON fails to submit the modifications as required by this paragraph, the DEP, in consultation with

the other Resource Agencies, may establish modifications and EXELON shall implement the modifications consistent with the approval of the DEP.

B. American Shad Passage

1. Upstream Shad Passage

- a. Cooperation with Holtwood. If the Holtwood Hydroelectric Facility fails to meet its Tier I upstream shad passage target described and included in the 401 Water Quality Certification for the Amended Holtwood Hydroelectric Facility, and DEP determines that EXELON's operation of the Muddy Run Project is a proximate cause of Holtwood failing to meet the Tier 1 target, EXELON shall meet with the Resource Agencies to establish and implement a plan and schedule for a radio telemetry study or equivalent (Tier II Study) of American shad passage and behavior within the Muddy Run project boundary. This meeting shall occur within one month of the DEP's determination that Holtwood failed to meet its Tier 1 upstream shad passage target or such longer time as established by the DEP in writing.
- b. Evaluation of Muddy Run Shad Passage. If EXELON is a proximate cause of Holtwood's failure to meet its Tier I upstream shad passage target, EXELON shall develop a

radio telemetry study plan and schedule or equivalent to determine: (1) the percentage of American shad that enter Muddy Run project at the northern tip of Sicily Island area and subsequently exit the Muddy Run project area at the southern tip of Deepwater Island; and (2) any delay or impedance of shad passage attributable to the redevelopment of the Holtwood Facility. EXELON shall coordinate development of this plan with the Holtwood Hydroelectric Facility and the Conowingo Hydroelectric Facility. The radio telemetry study shall be designed to insert the transmitter at the Conowingo facility or at such other location(s) approved by the DEP.

- c. Within two months of the meeting described in Paragraph III.B.1.a. or such longer period approved by the DEP in writing, EXELON shall submit the fish passage study plan and schedule to the Resource Agencies for review and approval by DEP. EXELON shall implement the plan according to the schedule therein and consistent with the approval of the DEP. In the event EXELON fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and EXELON shall implement that plan and schedule consistent with the

approval of the DEP. EXELON shall continue implementation of a fish passage study for a minimum of four years or such other time period as required by the DEP in consultation with the other Resource Agencies.

EXELON shall provide an annual report of the monitoring results of the fish passage study by December 31st of each year.

- d. At the end of the four-year study period, or such longer time as established by the DEP, if the results indicate that, as a result of Muddy Run operations, less than 88% of the American shad that enter the Muddy Run project waters at the northern tip of Sicily Island exit the Muddy Run project waters at the southern tip of Deepwater Island, EXELON shall propose a plan and schedule for operational modifications to enhance fish passage at the project. EXELON shall not be responsible for mitigating any impacts attributable to PPL Holtwood. This plan and schedule shall be submitted to the DEP as an amendment to the FPOP for the following year. EXELON shall implement the plan and schedule consistent with the approval of the DEP. In the event EXELON fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies,

may establish a plan and schedule and EXELON shall implement that plan and schedule consistent with the approval of the DEP.

- e. The average of the two highest years in the monitoring period will be used determine whether the 88% fish passage percentage is achieved. If EXELON implements operational modifications, only those years following the operational modifications shall be considered to determine whether the 88% passage percentage is achieved.
- f. If at the end of the monitoring period, or such longer time as established by the DEP, the results indicate that the operational modifications have resulted in less than 88% of the American shad that enter the Muddy Run project waters pass through the Project, EXELON shall propose a plan and schedule for mitigation, as defined in 25 Pa. Code Section 105.1 for the failure to achieve the 88% fish passage target. This mitigation shall be: (1) in addition to the compensatory mitigation described in this certification; and (2) reasonably related and proportional to the identified impact. This plan and schedule shall be submitted to the Resource Agencies within 6 months from the end of the monitoring period. EXELON shall implement the plan and schedule consistent with the approval of the DEP. In the

event EXELON fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and EXELON shall implement that plan and schedule consistent with the approval of the DEP.

2. Downstream Shad Passage

- a. Consistent with the relicensing studies for Muddy Run, by January 15, 2015, EXELON shall submit a plan and schedule to provide for 95% survival of the juvenile American shad and 80% survival of the adult American shad that pass through the project area. The schedule shall provide for full implementation of the plan by 2015. EXELON shall implement the approved plan and schedule. If EXELON fails to submit the plan, the DEP shall develop a plan and schedule, in consultation with the other resource agencies, and EXELON shall implement that plan and schedule.
- b. By February 15, 2026 or such later date approved by the DEP in writing, EXELON shall submit a plan to measure the passage of American shad moving downstream past the project to the DEP for approval (“Discrete Passage Study”). EXELON shall implement the plan to measure the passage of American shad moving downstream past the project

according to the schedule and consistent with the approval of the DEP. In the event EXELON fails to submit the plan and schedule required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and EXELON shall implement that plan and schedule consistent with the approval of the DEP.

- c. EXELON shall, in accordance with the plan, conduct the Discrete Passage Study. EXELON shall provide a report of the Discrete Passage Study within 180 days of its completion or such later date approved by the DEP in writing to the Resource Agencies.
- d. If the results of the Discrete Passage Study indicate that EXELON can operate the Muddy Run project so that EXELON achieves at least 95% passage of the juvenile American shad and 80 % passage of the adult American shad that pass through the project area based on the likelihood of a shad being exposed to typical pumping operations and becoming entrained, then EXELON shall incorporate into the annual FPOP any required operational measures or protocols to meet the established percentages. These procedures will be subject to review at the annual meeting for the FPOP.

e. If the results of the Discrete Passage Study do not indicate that the project can be operated to achieve at least 95% passage of juvenile American shad and 80% passage of adult American shad based on the likelihood of a shad being exposed to typical pumping operations and becoming entrained, EXELON shall propose a plan and schedule for mitigation, as defined in 25 Pa. Code Section 105.1, for the failure to achieve the fish passage target or targets. This mitigation shall be: (1) in addition to the compensatory mitigation described in this certification; and (2) reasonably related and proportional to the identified impact. This plan and schedule shall be submitted to the Resource Agencies within 6 months from the end of the monitoring period or such later date approved by the DEP in writing. EXELON shall implement the plan and schedule consistent with the approval of the DEP. In the event EXELON fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and EXELON shall implement that plan and schedule consistent with the approval of the DEP.

C. Eel Passage

1. Upstream Eel Passage

The terms and conditions of the EXELON American Eel Passage Plan for the Muddy Run Pumped Storage Hydroelectric Project (P-2355-018), attached hereto as Appendix 1, are incorporated as if fully set forth herein.

2. Downstream Eel Passage

- a. The trigger date for initiation of downstream eel passage studies shall be the date on which the DEP, in consultation with the other Resource Agencies, determines that available data indicates that eels are present upstream of the project or other upstream areas in numbers appropriate to require downstream eel passage. This trigger date shall not occur prior to October 1, 2026 in order for the trapping and transport program to have sufficient time to reestablish a significant eel population.
- b. EXELON shall achieve at least 85% eel passage through the project area based on the likelihood of an American eel being exposed to typical pumping operations and becoming entrained.
- c. Within six months of the trigger date in Paragraph (a), or such later date approved by the DEP in writing, EXELON shall submit a plan to conduct a passage study to the Resource Agencies. The plan shall be designed to demonstrate continued compliance with the 85% fish passage target. The plan shall

include radio telemetry studies or such other studies approved by the DEP in consultation with the other Resource Agencies. EXELON shall implement the plan according to the schedule consistent with the approval of the DEP. In the event EXELON fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and EXELON shall implement that plan and schedule consistent with the approval of the DEP.

- d. The study shall be initiated within 1 year of the trigger date unless a different time frame is approved by the DEP in writing. EXELON shall provide a report of the study results within 180 days of the date of completion of the study.
- e. If the results of a discrete passage study indicate that EXELON can operate the project so that EXELON achieves at least 85% passage of the American eel that pass through the project area based on the likelihood of an American eel being exposed to typical pumping operations and becoming entrained, EXELON shall incorporate into the FPOP any operational measures needed to meet this percentage. These procedures will be subject to review at the annual FPOP meeting.
- f. If the results of the studies do not indicate that the project can be operated to achieve at least 85% passage of American eel

based on the likelihood of an American eel being exposed to typical pumping operations and becoming entrained, EXELON shall propose a plan and schedule for mitigation, as defined in 25 Pa. Code Section 105.1, for the failure to achieve the 85% eel passage target. This mitigation shall be: (1) in addition to the compensatory mitigation described in this certification; and (2) reasonably related and proportional to the identified impact. This plan and schedule shall be submitted to the Resource Agencies within 6 months from the end of the monitoring period or such later date approved by the DEP in writing. EXELON shall implement the plan and schedule consistent with the approval of the DEP. In the event EXELON fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and EXELON shall implement that plan and schedule consistent with the approval of the DEP.

D. Resident Fish Passage

1. Resident fish species include all fish species that occur in the Susquehanna River excluding anadromous and catadromous fish.
2. From 2015 through 2030, EXELON shall implement the mitigation measures described in Section VI to compensate for the entrainment of resident fish species.

IV. DISSOLVED OXYGEN (“DO”)

A. Dissolved Oxygen Limitation.

1. EXELON shall operate the project in such manner that it does not cause a violation of the dissolved oxygen criteria in the DEP water quality standards (currently a minimum daily average dissolved oxygen concentration of 5 mg./l. and a minimum of 4 mg./l.) at a location downstream of Muddy Run.

2. To assess compliance with Section IV. A. 1. above, EXELON shall, at DEP’s request but no earlier than November 1, 2027 submit a DO monitoring plan to the DEP. The plan shall propose a plan and schedule for monitoring dissolved oxygen in the Conowingo Reservoir below the project during the months of April through September for a period sufficient to characterize the impact of the project operations on DO levels. Appropriate flow and temperature criteria suitable to trigger the two year period will be developed in consultation with DEP. Such studies will be developed after consultation with the owner of the upstream Holtwood Project such that any water quality impacts of the Muddy Run facility can be isolated. The plan shall include data collection, analysis and reporting.

3. EXELON shall implement the plan and schedule as approved by the DEP.

4. If the monitoring conducted under the plan identifies violations, defined as meeting less than 99% of the daily average or instantaneous standards (or the alternative regulatory standard in place at the time of the study), resulting from operation of the project, EXELON shall, within 30 days, consult with the DEP and within 90 days submit a plan to resolve any DO violations resulting from operation of the project.

5. In the event EXELON fails to submit the DO monitoring plan as required by Section IV. A. 2., the DEP, in consultation with the other Resource Agencies, may establish a plan and EXELON shall implement the plan consistent with the approval of DEP.

V. ENDANGERED SPECIES AND SPECIES OF SPECIAL CONCERN

A. Once every 10 years throughout the term of the license or such longer period approved by the DEP in writing, EXELON shall conduct an evaluation of all state and federal endangered or threatened species that may be present within the project boundary.

B. Where that evaluation identifies the presence, critical habitat, or critical dependence of endangered species, EXELON shall propose a plan and schedule to the Resource Agencies to ensure protection of the endangered or threatened species within 180 days from completing the evaluation. EXELON shall implement the plan and schedule as approved by the DEP.

C. In the event EXELON fails to submit the plan and schedule as required by Section V. B., the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and EXELON shall implement that plan and schedule consistent with the approval of the DEP.

VI. COMPENSATORY MITIGATION

A. Habitat Improvement Projects

1. By October 1 of each year from 2014 through 2030, EXELON shall provide a total of FIVE HUNDRED THOUSAND DOLLARS (\$500,000.00) annually in compensatory mitigation to the Lancaster County Conservation District

("LCCD"), the York County Conservation District ("YCCD") and the PFBC, or to such other conservation district, resource agency or 501(c)(3) organization as directed by the DEP, for the implementation of agricultural pasture and barnyard best management practices to address sediment introduction and other habitat improvement projects including small dam removals ("HIPs").

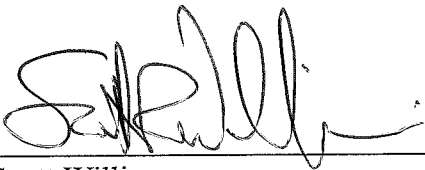
2. This annual compensatory mitigation shall be by corporate checks, or the like, one made payable to the LCCD in the amount of TWO HUNDRED TWENTY FIVE THOUSAND DOLLARS (\$225,000.00), one made payable to the YCCD in the amount of TWO HUNDRED TWENTY FIVE THOUSAND DOLLARS (\$225,000.00) and one made payable to the PFBC in the amount of FIFTY THOUSAND DOLLARS (\$50,000.00) for HIP funding in Lancaster or York Counties or in such other combination or to such other entities as the PADEP shall direct. In addition, by March 1, 2014, EXELON shall provide a total FIFTY THOUSAND DOLLARS (\$50,000) to the PFBC to be used for HIPs in Lancaster and York Counties. EXELON and DEP shall receive from LCCD, YCCD and PFBC an annual accounting of fund expenditures. The funds shall be deposited by the LCCD, the YCCD and the PFBC into a special non-lapsing interest bearing account established and to be used only for the HIPs required by this Water Quality Certification ("Exelon HIP Funds"). Funds provided to the PFBC shall be used solely for dam removal projects.

DEP shall ensure that each project proposed by the LCCD, the YCCD and the PFBC shall be submitted to the DEP South-central Regional Office Waterways and Wetlands Program Manager, or the successor position, for approval. No single project shall receive more than \$75,000.00 in compensatory mitigation funding from the Exelon

HIP Fund. Funding priority shall be given for projects that include stream forested buffers of at least 50 feet in width and wetland creation projects. Project funding shall not include any indirect administrative costs and, except where specifically authorized by the DEP, shall not include direct administrative costs. In no case shall direct administrative costs be greater than 5% of the project funding. At EXELON's option, and subject to land owner approval, for each project signage shall be displayed acknowledging EXELON's funding of the habitat improvement.

B. Flow Modeling

EXELON shall provide the version of the Lower Susquehanna River OASIS Model to the Susquehanna River Basin Commission as provided in the "Letter Agreement Addressing Exelon's Provision of an OASIS Model to SRBC" dated November 19, 2013 and attached to this certification as Appendix 2.



Scott Williamson
Program Manager
Waterways and Wetlands Program

6-3-14
Date

PENNSYLVANIA WATER QUALITY CERTIFICATION EA 36-033

APPENDIX 1

**Exelon Generation
American Eel Passage Plan**

Muddy Run Pumped Storage Hydroelectric Project (P-2355-018)

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- IV. Upstream Passage (2031 - Term of New License)**

I. Introduction

Pursuant to the Federal Power Act, Exelon Generation (Exelon) filed new license applications with the Federal Energy Regulatory Commission (FERC) in August 2012 for the Muddy Run Pumped Storage Hydroelectric Facility (Muddy Run) and the Conowingo Hydroelectric Project (Conowingo). This American Eel Passage Plan (“Eel Plan”) is a condition of, and incorporated into, the Water Quality Certification for the Muddy Run Project. Under Section 401(d) of the Clean Water Act, the Eel Plan becomes a condition of the FERC license for the Muddy Run project.

II. Eel Passage Advisory Group

To inform implementation of the Eel Plan, Exelon will establish an Eel Passage Advisory Group (EPAG) by May 1, 2014. EPAG will be chaired by Exelon and composed of a representative from each of the following (collectively, the “Resource Agencies”): the Pennsylvania Department of Environmental Protection (PADEP), Pennsylvania Fish and Boat Commission (PAFBC), United States Fish and Wildlife Service (USFWS), the Maryland Department of Natural Resources (MDNR), Maryland Power Plant Research Project (PPRP) and the Susquehanna River Basin Commission (SRBC). Each designated representative shall be knowledgeable of American eel, the Susquehanna River, and ongoing fisheries and other related resource programs being implemented in the Lower Susquehanna River (*e.g.*, American shad restoration).

III. Upstream Passage for American Eel (2015-2030)

Consistent with the implementation plan set forth below, Exelon will trap, hold and transport American eels from the Conowingo Dam and transport them to designated points in the Susquehanna River watershed consistent with the level of effort established and described in this plan. Any trapping, holding, transportation or monitoring of eels or other eel related activities addressed in this plan that occurs in Maryland waters is expressly subject to any permits, licenses or authorizations that may be required by the State of Maryland related to such activities.

A. Trapping

Subject to required regulatory approvals, Exelon will design, install and operate an eel trapping facility along the western shore of the Conowingo Dam near the location of the current USFWS trapping location and facility, unless an alternate location is approved by the PADEP and MDNR in writing, according to the following schedule, unless an alternative schedule is approved by the PADEP in writing. In the event that the MDNR, USFWS or FERC determine that additional information, revisions, modifications, or amendments are necessary to the plans, specifications or construction activities, then within 60 days of receipt of written notice, Exelon shall submit to the Resource Agencies and FERC such information, revisions or amendments unless a longer period of time is approved by the requesting agency or FERC in writing.

1. Submit complete design plans and specifications for a trapping facility to the Resource Agencies and FERC by October 15, 2015;
2. Hold preconstruction meeting with MD and USFWS within 150 days of approval of the design plans and designs by FERC, MDNR and USFWS;
3. Begin construction within 180 days of receipt of approval of the design plans and specifications by the MDNR and USFWS;
4. Begin operation by May 1, 2017.

Beginning in 2014 and until Exelon's trapping facility along the western shore of the Conowingo Dam is completed, Exelon will work with the USFWS to trap eels using the USFWS trapping facility and will assist in the financial support of the USFWS trapping facility through a payment of \$20,000 per year to an entity approved by the PADEP with the capability of providing financial support to the USFWS Maryland Fisheries Resource Office for the eel trapping program. This payment will be made by May 1 of each year. In 2014, Exelon will participate in this effort using USFWS facilities, including the USFWS trapping facility, tanks and trucks. Beginning May 1, 2015, or such later date approved by the PADEP and MDNR, in writing, Exelon will use its own holding and transport facilities and continue working with the USFWS to trap eels using the USFWS trapping facility. Exelon will begin

operating the program independently, subject to USFWS supervision and input, using its own trapping facility when construction of that facility is completed.

Subject to required regulatory approvals, Exelon also will design, install and operate a temporary eel trapping facility on Octoraro Creek at a location approved by the PADEP in writing according to the following schedule, unless an alternative schedule is approved by the PADEP in writing. In the event that the MDNR, FERC, PADEP or the USFWS determine that additional information, revisions, modifications, or amendments are necessary to the plans, specifications or construction activities, then within 60 days of receipt of written notice, Exelon shall submit to the Resource Agencies and FERC such information, revisions or amendments unless a longer period of time is approved by the requesting agency or FERC in writing.

1. Conduct field evaluation using visual observation, electrofishing and other methods approved by the PADEP and USFWS, in writing, to evaluate and rank trapping locations on Octoraro Creek by September 15, 2014.
2. Submit complete design plans and specifications to the Resource Agencies by November 1, 2014;
3. Hold preconstruction meeting with PADEP and USFWS within 45 days of approval of the design plans and designs by FERC, PADEP and USFWS;
4. Begin construction within 90 days of receipt of approval of the design plans and specifications by PADEP and USFWS;
5. Begin operation by May 1, 2015.

If, after three years of operation, PADEP in consultation with EPAG determines the temporary eel trapping facility at Octoraro Creek is successful, Exelon will design, install, and operate a permanent eel trapping facility at this location in accordance with a schedule established by PADEP in consultation with the other Resource Agencies.

If, after three years of operation, PADEP in consultation with EPAG determines the temporary eel trapping facility at Octoraro Creek is unsuccessful, site-determination studies for an additional permanent trap will be performed beginning in 2017. Congregations of juvenile eels will be documented visually via bi-weekly nighttime surveys during the migration period; the locations surveyed will focus on the East Fish Lift area, the river banks and possibly lower-river tributaries, but will exclude the Conowingo Dam spillway. Based on the results of the site-determination studies, Exelon will design, install, and operate temporary mobile traps to inform the potential location of one additional permanent eel trapping facility. Temporary exploratory traps will be installed and operated at up to five locations determined by PADEP, MDNR and USFWS during 2018 and, if necessary, 2019, to assess the ability to collect sufficient numbers of juvenile eels for the eel passage program. Collection facilities for the temporary site determination study will be similar to those used in the 2011 and 2012 studies conducted by Exelon.

Based on the results of the site-determination studies, Exelon, in consultation with EPAG, will determine if and where an additional permanent eel trap is justified in support of the Eel Passage Program. If a decision is made in 2018 to install an eel trap at the selected location, unless a different date is established by the PADEP, MDNR and USFWS, that trap will be designed and constructed in 2019-2020, and operated beginning in 2021 subject to required regulatory approvals. If a second year of study is needed, the dates would advance by a year. Exelon will not be required to maintain and operate more than two permanent eel traps at any time during the term of the new license.

The collection device(s) for the two permanent eel trapping facilities will consist of a ramp-style trap leading to a collection tank at the top of the ramp. The collection device(s) shall have a capacity to pass 50,000 eels over a 24 hour period accommodating a minimum size of 3 inches. One or more pumping systems will provide attraction flow at the entrance of the ramp, flow in the troughs to allow eels to climb the ramp, and water to the collection and holding tanks. The lower section of the ramp will be designed to have removable covers or grating to allow eels to enter at differing water surface elevations. The ramp will contain two side-by-side troughs to provide redundancy and allow for the potential use of different climbing media in each trough. For the ramp on the western shore, the entrance to the ramp will be designed to accommodate the normal range of tailwater elevation (El. 12 – 25 ft). The additional permanent collection facility will contain elements of the facility on the western shore with the design modified to accommodate local conditions.

The trapping facilities will be operated continuously during the eel migration period from May 1 to September 15. Exelon will monitor and record days fished, hours fished and the weather. Daily counts of eels will be recorded. The method of counting under various capture scenarios will be developed in consultation with the EPAG. Temperature data will be obtained from Monitoring Station 643 (located approximately 0.6 miles below Conowingo Dam near the western shoreline) to examine river temperature in relation to catch rates of juvenile eels. Biweekly subsamples of collected eels will be examined for various life history parameters (e.g., length, weight, and condition factor). A portion of the subsampled eels will be sacrificed and examined for the presence of *Anguillicoloides crassus*.¹ Some of the sacrificed eels will have the otoliths removed and retained for age analysis. *Anguillicoloides crassus* infection rates (proportion of eels infected), the number of parasites per eel, along with associated age, length, and weight data will be reported. Additionally, Exelon will pay to have 60 elvers/year sent to the USFWS or such other entity that the PADEP may approve in writing, for wild fish health screening. The screening shall occur once per year and can occur anytime during the eel upstream passage season.

¹ This introduced parasite has been documented in juvenile eels collected at Conowingo Dam (Minkkinen and Park 2012) and could affect the overall success of adult outmigration due to reduced swimming ability and potentially higher mortality of migrating silver eels (Szekely et al 2009).

B. Holding

Subject to required regulatory approvals, Exelon also will design, install and operate the holding facility for the west shore Conowingo Dam and the Octoraro Creek traps according to the following schedule, unless an alternative schedule is approved by the PADEP in writing. In the event that the MDNR, FERC, PADEP or the USFWS determine that additional information, revisions, modifications, or amendments are necessary to the plans, specifications or construction activities, then within 60 days of receipt of written notice, Exelon shall submit to the Resource Agencies and FERC such information, revisions or amendments unless a longer period of time is approved by the requesting agency or FERC in writing.

1. Submit complete design plans and specifications for holding facilities to the Resource Agencies by April 15, 2015;
2. Hold preconstruction meeting with PADEP and USFWS within 150 days of approval of the design plans and designs by FERC, PADEP and USFWS;
3. Begin construction within 180 days of receipt of approval of the design plans and specifications by PADEP and USFWS;
4. Begin operation by May 1, 2016.

Periodically, consistent with standards established by the PADEP, MDNR and USFWS, eels will be transferred from the collection tank to the holding tank(s) where they will be held prior to being transported upstream. The holding tanks will have an automatically engaging back up pump and an alarm that sounds in a daily staffed location if the primary pump malfunctions. The holding tank will have continuous temperature, dissolved oxygen and gallon/minute water exchange monitoring devices with alarms that sound in a daily staffed location if levels of any parameter are outside of established limits. Upon observation, dead eels will be removed, enumerated, and reported. The holding tank shall be designed and operated to hold eels at densities not exceeding 10 eelers per liter unless modified by PADEP in consultation with the other Resource Agencies. If necessary, aeration will be provided to the holding tanks.

C. Transport

Subject to required regulatory approvals, Exelon will design, construct and operate vehicle(s) to transport eels from the western shore and Octoraro facilities according to the following schedule, unless an alternative schedule is approved by the PADEP in writing. In the event that the FERC, MDNR, PADEP or the USFWS determine that additional information, revisions, modifications, or amendments are necessary to the plans, specifications or construction activities, then within 60 days of receipt of written notice, Exelon shall submit to the Resource Agencies and FERC such information, revisions or amendments unless a longer period of time is approved by the requesting agency or FERC in writing.

1. Submit complete design plans and specifications to the Resource Agencies and FERC by April 15, 2015;
2. Begin construction within 180 days of receipt of approval of the design plans and specifications by PADEP, MDNR and USFWS;
3. Begin operation by May 1, 2016.

Transport of juvenile eels will occur as necessary based on the capacity of holding tanks at the eel trapping facilities. All eels shall be moved within 1 week of capture. Eels from the holding tank(s) will be transferred to a transport vehicle equipped with an insulated transport container(s) that will be covered and aerated. The transport vehicle(s) will have an automatically engaging back up pump and an alarm that sounds in the cab of the vehicle(s). The transport vehicle taken will have continuous temperature and dissolved oxygen monitoring devices with alarms that sound in the vehicle(s) if levels of any parameter are outside of established limits. The transport vehicle(s) shall be designed and operated to hold eels at densities not exceeding 10 elvers per liter unless modified by PADEP in consultation with the other Resource Agencies. If necessary, aeration will be provided to the holding tanks on the transport vehicle(s). These eels will be trucked to appropriate release locations on the same day of removal from holding. Upon observation, dead eels will be removed, enumerated, and reported.

D. Release

Exelon will release eels at locations identified in Appendix A in amounts consistent with the release information provided to and approved by the PFBC in writing. Where feasible, eels will be released at public access locations. Unless otherwise directed by PFBC in consultation with EPAG, eels will be released: (1) at least one hour after sunset to promote eel dispersal and minimize predation; and (2) into at least three feet of water at multiple locations within designated release areas in order to avoid concentrations of eels that could become potential targets for increased predation. If necessary due to time limitations established by the Resource Agencies in writing, Exelon shall release eels at alternative locations to avoid mortality. The estimated number of eels released at each location will be documented in writing and on a GPS device capable of being mapped in a database as approved by the Resource Agencies. After release, any dead eels remaining in the transport vehicle or observed at the stocking locations will be removed, enumerated, and reported.

Modification of, or revisions to, the release locations in Appendix A shall occur after consultation with EPAG and consistent with the approval of the PFBC.

E. Quality Assurance/Quality Control

Exelon will develop a detailed quality assurance/quality control ("QA/QC") program according to the following schedule, unless an alternative schedule is approved by the PADEP in writing. In the event that the MDNR, PADEP or the USFWS determine that additional information, revisions, or amendments are necessary to the QA/QC program, then within 60 days of receipt of written notice Exelon shall submit to the Resource Agencies and such information, revisions or amendments unless a longer period of time is approved by the requesting agency in writing.

1. Submit a draft QA/QC program to the Resource Agencies for approval by April 15, 2014;
2. Implement the QA/QC program approved by the PADEP when trapping and transport begins.

Important parameters associated with trapping, collecting, holding, transport, release, and stocking will be recorded to assure and control the quality of various program elements. The collection of these data will assure that the program will be conducted according to design parameters, will adhere to sound scientific principles, and will allow for any necessary adjustments. The results of these quality assurance and quality control measures will be included in annual reports to the Resource Agencies and EPAG. Changes to the QA/QC procedures shall be submitted as requested by the PADEP, MDNR or USFWS in writing.

At a minimum, the QA/QC program shall provide:

- Detailed description of the eel trapping and holding process to achieve a minimum 95% survival rate.
- Detailed description of the eel transport process to achieve a minimum 95% survival rate.
- Collection facilities will be visually inspected daily to ensure proper operation.
- Design parameters for flows and key critical components (e.g. attraction flow, spray bar, collection tank) that will be measured weekly and qualitatively assessed daily to ensure that traps are operating within design parameters.
- Water temperature and dissolved oxygen and water exchange in the collection, holding, and transport tanks will be monitored continuously to ensure that water quality remains suitable for juvenile eels.
- Information on the periodic checks on the accuracy of the estimates of volumetric counts.

- Information on the cleaning and disinfection of the collecting, holding, and transportation tanks.
- Protocols for monitoring, removing, enumerating and reporting eel mortality.

F. Reporting, Monitoring, and Periodic Evaluation

1. *Reporting and EPAG Meetings*

During the eel passage season, Exelon shall provide a daily email to designated members of EPAG describing the status of trapping and trucking at each facility, the numbers of eels trapped and transported, any deviations from normal facility operations and the timing and substance of the resolution of any deviations.

On or before December 10 annually from 2015 through 2030, Exelon will submit a report to EPAG summarizing data from the trapping, collection, holding, transport, and stocking components of the Eel Plan for the calendar year. This report will provide program data to EPAG at the earliest practicable date, and provide EPAG with an opportunity to inform development of the Annual Report. On or before January 15 of the following year, Exelon will file an Annual Report with EPAG that analyzes annual data, including results from QA/QC.

Upon request, Exelon will meet with EPAG on or before February 15 of each year in which the Annual Report is filed.

2. *Periodic Evaluation*

Every three years, unless a different period is established by the PADEP in writing beginning in 2018 through 2030, Exelon will conduct stream segment evaluations through electrofishing or other method identified after consultation with EPAG. Representative stream segments will include tributaries and shorelines of the main-stem river. Exelon will propose locations and methods for this survey at least one year in advance to the Resource Agencies. Exelon shall implement the survey based on approval of the PADEP of the proposed locations and methods.

To implement the evaluations, eels will be captured by electrofishing, or other methods approved by the PADEP in consultation with the Resource Agencies. Sampling will be performed at block-netted transects along river shorelines and at block-netted segments of small tributaries using backpack electrofishing. The exact number, length, and location of transects sampled will be approved by the PADEP in consultation with EPAG.² Associated water quality parameters such as temperature and dissolved oxygen, as well as habitat characteristics, including mussel numbers observed, will be collected at each sampling location.

² It is anticipated that two weeks of electrofishing will be conducted during each third-year evaluation.

During sampling, the number of eels captured will be documented and data will be collected from a representative subsample of eels. A subsample of captured eels larger than 200 mm will be tagged with Passive Integrated Transponder (PIT) tags and released. Sampled eels will be scanned for PIT tags and data from recaptured eels will be recorded and included in the annual report. Data will include a variety of life history characteristics (e.g., length, weight, and condition factor) that can be assessed to determine how well stocked eels are utilizing the river and tributaries. A portion of the subsample will be sacrificed and examined for age (otolith analysis), gender, and level of *Anguillicoloides crassus* infection. Eels that are not sacrificed for further analysis will be measured, weighed, and released.

Results of stream segment evaluations will be included in the Annual Report and will document dispersal of the stocked eels, estimate the approximate density of stocked eels, and evaluate the growth, condition, age, gender and level of infestation with *Anguillicoloides crassus* of stocked eels.

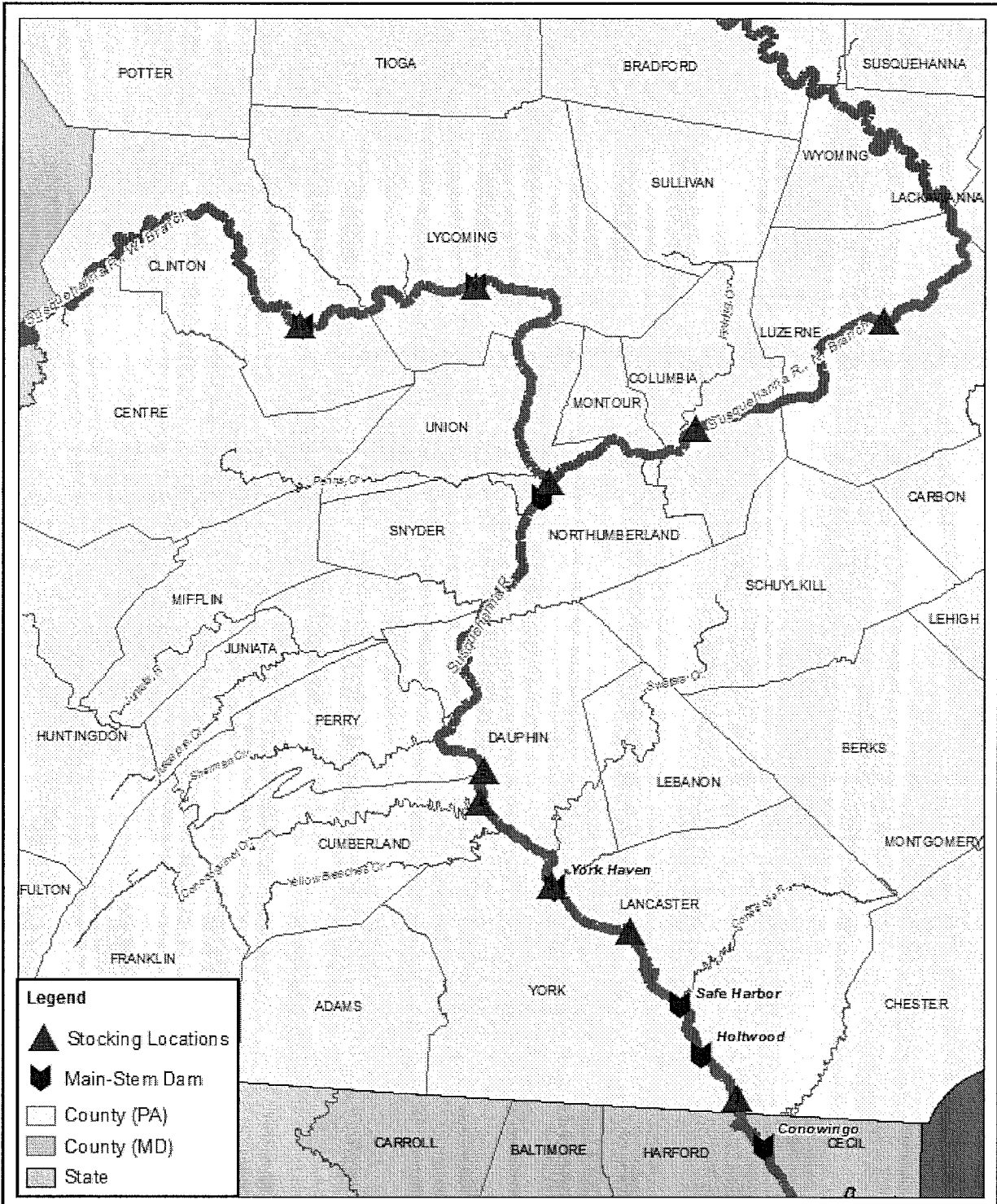
III. Upstream Passage (2031 - Term of New License)

If the upstream American eel passage trap and transport program terminates in 2030, Exelon will construct and operate a volitional upstream eel facility at Conowingo Dam through the term of the new license. Exelon will design and construct the volitional upstream eel facility, which will be operated in consultation with EPAG. In no event will Exelon be required to participate in the trap and transport program once the volitional upstream eel passage facility is operational.

If the upstream eel trap and transport and periodic evaluation program continues beyond 2030, Exelon will continue to provide access to the Conowingo eel collection facilities for as long as the program continues. Exelon, however, shall bear no cost responsibility for the trap and transport and periodic evaluation program until 2046, at which time cost responsibility shall be shared among all participants in the program.

**APPENDIX A
LOCATIONS OF EEL RELEASE**

Site Number	Location	Water	County
1	Conowingo Pool	Susquehanna River	Lancaster
2	Between Holtwood and Safe Harbor	Susquehanna River	Lancaster/York
2	Between Safe Harbor and York Haven Dam	Susquehanna River	Lancaster
3	Upstream of York Haven Dam	Susquehanna River	Dauphin
4	West Fairview Access (Route 11/15)	Susquehanna River	Cumberland
5	Fort Hunter Access	Susquehanna River	Perry
6	Shikellamy State Park	Susquehanna River	Northumberland
7	Route 487 Bloomsburg	North Branch Susquehanna River	Columbia
8	Route 29 Bridge (Wilkes Barre)	North Branch Susquehanna River	Luzerne
9	Upstream of Hepburn Street Dam (Williamsport)	West Branch Susquehanna River	Lycoming
10	Upstream of Grant Street Dam	West Branch Susquehanna River	Clinton



Legend

- ▲ Stocking Locations
- ▣ Main-Stem Dam
- County (PA)
- ▨ County (MD)
- ▩ State

EXELON CORPORATION
PROPOSED EEL PASSAGE

0 5 10 20 30 40 Miles

1 in = 15 miles

**Proposed Eel
Stocking Locations -
Overview**

Path: X:\G:\Maps\Krazy\Eel Stocking\Eel Stocking Locations Updated 6-4.mxd

References Cited

- Minkinen, S. and I. Park. 2012. American eel sampling at Conowingo Dam, 2012. U.S. Fish and Wildlife Service – Maryland Fishery Resources Office.
- Székely, C., A. Palstra, K. Molnár, and G. van den Thillart. 2009. Impact of the swim-bladder parasite on the health and performance of European Eels, Chapter 9 in Spawning Migration of the European Eel, Fish & Fisheries Series, Volume 30, pages 201-226.

BAKER BOTTS LLP

THE WARNER
1299 PENNSYLVANIA AVE., NW
WASHINGTON, D.C.
20004-2400

TEL +1 202.639.7700
FAX +1 202.639.7890
BakerBotts.com

ABU DHABI
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RIO DE JANEIRO
RYADH
WASHINGTON

November 19, 2013

Jay T. Ryan
TEL: 202.639.7789
FAX: 202.585.1015
jay.ryan@bakerbotts.com

Thomas W. Beauduy
Special Counsel
Susquehanna River Basin Commission
4423 North Front Street
Harrisburg, PA 17110-1788

Re: Letter Agreement Addressing Exelon's Provision of an OASIS Model to SRBC

Dear Mr. Beauduy:

Exelon Corporation, on behalf of its wholly-owned subsidiary, Exelon Generation Company, LLC ("Exelon") is in the process of relicensing the Muddy Run Pumped Storage Hydroelectric Project located in Lancaster County, Pennsylvania. Prior to obtaining a new license from the Federal Energy Regulatory Commission ("FERC"), Exelon must obtain a water quality certification from the Pennsylvania Department of Environmental Protection ("PADEP").

Exelon also is in the process of relicensing the Conowingo Hydroelectric Project ("Conowingo") located in Harford and Cecil counties, Maryland. Prior to obtaining a new license from FERC, Exelon must obtain a water quality certification from the Maryland Department of the Environment.

The water quality certificate issued by PADEP will require Exelon to provide a version of the Lower Susquehanna River OASIS Model ("OASIS Model") to the Susquehanna River Basin Commission ("SRBC"). Exelon will provide the OASIS Model to SRBC in accordance with the following terms:

- (1) Exelon will provide the OASIS Model within thirty (30) days after the Conowingo and Muddy Run water quality certifications and new FERC licenses become "final" (*i.e.*, are no longer appealable or subject to ongoing litigation).
- (2) The OASIS Model provided to SRBC will include the following components:
 - (a) Susquehanna River Basin daily flow;
 - (b) Safe Harbor hourly hydroelectric generation and revenue optimization;
 - (c) PPL Holtwood hourly hydroelectric generation and revenue optimization;
 - (d) Conowingo and Muddy Run hydroelectric generation and revenue optimization;
 - (e) SRBC abridged daily model; and
 - (f) Three Mile Island water withdrawals.

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Thomas W. Beauduy

- 2 -


November 19, 2013

- (3) Exelon will develop, and include in the OASIS Model provided to SRBC, a Conowingo and Muddy Run generation node 2013 Real Time pricing file.
- (4) The OASIS Model will be available for SRBC's long-term non-exclusive use.
- (5) Exelon will have no obligation to update the OASIS Model, including the 2013 PJM pricing file, after the model has been provided to SRBC.

Please note that the model utilized by Exelon during the relicensing process incorporated Exelon's proprietary forward price curve. This proprietary pricing file will not be included in the OASIS Model provided to SRBC.

If the foregoing is acceptable to the SRBC, please so acknowledge by signing below in the space indicated and return the executed agreement to me at your convenience.

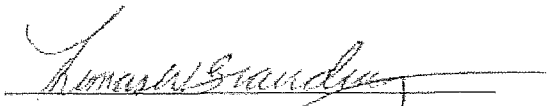
With kind regards,



Jay Ryan
Counsel to Exelon

ACKNOWLEDGED AND AGREED TO:

SUSQUEHANNA RIVER BASIN COMMISSION

By: 
Name: Thomas W. Beauduy
Title: Special Counsel
Date: November 21, 2013