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January 30, 2014

BY ELECTRONIC FILING

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Re: York Haven Power Company, LLC, Project No. 1888-030; Offer of Settlement

Dear Secretary Bose:

Pursuant to Rule 602 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission (the "Commission" or "FERC"),¹ York Haven Power Company, LLC ("YHPC"), U.S. Fish and Wildlife Service ("FWS"), Commonwealth of Pennsylvania, Pennsylvania Fish and Boat Commission ("PFBC"), Maryland Department of Natural Resources ("MDNR"), and the Susquehanna River Basin Commission ("SRBC") (each a "Settling Party" and together, collectively, the "Settling Parties") hereby submit this Offer of Settlement, pertaining to relicensing of the York Haven Hydroelectric Project (the "Project"). This Offer of Settlement represents a complete resolution of all issues pending in the above-captioned proceeding. This Offer of Settlement is also supported by substantial evidence, is within the public interest, and meets the federal regulatory requirements applicable to relicensing of the Project.²

The Settling Parties contemplate that under the settlement, FWS will be concurrently filing license prescriptions or other materials with FERC.

This submission includes:

1. Certificate of Service
2. YHPC Explanatory Statement
 - a. Exhibit A - York Haven Nature-Like Fishway Task Schedule
 - b. Exhibit B - Determination of Flow and Depth in Proposed Fish Bypass Channel at Powerhouse Sluice Gate, York Haven Hydroelectric Project
3. Settlement Agreement

In accordance with Rule 602(d), the YHPC is serving a copy of this filing on all parties in the above-captioned proceeding. Also, pursuant to Rule 602(f), the Settling Parties advise participants served that

¹ 18 C.F.R. § 385.602.

² See *Settlements in Hydropower Licensing Proceedings under Part I of the Federal Power Act, Policy Statement on Hydropower Licensing Settlements*, Docket No. PL06-5-000, PP 3-5 (2006).

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comments on the Offer of Settlement will be due 20 days after this filing of the Offer of Settlement), or February 19, 2014. Reply comments will be due within 30 days after this filing, or March 3, 2014.

The Settling Parties respectfully request that the Commission find that the Offer of Settlement is in the public interest, accept the Offer of Settlement without modification or condition, and issue a new license for the Project incorporating the license terms and conditions reflected in the Offer of Settlement.

Respectfully submitted,

/s/ Charles A. Patrizia
Charles A. Patrizia
for PAUL HASTINGS LLP
875 15th Street, N.W.
Washington, DC 20005
202-551-1710

Attorney for York Haven Power Company, LLC

cc: All Participants in Docket No. P-1888

CERTIFICATE OF SERVICE

Pursuant to Rule 2010 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission, I hereby certify that I have this day caused the foregoing York Haven Power Company, LLC, Project No. 1888-030; Offer of Settlement and accompanying materials to be served upon each person designated on the official service lists compiled by the Secretary in these proceedings.

Dated at Washington, D.C., this 30th day of January, 2014.

/s/ Candice Castaneda

Candice Castaneda
Paul Hastings, LLP
875 15th Street, N.W.
Washington, DC 20005
202-551-1968

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

YORK HAVEN POWER COMPANY, LLC)))	Project No. P-1888-030
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EXPLANATORY STATEMENT

Pursuant to Rule 602 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission (the “Commission” or “FERC”),¹ York Haven Power Company, LLC (“YHPC”), U.S. Fish and Wildlife Service (“FWS”), Pennsylvania Fish and Boat Commission (“PFBC”), Maryland Department of Natural Resources (“MDNR”), and Susquehanna River Basin Commission (“SRBC”) (each a “Settling Party” and together, collectively, the “Settling Parties”) have concurrently submitted an Offer of Settlement (the “Settlement Agreement”) pertaining to relicensing of the York Haven Hydroelectric Project (the “Project”).² In support of that Settlement Agreement, YHPC hereby submits this Explanatory Statement. The Settlement Agreement represents a complete resolution among the Settling Parties of all issues pending in the above-captioned proceeding. As YHPC demonstrates below, the Settlement Agreement is supported by substantial evidence, is within the public interest, and meets the federal regulatory requirements applicable to relicensing of the Project.³

¹ 18 C.F.R. § 385.602. Capitalized terms not defined herein are defined per the Settlement Agreement.

² The Pennsylvania Department of Environmental Protection (“PADEP”) participated in settlement discussions, but has not joined in the Settlement Agreement, preferring to express its requirements through a Clean Water Act § 401 water quality certification. However, it is the understanding of the Settling Parties that the PADEP supports the basic elements of the Settlement Agreement and the Settling Parties anticipate that the State’s § 401 water quality certification, when issued, will be consistent with the substantive provisions of the Settlement Agreement.

³ See *Settlements in Hydropower Licensing Proceedings under Part I of the Federal Power Act, Policy Statement on Hydropower Licensing Settlements*, Docket No. PL06-5-000, PP 3-5 (2006) (“Settlement Policy”); 16 U.S.C. § 8251(b) (including the “substantial evidence” standard); 16 U.S.C. § 803(a)(1) (relating to review of license conditions); 16 U.S.C. § 803(j) (relating to fish and wildlife protection and recommendations); 16 U.S.C. § 811 (relating to license prescriptions); 16 U.S.C. § 797(e) (relating to issuance of licenses); and 33 U.S.C. § 1341 (pertaining to certifications under the

For the reasons discussed below, YHPC respectfully requests that the Commission find that the Settlement Agreement is in the public interest, accept the Settlement Agreement, and issue a new license for the Project incorporating the license terms and conditions set forth in Section 3.0 the Settlement Agreement without modification or condition.

I. BACKGROUND

The Project was originally constructed in 1901-1904, and YHPC was granted a new major license for continued operation of the Project on August 14, 1980.⁴ The current license will expire on September 1, 2014. On August 30, 2012, YHPC submitted its Final License Application for the Project to the Commission under its Integrated Licensing Process (“ILP”), seeking a new major license for this existing hydroelectric project on the Susquehanna River.⁵ On April 29, 2013, the Commission issued the Ready for Environmental Analysis (“REA”) Notice for the York Haven License Application and accompanying schedule (including, among other dates, the initial deadline for motions, comments, recommendations, and preliminary terms, conditions, and fishway prescriptions in response to the York Haven License Application).⁶

YHPC requested an extension of the schedule (including the deadline for comments on the York Haven License Application) in light of the Settling Parties' efforts to negotiate a resolution of the issues pending in this above-captioned proceeding.⁷ The Commission amended

Clean Water Act). *See also Bangor Hydro-Electric Co. v. FERC*, 78 F.3d 659 (D.C. Cir. 1996) (relating to substantial evidence); *Allegheny Energy Supply Co.*, 109 FERC ¶ 61,028 (2004) (same); and *Boise-Kuna Irrigation Dist.*, 124 FERC ¶ 62,090, P 22 (2008) (same).

⁴ Additional Project details are discussed below in Section II.A.

⁵ *Final License Application of York Haven Power Company LLC for the York Haven Hydroelectric Project*, Project No. 1888-030 (filed Aug. 30, 2012) (“York Haven License Application” or “YHPC 2012a”) (including descriptions of the Project at Exhibit B, Sections 1-2). *See also id.*, at Exhibit B, Fig. 1.0-1 (including a map of the Project).

⁶ *Notice of Application Accepted For Filing, Soliciting Motions To Intervene and Protests, Ready for Environmental Analysis, and Soliciting Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Fishway Prescriptions*, York Haven Power Company, LLC, Project No. 1888-030 (issued Apr. 29, 2013) (the “York Haven REA Notice”).

⁷ *Request for Extension of Procedural Schedule for York Haven Power Company, LLC*, Docket No. P-1888-030 (filed June 7, 2013).

the schedule per its letter order issued June 14, 2013, granting the requested extensions.⁸ On August 30, 2013, YHPC submitted a copy to the Commission of its Clean Water Act § 401 Water Quality Certification Application as filed with the Pennsylvania Department of Environmental Protection (“PADEP”).⁹ Also, on August 30, 2013, in response to a request for extension of the schedule submitted by Exelon Generation Company, LLC (“Exelon”) in relation to Exelon’s Conowingo and Muddy Run projects located downstream of the York Haven Project, the Commission granted a further schedule extension applicable to both the Exelon projects and the York Haven Project, extending to December 15, 2013 (a Sunday) the deadlines for (i) filing a request for a water quality certification with the appropriate state agencies (which YHPC has already filed) and (ii) filing motions to intervene, comments, protests, recommendations, preliminary terms and conditions, and preliminary fishway prescriptions. The Commission’s August 30, 2013 notice stated that Commission Staff intends to prepare a single, multi-project Environmental Impact Statement for the Exelon projects and the YHPC Project.¹⁰

On December 6, 2013, the FWS filed a motion in this docket and the Conowingo and Muddy Run dockets, seeking an extension of time until January 31, 2014 to file its preliminary terms, conditions, prescriptions, and recommendations in those dockets.¹¹ Exelon, as owner of Conowingo and Muddy Run, supported that request through its own filing on December 6, 2013 in the Exelon dockets.¹² On December 13, 2013, the Commission issued notice granting an

⁸ *Letter Order Granting York Haven Power Company, LLC's 6/7/13 Request For Extension*, Docket No. P-1888-030 (June 14, 2013).

⁹ *See York Haven Hydroelectric Project*, FERC Project No. 1888-030; *Clean Water Act Section 401 Water Quality Certification Application for York Haven Hydrorelicensing*, Docket No. P-1888-030 (filed Aug. 30, 2013) (submitted to PADEP on August 29, 2013).

¹⁰ *See Notice Granting Extension of Time and Intent To Prepare An Environmental Impact Statement*, Docket Nos. P-1888-030 et. al. (Aug. 30, 2013)

¹¹ *See Motion of U.S. Department of the Interior*, Docket Nos. P-405, et. al. (filed Dec. 6, 2013).

¹² In the Conowingo docket, the Stewards of the Lower Susquehanna, Inc., the Lower Susquehanna Riverkeeper, and Waterkeepers Chesapeake also filed in support of the FWS motion for extension of time.

extension of the deadline to file motions to intervene, protests, comments, recommendations, preliminary terms and conditions, and preliminary fishway prescriptions, through January 31, 2014, and a revised Hydro Licensing Schedule was then issued.¹³

Throughout this time, the Settling Parties and PADEP (collectively, PADEP with FWS, PFBC, MDNR, and SRBC, the “Resource Agencies”) have been negotiating a resolution of the issues implicated under this proceeding. As a result of these negotiations, YHPC has reached agreements with the other Settling Parties on all significant resource issues associated with relicensing of the Project, as reflected in the Settlement Agreement. As noted above, the Settling Parties anticipate that PADEP will issue a Clean Water Act § 401 water quality certification that is consistent with the substantive terms reflected in the Settlement Agreement.

II. OVERVIEW OF SETTLEMENT AGREEMENT

The Settlement Agreement is organized in four parts. Section 1.0 provides an introduction, definitions, and general provisions. Section 2.0 sets forth the general agreements among the Settling Parties, including stipulations concerning the term of the new license, enforceability and withdrawal rights, reopeners and amendments of the new license, amendment of the Settlement Agreement, Endangered Species Act compliance, dispute resolution, renewable energy credits and force majeure provisions. Section 3.0 contains measures that the parties agree should be incorporated as articles into the new license. Section 4.0 provides miscellaneous provisions that are not intended for incorporation into the new license, including provisions for cooperation in conducting the proposed Lower Susquehanna River Downstream Eel Study.

The Commission must license projects which “will be best adapted to a comprehensive plan” for a particular waterway, including consideration of power and development purposes of a project, as well as the purposes of energy conservation and fish, wildlife, and environmental

¹³ *Notice Granting Extension of Time*, Docket Nos. P-1888-030 et. al. (issued Dec. 13, 2013); *and Re: Notification of Updated Schedule*, Docket Nos. P-1888-030 et. al. (issued Dec. 19, 2013).

protections.¹⁴ The Settlement Agreement, submitted together with this Explanatory Statement, fully satisfies this comprehensive development/equal consideration standard.¹⁵ The provisions of the Settlement Agreement, and in particular the proposed license terms described in Section 3.0 of the Settlement Agreement, were carefully developed with attention to the Commission's guidance on hydroelectric licensing settlements in the *Settlement Policy*. Consistent with Commission precedent and the *Settlement Policy*, the proposed license articles reflected in Section 3.0 of the Settlement Agreement and the Settlement Agreement as a whole are supported by substantial evidence, reflect comprehensive development/equal consideration review, are enforceable by the Commission, and reflect a nexus between proposed measures and the Project's effects or purposes, with such measures being as narrow and geographically tailored as possible.

Specifically, under the Settlement Agreement, the Settling Parties have reached agreement on all significant resource issues associated with relicensing of the Project, including: (1) upstream passage of American shad and other anadromous species;¹⁶ (2) upstream passage of American eels;¹⁷ (3) downstream passage of post-spawning American shad;¹⁸ (4) downstream passage of juvenile American shad;¹⁹ (5) downstream passage of silver stage American eel;²⁰ (6) resident fish passage;²¹ (7) flow management;²² (8) water quality and debris management;²³ and (9) endangered species and species of special concern. In addition, the other Settling Parties have

¹⁴ See 16 U.S.C. § 803(a); and 16 U.S.C. § 797(e).

¹⁵ See *infra* Section II.B. below.

¹⁶ Settlement Agreement, at Section 3.1.1 – 3.1.3.

¹⁷ Settlement Agreement, at Section 3.1.4.

¹⁸ Settlement Agreement, at Section 3.1.5.

¹⁹ Settlement Agreement, at Section 3.1.6.

²⁰ Settlement Agreement, at Section 3.1.7.

²¹ Settlement Agreement, at Section 3.1.8.

²² Settlement Agreement, at Section 3.2.

²³ Settlement Agreement, at Section 3.3.

agreed that in light of YHPC's commitments, they will support a new license term of at least 45 years and not oppose a license term of 50 years. YHPC requests a 50 year new license term.²⁴

The Settlement Agreement also reserves the Commission's compliance authority and its authority to review or modify, as necessary, proposed resource or activity plans and adaptive measures (for example, requirements that certain adaptive measures developed in consultation with the Resource Agencies be filed with the Commission for its ultimate review).²⁵ Therefore, the attached Settlement Agreement reflects the significant efforts by the Settling Parties to achieve a package of license terms and conditions which satisfies the public interest, is supported by substantial evidence, and comports with the Commission's standards for hydroelectric licensing and settlements.

A. Resource Balancing

The characteristics of the Project and the physical setting of the Project within the lower Susquehanna River area are essential to understand the resource balancing achieved by the Settling Parties through the Settlement Agreements.

1. Project Overview

The Project is located in York, Dauphin, and Lancaster counties in Pennsylvania on the Susquehanna River, and is operated as a run-of-river hydroelectric generation facility with 20 turbines and a nameplate capacity of 19.62 MW. It has an estimated maximum hydraulic capacity of approximately 17,000 cubic feet per second (“cfs”) under optimum head conditions. The Project encompasses an area of approximately 3,220 acres, and its impoundment (Lake Frederic) is approximately 3.5 miles long and covers approximately 2,218 acres at normal pool (Elevation 277.9 feet NGVD). The Project works include a stone masonry headrace wall that extends north from the north end of the powerhouse (the “Headrace Wall”). This Headrace Wall

²⁴ Settlement Agreement, at Section 2.1.

²⁵ See *infra* Section II.C. below; and *Settlement Policy*, at PP 1-12 (discussing these standards generally).

directs water to the power house. The main dam (“Main Dam”) is attached to the north end of the Headrace Wall and crosses the main channel of the river to the western shore of Three Mile Island (“TMI”). The junction of the Main Dam with the west shore of TMI forms a triangular section of river channel below the dam referred to as the “apex” area. There is also an east channel dam (“East Channel Dam”) that is a concrete gravity overflow dam and extends across the remaining Susquehanna River from the eastern shore of TMI to the mainland shore, completing the project impoundment.²⁶

The Project was originally built for the purpose of supplying power and water to the public and customers in areas surrounding the Susquehanna River.²⁷ The Project's installed capacity is 19.62 MW, and its estimated dependable capacity is 17.57 MW. The Project's annual energy production averaged over the decade between 2001 and 2011 was 132,271 MWh.²⁸ Electric energy produced by the Project is currently sold to PJM Interconnection, LLC (“PJM”),²⁹ for distribution to customers with the broad PJM region. The Project coordinates with other generating facilities on the Susquehanna River and regionally with the Pennsylvania-New Jersey-Maryland area of PJM.³⁰ The Project is the fourth upstream conventional hydroelectric facility located on the main stem of the Susquehanna River. It is the only facility of the four that operates

²⁶ See York Haven License Application, Executive Summary, at p. 1; *and id.*, at Exhibit A at Section 1.0 and Exhibit B, Section 1.0. *See also id.*, at Exhibit C, Section 2.0.

²⁷ York Haven License Application, at Exhibit B, Section 1.0.

²⁸ York Haven License Application, at Exhibit B, Section 2.5.2.

²⁹ *See York Haven Hydroelectric*, Olympus Power, LLC, available at <http://www.olympuspower.com/portfolio> (including basic project highlights).

³⁰ The hydroelectric projects downstream of YHPC on the Susquehanna River include Safe Harbor (P-1025), Holtwood (P-1881), Muddy Run Pumped Storage (P-2355) and Conowingo Project (P-405). Muddy Run and Conowingo are owned by Exelon. *See York Haven License Application*, at Exhibit A, Section 1.0-1.2; *and id.*, at Exhibit B, at Section 2.5.2. *See also, York Haven Power Company, LLC*, 132 FERC ¶ 61,035, P 2 (2010) (describing the five hydroelectric projects on the Susquehanna River). TMI Nuclear Station, is adjacent to the Project and owned by Exelon. In addition, the coal-fired steam electric generating plant Brunner Island Station is located downstream of the Project and is owned by Pennsylvania Power and Light.

in a run-of-river mode and it has the lowest hydraulic head of all of the hydroelectric developments in the lower Susquehanna River area.³¹

The current fish passage operational plan (“FPOP”) includes an East Channel Fish Passage Facility, located on the East Channel between TMI and the eastern bank of the Susquehanna River. The East Channel Fish Passage Facility began operation in 2000, and consists of a “weir cut” and a vertical slot fish ladder. Current upstream passage operations for American shad occur annually from mid-April to mid-June, and following the end of American shad upstream passage season the East Channel Fish Passage Facility remains open, though unattended, until winter when the East Channel Fish Passage Facility closes until the following spring.

During periods of moderate to high runoff, excess river flow is spilled at the Main Dam, East Channel Dam, and Headrace Wall, which provide numerous locations for fish movements downstream of the Project without passing through the turbines.³² Unlike many hydropower facilities, where river flows only exceed turbine capacity about 20% of the time, at York Haven river flows exceed the Project's hydraulic capacity approximately 60% of the time, providing more frequent downstream fish movement opportunities.³³

Lake Frederic, which is formed by the York Haven Dam, is a popular recreation venue for boating, fishing, swimming and picnicking. Further, through programs maintained by YHPC, recreational facilities, nature trails, picnic grounds, playground facilities, portage, and recreational lot sites are available at Lake Fredric.³⁴ Project lands and the Project's tailwaters also provide other opportunities for fishing, boating, swimming, hiking/walking, picnicking, canoeing, and other recreation uses. The Project also provides employment opportunities.³⁵

³¹ York Haven License Application, at Exhibit E, Section 3.2.1.

³² York Haven License Application, at Exhibit A, Section 2.10.

³³ York Haven License Application, at Exhibit E, Section 3.3.1.2.

³⁴ See York Haven License Application, at Exhibit B, Sections 1-2.

³⁵ York Haven License Application, at Exhibit E, Section 3.10.1.2.

2. Summary of Resource Balancing

The Project is an existing project that should be relicensed without changes to project facilities and operations except for those specific resource improvements and protection, mitigation and enhancement (“PM&E”) measures reflected in the Settlement Agreement and discussed in this Explanatory Statement. These improvements and measures have been carefully crafted by the Settling Parties as tailored means seeking to increase the successful passage of American Shad, American eel, and to restore aquatic habitat connectivity between upstream and downstream segments of the Susquehanna River at the York Haven Dam.

The core of the Settlement Agreements is the balance reached between the power and non-power values of the Project, and specifically those non-power attributes in the lower Susquehanna River that may be affected by continued operation of the Project. Considerable time and effort was expended by the Settling Parties and other stakeholders in the relicensing process to identify issues and evaluate the effect of Project operations on the resources and issues that were identified during NEPA scoping and through the entire relicensing process. During the first portion of Integrated Licensing Process (“ILP”), which started in 2009, extensive resource studies were scoped and planned cooperatively among the Settling Parties,³⁶ then conducted by YHPC to gather the information needed to assess the potential Project effects and design any appropriate responsive measures. As an example of this collaborative effort, YHPC, Resource Agencies, and stakeholders developed a large scale study of upstream migration of American shad and downstream migration of adult American shad. Together, these studies provided valuable information on shad migration upon which all Settling Parties relied to make sound judgments about Project effects and fish behavior at the Project.

With the power and non-power attributes of the Project in mind, stakeholders participating in the relicensing proceedings for the Project identified concerns and issues related

³⁶ Pre-Application Document, York Haven Hydroelectric Project, FERC Project No. 1888, June 1, 2009.

to resources in the Project's area and potential impacts. The primary areas of potential concern included:

- Upstream and downstream passage of American shad, and by association, river herring;³⁷
- Future upstream and downstream passage of American eels, as efforts to reestablish in-basin populations are only in early stages;
- Resident fish passage and restoration of in-river connectivity for aquatic resources;
- Flow management; and
- Debris Management.

The Settlement Agreement includes measures designed to protect and mitigate adverse effects to, and enhance, aquatic resources in the lower Susquehanna River (“PM&E measures”). The Settling Parties expect these measures to improve habitat conditions for aquatic species in the lower Susquehanna River, contribute to the restoration of American shad, American eel and river herring, and improve water quality. At the same time, the Settlement Agreement provides for monitoring of the effectiveness of particular PM&E measures (such as upstream and downstream passage rates) and for implementation, in steps, of various types of adaptive measures depending on the results of such monitoring. The Settlement Agreement reflects the careful balancing of these matters and states, “based on the record and having given careful consideration to the non-power and power values of the Project, the measures set forth in Section 3 are those that are appropriate to address the operational, fisheries and aquatic resources, wildlife and water quality issues related to the Project, (ii) the Parties do not anticipate the imposition of additional PM&E

³⁷ Although river herring are currently at low levels in the Susquehanna River, upstream and downstream passage requirements of river herring and American shad are very similar. Therefore measures designed to protect American shad are considered equally effective for river herring. *See* York Haven License Application, at Exhibit E, Section 3.5.4.1.

Measures during the term of the License, and (iii) any additional PM&E Measures would be considered a Material Modification.”³⁸

All of these measures are expected to create measurable public benefits as discussed herein; however, they also represent considerable new costs to YHPC in the form of new capital investments, foregone energy and capacity, and reduced flexibility of project operations.

The York Haven License Application projected that the Project's annual costs for operation, maintenance, insurance, employee expenses, and similar expenditures are approximately \$5.5 Million. That projection was made prior to negotiation of the PM&E measures reflected in the Offer of Settlement. Installation of the nature-like fishway (“NLF”) discussed below is expected to involve a significant capital investment, estimated at \$8 million. Together with the estimated cost of the fish passage improvements, including the NLF, and cost of implementing the Historic Properties Management Plan, the projected future annual cost for the Project is estimated to be approximately \$6.3 million annually.

To assist YHPC to recoup its costs to comply with the license conditions, the Settling Parties have agreed that they support a new license term of at least 45 years and would not oppose a license term of 50 years. YHPC is requesting a license term of 50 years. Further, recognizing the substantial investment required to design and install the NLF, Section 2.5.4(c) of the Settlement Agreement reflects the understanding of the parties that except for certain facility and operational adjustments as described in Section 3.1.3(e), the Settling Parties contemplate that York Haven will not be required to design, construct or install any other fish passage facility at the project before 2041, and that any requirement for design, construction, or installation of any

³⁸ Settlement Agreement, at Section 2.5.4.

other fish passage facility at YHPC would be considered a material modification to the License that could occur only upon FERC's determination to amend the License.³⁹

Hence, the license conditions and project operations are well-balanced. While preserving the Commission's compliance authority, the Settlement Agreement also provides room for adaptive measures in the future, as additional information is available. This further balances improvements to the FPOP without imposing broad requirements involving excessive costs and inefficiencies.

With regard to enforceability, the Settling Parties have agreed that the measures reflected in Section 3.0 of the Settlement Agreement should be license conditions included in any license issued by this Commission, and that the Commission will enforce these provisions.⁴⁰ The Settling Parties understand that all of the requirements under Section 3.0 are within the Commission's jurisdiction to require and enforce.⁴¹ Moreover, the Settling Parties believe that the measures set forth in Section 3.0 of the Settlement Agreement must be viewed as an integrated and indivisible package; and the Settlement Agreement stipulates that a material modification to the terms set forth in Section 3.0 would give any Settling Party the right to withdraw from the settlement, in which case the Settlement Agreement would become null and void. As a result, the Commission should accept the Settlement Agreement and license conditions reflected therein.

B. License Articles

Section 3.0 of the Settlement Agreement sets forth the provisions that the Settling Parties agree should be incorporated in the terms of the new license as license articles. The following discussion summarizes each proposed provision and explains the basis of the proposed article requirements. Section 3.1 of the Settlement Agreement comprises the measures associated with

³⁹ Notwithstanding this understanding, the Settling Parties recognize that Section 2.5.4(c) does not constitute a waiver by FWS of its respective reserved prescription authority under § 18 of the Federal Power Act.

⁴⁰ Settlement Agreement, at Section 2.2.

⁴¹ *See Settlement Policy*, at P 14.

fish protection and passage, including construction and operation of the NLF, upstream passage of American shad and other anadromous fish, upstream passage of eels, downstream post-spawning adult American Shad passage, downstream juvenile American shad passage, downstream passage for silver eels, and resident fish passage. Section 3.2 provides for flow management targets for Project operations before and after NLF construction. Section 3.3 addresses debris management.

1. Fish Protection and Passage Overview⁴²

a. Current FPOP Operations

The Project's current fish passage operations plan includes certain measures for fish passage, which (as discussed below) will be substantially enhanced as a result of the measures described in Section 3.1 of the Settlement Agreement.

Under the current FPOP, the primary upstream fish passage pathway is through the East Channel Fish Passage Facility, which was constructed and began operation in 2000 after consultations with the Resource Agencies (particularly the PFBC and FWS). As noted above, during the upstream American shad passage season (generally mid-April to mid-June), the East Channel Fish Passage Facility is operated to support the upstream migration of adult American shad. During this period, the FPOP provides that the Project must spill 4,000 cfs at the Main Dam and release 2,000 cfs at the East Channel Dam (including 67 cfs that is provided through the fishway facilities as needed for the fish ladder operation). River flow in excess of spring minimum flow requirements and station capacity is spilled over the Main and East Channel Dams. Spring minimum flows are maintained 24 hours a day during the entire American shad upstream passage operating season. If river flow is less than 23,000 cfs during that season, East Channel flows are maintained through the wheel gates at the dam, a minimum spill of at least 4,000 cfs is maintained over the Main Dam by curtailing operation of the Project's turbines as

⁴² Settlement Agreement, at Section 3.1.1 – 3.1.3.

necessary. At the end of the shad upstream fish passage season, the Project returns to volitional unattended passage to accommodate movement of resident fish.

Under a June 2010 Consent Order and Agreement between YHPC and PADEP, before and after the American shad upstream passage season and during the resident fish passage period (April 1 through December 15), the Project maintains a minimum flow of 400 cfs in the East Channel while the East Channel Fish Passage Facility remains open. Under the current FPOP, the East Channel Fish Passage Facility closes upon the earlier of December 15th or when river water temperature is equal to or less than 40 degrees Fahrenheit for three days.⁴³

b. YHPC Studies and Discussions with Resource Agencies on Fish Passage During the Proceeding

Extensive fish passage discussions with the Resource Agencies occurred throughout the relicensing of the Project, with particular focus on passage for American shad, river herring, and American eel. However, the Resource Agencies also expressed general interest in protecting and enhancing resident fish populations and aquatic communities in the lower Susquehanna River through re-establishing riverine connectivity of upstream and downstream aquatic life and their habitats. As discussed in more detail below, all these objectives will be achieved through the innovative design and construction of the NLF at the Project.

In support of relicensing, YHPC conducted an upstream American shad radio-telemetry study in 2010 to assess the effectiveness of the existing East Channel Fish Passage Facility and observe the migratory patterns of fish as they approach and enter the Project area.⁴⁴ The results of the study indicated that 70% of the tagged shad leaving Safe Harbor arrived at the Project area, while 30% remained in the 25 miles of river between the two dams. That 25 mile reach includes approximately 15 miles of riverine habitat that are assumed to provide suitable spawning areas for

⁴³ York Haven License Application, Exhibit B, at Section 2.1 and 2.4.

⁴⁴ For these purposes, the "Project area" is defined as the area upstream of a line drawn across the Susquehanna River from the downstream end of the Powerhouse to the east bank of the River.

American shad. Further, results of the 2010 telemetry study indicated that 100% of fish that entered the Project area visited the south end of the powerhouse tailrace.⁴⁵ The study indicated that once the tagged shad arrived at the powerhouse, a number of different migratory behaviors were observed, including movements along the Main Dam to the apex at TMI and into the East Channel.⁴⁶

The radio-telemetry study results initially prompted YHPC to investigate fish passage options at the powerhouse.⁴⁷

YHPC held an American shad upstream passage technical meeting with federal and state resource agencies and interested parties in October 2011 to discuss the results of the 2010 telemetry study as well as additional analyses requested by the stakeholders during relicensing. At this meeting, YHPC presented conceptual drawings of fish passage facilities at the southern end of the Project powerhouse. The stakeholders, in particular the PFBC, requested YHPC investigate the feasibility of a nature-like fishway concept at the Main Dam apex.⁴⁸

Results from the 2010 telemetry study indicated that many shad visited the Main Dam apex area.⁴⁹ During the course of the study, 99 of the 127 tagged shad (78%) detected in the study area were detected in the vicinity of the apex of the Main Dam. Considering that the 2010

⁴⁵ *ILP Initial Study Report*, Docket No. P-1888-000 (filed Apr. 4, 2011); and *Applicant's Response to Initial Study Report Comments by Stakeholders on the Assessment of American Shad at the York Haven Project and Supplemental Data Analysis*, York Haven Hydroelectric Project, Docket No. P-1888-000 (filed Sept. 27, 2011).

⁴⁶ *Applicant's Response to Initial Study Report Comments by Stakeholders on the Assessment of American Shad at the York Haven Project and Supplemental Data Analysis*, York Haven Hydroelectric Project, Docket No. P-1888-000 (filed Sept. 27, 2011).

⁴⁷ *Response to Additional Information Request: Nature-Like Fishway Conceptual Design Final Report*, Docket No. P-1888-030 (filed Mar. 15, 2013) ("YHPC 2013a"); and *Updated Figure for Nature-Like Fishway Conceptual Design Final Report*, Docket No. P-1888-30 (filed June 10, 2013) (together, the "2013 NLF Filings").

⁴⁸ See 2013 NLF Filings.

⁴⁹ *ILP Initial Study Report*, Docket No. P-1888-000 (filed Apr. 4, 2011); and *Applicant's Response to Initial Study Report Comments by Stakeholders on the Assessment of American Shad at the York Haven Project and Supplemental Data Analysis*, York Haven Hydroelectric Project, Docket No. P-1888-000 (filed Sept. 27, 2011).

study was conducted without any flow originating from the Main Dam apex area to attract shad, resource agencies suggested that installation of a rock ramp NLF in this location with substantial attraction flow at the NLF area (5% or more of the total river flow) should provide timely and effective upstream passage (and possibly downstream passage) of American shad and other migratory and resident fish species. YHPC agreed to pursue this fish passage option at the resource agencies' request.⁵⁰

2. The NLF Facility and Upstream American Shad Passage

a. NLF Facility Concept and Design Criteria

At the urging of the Resource Agencies, YHPC investigated the concept of developing a nature-like fishway facility at or near the apex of the Main Dam and TMI. A nature-like fishway substantially differs from a technical fishway (fish ladder and fish lift facilities), such as those installed at the downstream Susquehanna River dams. A nature-like fishway would consist of a channel over or around the dam that is designed to emulate the slope, roughness, and hydraulic complexity of a natural rocky shoal or riffle reach of the river.

YHPC engaged the services of Luther Aadland, PhD, a nationally-recognized expert experienced in NLF design and operation, to assist in conducting a feasibility study of the NLF concept. In that process, a series of alternative design configurations were developed and evaluated, as reported in the *York Haven Project Nature-Like Fishway Conceptual Design Report* ("*NLF Conceptual Design Report*"), filed with the Commission on March 15, 2013.

The principal focus of YHPC and the Resource Agencies throughout this process was to locate the proposed NLF Facility in an area that would have a high potential for facilitating passage of adult American shad during their upstream spawning migration, and the restoration of habitat connectivity by facilitating upstream and downstream movement of other species. To that

⁵⁰ *Id.*

end, the NLF has been sited in an area that meets these goals while minimizing adverse environmental effects to the greatest extent practical.

In the course of developing the *NLF Conceptual Design Report*, YHPC held a series of informational meetings to solicit stakeholder input for the design of the NLF. The information obtained during these meetings supplemented the research and engineering conducted by YHPC's consultants to make further refinements and improvements to proposed NLF Facility concept. The Settlement Agreement provides for implementing what was identified as Option 4 in the *NLF Conceptual Design Report*, meeting design criteria that are described in Appendix A to the Settlement Agreement. Consultation with Resource Agencies is continuing in order to refine details of the design and overall construction of the NLF Facility.⁵¹

As described in Appendix A to the Settlement Agreement, the proposed NLF Facility will be located at the apex of the Main Dam and abutment with the west shore of TMI, so that the downstream entrance is located near the toe of the existing dam to optimize access for fish. Locating the NLF at the apex also aligns it with the top of a natural thalweg channel between the powerhouse tailrace and the Main Dam apex that migratory fish are expected to follow. The gradient of the NLF channel is designed to closely match the gradient of the steeper reaches of that natural thalweg channel. Thus, the NLF Facility is located where upstream migrating fish are expected to concentrate, is consistent with natural channel gradient, and is supported by relicensing studies which showed that 78% of radio tagged American shad that reached the Project area approached the NLF vicinity at the apex of the Main Dam at least once without any additional attraction flow release.

The proposed NLF Facility includes a supplemental attraction water facility ("SAWF"), consisting of a channel parallel to and adjoining the NLF's fish passage channel. The SAWF, together with the NLF, will be designed to be capable of conveying during the upstream

⁵¹ *Id.*

American shad passage season at least 5% of River flow when River flows are between 5,000 and 150,000 cfs. This value meets criteria for attraction flow established by the Resource Agencies and prior precedent.⁵² Of this amount, the SAWF and related control structures would be designed to convey variable attraction flow volumes up to 800 cfs, but would have a capacity to be readily modified to convey, if needed, a variable flow volume of up to 1000 cfs. The agreed-upon design criteria would provide for the possibility of water being delivered along the length of the SAWF channel through a series of weirs into the fish passage channel, and over one or more weirs at the downstream end of the SAWF, with the flexibility to adjust flow delivery direction.

The Settling Parties believe that the NLF Facility at the apex location meeting the design criteria in Appendix A of the Settlement Agreement can achieve the goal of providing safe, timely, and effective fish passage that maintains the economic viability of the Project.

The proposed NLF Facility is consistent with the primary goal of the Susquehanna River Anadromous Fish Restoration Cooperative's ("SRAFRFC") 2010 Susquehanna River migratory fish management and restoration program, which is to produce a self-sustaining annual population of 2,000,000 American shad, reproducing in the free-flowing Susquehanna River and tributaries above the York Haven Project by 2025.⁵³ The York Haven NLF Facility is designed to

⁵² National Oceanic and Atmospheric Administration (NOAA). 2012. Diadromous Fish Passage: A Primer on Technology, Planning, and Design for the Atlantic and Gulf Coasts, available at: www.nero.noaa.gov/hcd/docs/FishPassagePrimer.pdf. (Accessed January 11, 2013).

⁵³ *Migratory Fish Management and Restoration Plan for the Susquehanna River Basin*, SRAFRFC, (Approved Nov. 15, 2010) ("SRAFRFC 2010"). Specifically, Task A1 of the SRAFRFC restoration plan states:

Task A1: Develop and implement upstream passage plans and performance measures at all four lower river hydroelectric dams to ensure that each facility passes at least 75 percent of the adult American shad passed at the next downstream facility, or at least 85 percent of the adult American shad reaching project tailwaters. Incorporate upstream passage plans and evaluation requirements in FERC licenses. Recommend or conduct evaluation studies as necessary. Require additional fish passage capacity, as needed, to meet fish passage targets.

achieve the 2010 SRAFRRC migratory fish restoration plan Task A1 objectives at the Project and is a major step towards reaching the Susquehanna River restoration goals.⁵⁴

b. NLF Facility Implementation Schedule

All parties recognize that this innovative approach to fish passage takes careful planning and considerable time to design, permit and construct. YHPC has prepared a detailed implementation schedule for the NLF Facility based upon Resource Agency consultations, review of all federal, state and local permitting requirements, and site knowledge. This detailed schedule is presented in Exhibit A to this Explanatory Statement. YHPC believes this schedule is reasonably achievable, provided that all involved entities (including the applicable permitting agencies) cooperate and act in a reasonably expeditious manner.⁵⁵ This schedule includes the following tasks related to construction of the NLF Facility: (1) field surveys required for design and environmental evaluation; (2) engineering design; (3) permitting; (4) construction; and (5) initial fishway performance monitoring and fishway modifications.

In anticipation of the FERC License issuance and in an effort to move the schedule along as quickly as possible consistent with sound planning, select engineering and environmental field surveys necessary for NLF Facility design and permitting were initiated in 2013 with the majority of the surveys to be completed in 2014. These surveys include:

- Geologic and geotechnical investigations including foundation rock coring, fishway rock inventory and mapping of useable construction stone and rock in the river for the NLF Facility.
- A field ground survey and bathymetry mapping.
- Additional bald eagle survey.
- Bog turtle habitat assessment.

⁵⁴ York Haven License Application, at Exhibit E, Section 3.5.4.1; and 2013 NLF Filings.

⁵⁵ As with any in-river construction project, unusually high river flow events can prolong the construction schedule.

- Rare, threatened and endangered (“RTE”) species survey in the precise locations of construction activity.
- Vegetation cover type mapping, wetlands, and invasive species survey in the precise locations of construction activity.
- Dam stability evaluations.

Preparation of baseline surveys and maps related to 2013/2014 surveys will be completed primarily in 2014. These surveys and evaluations will address elements required for the U.S. Army Corps of Engineers (“Corps”) Federal Clean Water Act § 404 permit (“404 Permit”) as well as engineering design.

As set forth in greater detail in Exhibit A, YHPC expects to proceed with design and implementation of the NLF Facility in accordance with the following schedule:

(1) YHPC will complete the required field studies predicate to design of the NLF Facility during the summer/fall season of 2014, and will thereafter prepare reports as to the results of those studies, which will be provided to the Resource Agencies.

(2) YHPC will develop the final plans and specifications for the NLF facility in consultation with FWS, National Marine Fisheries Service (“NMFS”), PADEP, and PFBC, consistent with the design criteria in Appendix A to the Settlement Agreement.

(3) By March 31, 2015, YHPC will prepare and submit to the Resource Agencies a functional design of the NLF Facility, including hydrologic and hydraulic analyses, NLF configuration and dimensions, general arrangements drawings with plan and profile views, and draft elements of applications for an Corps Clean Water Act § 404 Permit, a § 401 Water Quality Certification, and an NPDES Permit for Stormwater Discharge Associated with Construction Activities.

(4) YHPC will provide a minimum of 60 days for the Resource Agencies to submit comments on such plans and for approval of such plans by FWS and PADEP.

(5) By July 15, 2015, YHPC will prepare and submit (i) a complete application to the Corps for a Clean Water Act § 404 Permit; (ii) an application to PADEP for a § 401 Water Quality Certification; and (iii) an Erosion and Sedimentation Control Plan and application to PADEP for an NPDES Permit for Stormwater Discharge Associated with Construction Activities. There are a number of elements required for the § 404 Permit including coordination and correspondence with resource agencies, pre-application meeting(s) with the Corps, Pennsylvania Natural Diversity Inventory (“PNDI”) search, special-species habitat screening, cultural resource notice, environmental assessment form, hydrologic and hydraulic analysis, stormwater management analysis, erosion and sediment control plan and approval letter, alternatives analysis, mitigation plan, floodplain management analysis, risk assessment, cumulative impact screening form, and general information form.

(6) The schedule provides a period of up to 14 months for Corps review of the § 404 Permit application (July 2015 to September 2016). This time frame is considered reasonable, considering requirements for plan review, environmental assessment and agency consultation.

(7) By January 31, 2016, YHPC will prepare and submit to FERC complete engineering designs for the NLF Facility and a request for construction approval. If the Corps §404 Permit is issued after January 31, 2016, the schedule provides for YHPC to submit the Corps §404 Permit to FERC and, to the extent necessary, promptly prepare and submit to FERC any changes to the engineering designs necessitated by the Corps § 404 Permit. No plan shall be implemented until YHPC receives the Commission's approval.

(8) Within 150 days of obtaining all required governmental approvals for construction of the NLF Facility (including the Corps §404 Permit, the §401 Water Quality Certification, the NPDES Permit for Stormwater Discharge Associated with Construction Activities, and FERC approval of construction plans), YHPC will complete the process of soliciting and evaluating bids and will enter into construction contracts for the NLF Facility.

(9) The construction period is expected to require three low flow construction seasons. Due to river conditions, rock retrieval is expected to occur over a two to three year period. As rock is retrieved from the River, it will be stored in designated staging areas until the NLF Facility construction commences. Construction is expected to be completed in 2021 concurrently with the third year of rock retrieval.

c. Measures Reflected in the Settlement Agreement Relating to NLF Facility Implementation and Upstream American Shad Passage

Section 3.1.1 of the Settlement Agreement requires that YHPC will finance, design, permit, and install a NLF Facility in the vicinity of the apex of the Main Dam and TMI, in substantial compliance with the design criteria set forth in Appendix A to the Settlement Agreement. Engineering design, governmental approvals, construction, and initial operation of the NLF facility is to occur by November 30, 2021. This schedule assumes that the Commission issues the new license by September 1, 2014 and that there is premised on timely review and approval of plans and government approvals by involved agencies. If circumstances beyond YHPC's reasonable control make YHPC unable to complete construction of the NLF facility by November 30, 2021, Licensee may ask FERC for a reasonable extension of time.⁵⁶

NLF Facility operations and routine maintenance will be performed by YHPC. These routine maintenance measures include (i) periodic inspections of the NLF Facility; and (ii) the management and removal of debris from the NLF Facility to maintain the functioning and operability of the NLF Facility sufficient to allow and not significantly impede the passage of fish. As part of the maintenance and operation of the NLF Facility, YHPC is also required to prepare an NLF Facility operations and maintenance plan (the "NLF O&M Plan"), and submit the

⁵⁶ Settlement Agreement, at Section 3.1.1(a).

NLF O&M Plan for review to the Resource Agencies and for approval by PADEP and the FWS prior to its submission to the Commission.⁵⁷

As described in Section 3.1.3(a) of the Settlement Agreement, starting with completion of the NLF Facility and running through the first American shad upstream passage season, NLF Facility operations will be a “shake-down” period, during which YHPC will conduct visual observations and make adjustments to the NLF Facility to address any unanticipated inhibitions or barriers that impede NLF Facility Performance. This “shake-down” period will allow, for example, for adjustments in rock placement to address flow sheers or other conditions that may inhibit shad movement up through the NLF channel.

Starting with the second American shad upstream passage season following completion of the NLF Facility, fishway effectiveness monitoring will be commenced, consisting of an adult American shad radio-telemetry study conducted as described in Section 3.1.3 and Appendix C to the Settlement Agreement.

In addition, YHPC shall perform post-construction monitoring of the NLF Facility and its effectiveness per the provisions of the Settlement Agreement, in consultation with the Resource Agencies. The results of those monitoring activities will be submitted to the Resource Agencies and the Commission.

The general parameters for the telemetry studies are described in Appendix D to the Settlement Agreement. YHPC is to prepare a NLF monitoring plan prior to the start of the second upstream American shad passage season following completion of the NLF facility, for Resource Agency and then Commission's review.

The target established by the Resource Agencies is for at least 75% of upstream migrating American shad passing the Safe Harbor Dam to pass upstream of the Project through the NLF facility and the East Channel Fish Passage Facility. This target is referred to in the

⁵⁷ Settlement Agreement, at Section 3.1.2.

Settlement Agreement as the “Upstream Shad Passage Target”; and the NLF Facility is to be designed and operated to be capable of achieving the Upstream Shad Passage Target provided that adequate numbers of upstream migrating American shad reach the Project area.

However, as noted previously, the 2010 radio-telemetry study of upstream migrating American shad showed that only 70% of the shad released at the Safe Harbor project even reached the downstream end of the York Haven Project areas, while 30% did not traverse the intervening 25 miles of River between the two projects. This significant drop-off may be related to the availability of spawning areas in the intervening River area and associated tributaries, coupled with relatively low density of shad populations; and may be affected as well by other factors beyond the influence of the York Haven Project.

The Settling Parties recognize that the York Haven Project cannot be held accountable for such circumstances beyond the Project’s influence. For this reason, Section 3.1.3(c) of the Settlement Agreement provides that YHPC will not be deemed in violation if the Upstream Shad Passage Target is not achieved for reasons beyond the reasonable control of the Project, provided that YHPC complies with certain other conditions, including demonstration in two years of telemetry monitoring that at least 85% of the tagged American shad that enter the project area exit the combination of the NLF Facility and East Channel Fishway (the “Project Area Passage Success Criterion”). The Project Area Passage Success Criterion is consistent with the 2010 SRAFRC plan Task A1 goal (see footnote 53, above).

In addition, YHPC will, in consultation with the Resource Agencies, evaluate the results of the NLF monitoring plan to determine if there are barriers to timely passage of upstream migrating shad.⁵⁸ If such barriers are discovered within the Project area, YHPC shall submit to the Resource Agencies a plan for actions to address the barriers (provided that the Project shall

⁵⁸ Settlement Agreement, at Section 3.1.3(d).

not be required to undertake curtailment of generation). The plan will be subject to review and approval by PADEP and FWS, after which YHPC shall implement the approved plan.

If monitoring does not indicate achievement of the Project Area Passage Success Criterion, YHPC is to take certain measures, as appropriate and necessary after consultation with the Resource Agencies. The adaptive measures listed in Section 3.1.3(e) of the Settlement Agreement (such as evaluation of fishway hydraulics and access for velocity and shear stress barriers, adjustment of rock weir and attraction water discharge positions, adjustments in attraction flow amounts up to a total of 1000 cfs), reflect those adaptive adjustments that the Settling Parties believe may be useful and reasonable to address any shortfall in achieving the Project Area Passage Success Criterion.

Separate from the effectiveness monitoring using radio-telemetry methods, Section 3.1.3(f) of the Settlement Agreement provides that the upstream end of the NLF facility is to be designed to accommodate installation of Passive Integrated Transponder (“PIT”) tag monitoring devices at such time that such PIT tag monitoring devices become available and feasible for reliably monitoring American shad marked with PIT tags by others, exiting the NLF facility. Currently, the PIT tag monitoring devices presently available would probably not be able to effectively monitor tagged fish leaving the NLF, given the configuration of a nature like fishway facility. However, PIT tag monitoring devices may improve in terms of sensitivity and range. Accordingly, the Settlement Agreement provides that when requested by PADEP or FWS, YHPC will conduct a feasibility study to determine whether a PIT tag monitoring facility can be successfully installed and maintained at that location. YHPC will install PIT tag readers (or other monitoring technology that may be agreed upon) after consultation with the Resource Agencies, at the upstream end of the NLF facility when such technology becomes available, feasible, and technically sound⁵⁹ as a means of detecting PIT-tagged American shad at the exit of the NLF

⁵⁹ At various points in the Settlement Agreement, the Settling Parties have agreed that certain measures will be considered and implemented if they are feasible, appropriate under the circumstances,

facility. The Settling Parties contemplate that the monitoring will use American shad PIT tagged downstream, by others, in order to monitor overall effectiveness of American shad upstream passage at all four dams within the lower Susquehanna River.⁶⁰

Upstream passage of American shad and other migratory species measures included in Section 3.1 of Settlement Agreement (which would be incorporated into Article 1 of the License) specifically address a resource that is associated with Project-affected aquatic habitats in the Project Boundary. Enforceability of these measures is ensured by reporting requirements to FERC and Resource Agencies, and specific monitoring requirements and time lines for adaptive management measures.

Recognizing the considerable investment and expenditure required to implement the NLF Facility and related operational activities or adjustments as described in the Settlement Agreement, the Settling Parties contemplate that YHPC will not be required to design or install any other fish passage facility at the Project before 2041.⁶¹

3. Upstream passage of American eels.

Section 3.1.4 of the Settlement Agreement addresses the upstream passage of juvenile American eels.

The American eel population decline in the Susquehanna River has been attributed to the construction of the downstream mainstem high dams that do not provide adequate upstream passage for eels.⁶² Additionally, concern has been raised that declines in eastern *elliptio* mussel

reasonable, and technically sound. This formulation considers the combination of technical, logistical, effectiveness, economic and environmental issues to determine what measures are feasible, reasonable and appropriate under the circumstances.

⁶⁰ Settlement Agreement, at Section 3.1.3(f).

⁶¹ Settlement Agreement, at Section 2.5.4(c) (noting that this does not constitute a waiver by FWS of its prescription authority under § 18 of the Federal Power Act).

⁶² York Haven License Application, at Exhibit E, Section 3.5.4.1; *and* SRAFRC 2010.

populations may be related to declines in American eel numbers within the Susquehanna River.⁶³ American eels currently cannot naturally migrate up to the York Haven Project due to downstream barriers. However, these issues are being addressed through measures targeted at improving passage at downstream dams as envisioned by the 2010 SRAFRFC migratory fish restoration plan. The FWS is also currently stocking juvenile eels upstream of the Conowingo Dam and other lower Susquehanna River dams (*i.e.*, above the York Haven Project), via trap and transport.⁶⁴ It is assumed that upstream passage of eels in the lower Susquehanna River will continue to improve in the future and will create the need for adequate eel passage at the York Haven Dam.

In order to assess potential effects of the Project on American eel, YHPC conducted a desktop American eel passage study. The results of this study are reported in the relicensing study report entitled *American Eel Passage Study Report* (“American Eel Report”).⁶⁵ Generally, the American Eel Report found that while the Project currently has no upstream fish passage facility specifically designed for American eel, the existing Project features (*i.e.*, low head spillways, wetted and rough concrete surfaces, and vegetated banks) should allow adequate upstream passage of American eels.⁶⁶

The Settlement Agreement stipulates that YHPC will provide for upstream passage of juvenile American eels through the maintenance of the existing Project and the installation of the NLF Facility. Based on current understanding of the behavior of juvenile American eels and the

⁶³ Minkkinen, S. and I. Park. 2008. *American Eel Sampling at Conowingo Dam 2008*. Maryland Fishery Resources Office. December 12, 2008; and Minkkinen, S., J.L. Devers, W.A. Lellis, and H.S. Galbraith. 2010. *Experimental Stocking of American eels in the Susquehanna River Watershed - 2010 Annual Report*. Mitigation Project for: City of Sunbury, Riverbank Stabilization Project. DA Permit Application Number: NAB 2005-02860-PO5 [Online] URL: <http://www.fws.gov/northeast/marylandfisheries/reports.html> (Accessed: January 27, 2012) (“Minkkinen et al. 2010”).

⁶⁴ Minkkinen et al. 2010; and York Haven License Application, at Exhibit E, Section 3.5.4.1.

⁶⁵ Initial Study Report, Docket No. P-1888-000, at Appendix E, American Eel Passage Study Report (“American Eel Report”) (filed Apr. 4, 2011).

⁶⁶ York Haven License Application, at Exhibit E, Section 3.5.4.1.

NLF Facility design, the Settling Parties believe that construction of the NLF Facility together with the existing design of the Project will be adequate for successful upstream passage of American eels past the Project. No other PM&E measures are presently believed necessary for successful upstream passage of juvenile American eels at the Project.⁶⁷

The American eel measures in the Settlement Agreement for inclusion in the License at Article 2 specifically address a resource that is associated with Project-affected aquatic habitats in the Project Boundary. Enforceability of these measures is ensured by reporting requirements to FERC and Resource Agencies, and specific time lines and monitoring requirements for completion of designated enhancement efforts.

4. Downstream passage of post-spawning American shad.

Downstream passage of adult American shad after spawning is addressed in Section 3.1.5 of the Settlement Agreement.

As part of the relicensing of the Project, and in accordance with study plans approved by FERC,⁶⁸ YHPC completed a post-spawning adult American shad radio-telemetry study. Study results were reported in the *York Haven Project 2012 American Shad Radio Telemetry Study Report* (“*2012 Radio Telemetry Report*”).⁶⁹ Generally, the *2012 Radio Telemetry Report* found that the total downstream passage survival of post-spawning American shad was at least 83%. The American shad radio telemetry study further showed that all of the monitored fish that passed the Project did so prior to the end of June. YHPC also evaluated adult sized shad using a total Project survival spread sheet model at similar flows to those recorded during the 2012 telemetry

⁶⁷ Settlement Agreement, at Section 3.1.4.

⁶⁸ Study Plan Determination for the York Haven Hydroelectric Project, Project No. 1888-027 (issued by FERC on April 12, 2010); Determination on Requested Modifications to Study Plan for the York Haven Hydroelectric Project (issued by FERC on August 10, 2011).

⁶⁹ *Response of York Haven Power Company, LLC*, Docket No. P-1888-030, at Attachment 1 “2012 American Shad Radio Telemetry Study Report” (filed Dec. 31, 2012) (“*2012 Radio Telemetry Report*”).

study, and the model predicted total Project adult shad downstream passage survival in the same range of 80 to 85%.

Therefore, studies and model results conducted to date indicate that the existing Project operations, without any enhancements, meet the 2010 SRAFRFC migratory fish restoration plan objective of at least 80% successful passage of post-spawning adult American shad. The Settling Parties anticipate that the measures described in the Settlement Agreement, including the NLF Facility, will improve downstream passage of post-spawning adult American shad, and that installation and operation of the NLF Facility together with continuation of existing operations, and opening of the Forebay Sluice Gate for 1 to 2 hours to the extent practicable during the morning on weekdays during May and June if river flow exceeds certain values, will meet the 2010 SRAFRFC migratory fish restoration plan objective.⁷⁰ Opening the sluice gate is subject to Project personnel availability and access requirements for operations and maintenance purposes. The Settling Parties note that spilling may be provided in connection with opening the sluice gate for purposes of passing debris, and that during debris passage, it will not be feasible to utilize the chute gate structure referenced in Section 3.1.6(e), as that structure would be damaged by such debris.

Accordingly, the Settling Parties have agreed that no additional specific operational or structural measures are presently required for purposes of downstream post-spawning adult American shad passage

Measures for downstream passage of post-spawning American shad as described in Section 3.1.5 of the Settlement Agreement, which would be included in License Article 4, specifically address a resource that is associated with Project-affected aquatic habitats in the Project Boundary. Enforceability of these measures is ensured by reporting requirements to the

⁷⁰ 2012 Radio Telemetry Report. See also Settlement Agreement, at Section 3.1.5 (a) and (b).

Commission and the Resource Agencies, and specific time lines for completion of designated enhancement efforts

5. Downstream passage of juvenile American shad.

Section 3.1.6 of the Settlement Agreement addresses issues relating to downstream passage of juvenile American shad.

a. Studies and Discussion with Resource Agencies Underlying Measures

The annual downstream migration period for juvenile American shad varies depending upon Susquehanna River water temperature and flow conditions. Based on empirical data collected at the Project and other sites, the downstream juvenile American shad migration in the vicinity of the Project effectively begins in early October and runs through mid-November. For purposes of Project operations, in order to provide for safe, timely and effective downstream passage, the “Downstream Juvenile American Shad Passage Period” is assumed and defined to extend from October 1 to November 30. Based on site-specific studies conducted at the Project, at other lower Susquehanna River projects, and at other projects in the eastern United States, most juvenile American shad move downstream in schools at night, primarily from sunset to before midnight.⁷¹

In the late 1980s and early 1990s, a series of fish movement and behavior studies in the York Haven powerhouse forebay documented the migratory pathways of juvenile American shad in relation to turbine intake entrainment and an alternative downstream passage route at the forebay debris sluice gate. This led to a series of studies using strobe lights, mercury vapor lights, and sound as a behavioral guidance to avoid turbine entrainment and enhance sluice gate downstream passage. Hydroacoustic technology, with supplemental netting for verification, was utilized to monitor the behavior of juvenile American shad in the forebay as they approached the

⁷¹ York Haven License Application, at Exhibit E, Section 3.5.4.1 and studies cited therein.

powerhouse, and to evaluate the effectiveness of the various behavior guidance systems or changes to powerhouse operations (*e.g.*, strobe lights, unit shutdowns, etc.). In 2000, a balloon tag study of juvenile shad survival through representative generating turbines at the York Haven Powerhouse was performed to further refine the understanding of juvenile shad downstream passage survival at the Project. These studies are summarized in Table 1, below.

TABLE 1
SITE-SPECIFIC AMERICAN SHAD STUDIES
CONDUCTED AT THE YORK HAVEN PROJECT

Year	Study Type	Methods/Operations	Results
1985	Hydroacoustic study	Normal operations – testing hydroacoustics for monitoring juv. shad behavior – mid/late October	Hydroacoustics worked well at observing juv. shad in the forebay, juv. Shad congregated near Unit 1, movement into the forebay occurred at night.
1986	Hydroacoustic study	Monitored shad behavior throughout October and November under 2 test conditions (Units 1-3 on and off)	Peak movements between mid-October and early November around dusk. Shad traveled along west side of forebay with the main flow. Unit1-3 shutdowns attracted fish toward Unit 4.
1987	Hydroacoustic study	Monitored shad behavior during the peak weeks of movement in October and November under 2 test conditions (Units 1-3 on and off)	Similar results to 1986 study. Peak night movements between 1700 and 2000 hours.
1988	Hydroacoustic study, strobe lights and sound tests	Monitored juvenile shad behavior and guidance in response to strobe lights and sound to improve passage through the sluice gate using hydroacoustics.	Fish moved from Units 1-3 toward the sluice gate when the gate was opened, and moved through within 5 minutes of sluice gate opening. Strobe light successful in moving fish toward and through the sluice gate. High passage rate under control condition (no light) between 7-11pm.
1989	Hydroacoustic study, strobe lights and sound tests	Same study as 1988	High flows – no fish observed in the forebay; fish apparently passed over the dam.
1990	Hydroacoustic study, strobe lights and sound tests	Same study as 1988	High flows – no fish observed in the forebay; fish apparently passed over the dam.
1991	Hydroacoustic study - strobe lights	Same study as 1988, but used trammel nets to capture fish passing through Unit 1 and the sluice gate	94% of fish were observed moving through the sluice gate when the strobe lights were activated. High passage rate under control condition (no light) at dusk.
1992	Hydroacoustic study - strobe lights	Similar study to 1991 – tested new prototype strobe lights and evaluated use of the exciter bay	Exciter bay passage not feasible. Successful observations of strobe lights diverting fish to sluice gate

Year	Study Type	Methods/Operations	Results
1993	Hydroacoustic study, strobe lights and sound tests	Similar study to 1991 – tested the use of sound with lights	Total juvenile shad net catches in the sluice gate were greater than 97%, and often 100% of the catch compared to the tailrace net catches when light and sound were used
1994	Downstream adult shad passage telemetry study	Radio tagged adult shad tagged and released above the Project	Only 1 of the 20 (5%) tagged shad were entrained through the powerhouse
2000	Balloon tag turbine survival study	Juvenile American shad balloon tagged, released into turbines, and recaptured downstream	Survival rate of 93% was observed for the Kaplan turbine, while 77% survival was observed for the Francis turbine
2012	Downstream adult shad passage telemetry study	64 adult shad captured at Conowingo Dam, radio tagged, and released in Harrisburg. Monitored downstream migration at the Project.	At least 80% of shad that reached the Project successfully passed downstream of Haldeman Island. 22% passed through the sluice gate, 25.4% passed through the turbines, 50% passed over the dam, 1 fish passed through the East Channel.

Based on the result of these studies, YHPC currently implements a downstream American shad passage protocol during the two periods of downstream passage: immediately after upstream passage season in spring for post-spawning adult shad; and juvenile shad migration in fall. This protocol was filed with the Commission in 2002.⁷²

⁷² See e.g. *York Haven Power Company submits its downstream passage report re York Haven Project*, Docket No. P-1888 (filed Mar. 19, 2002).

The protocol contains the following three main elements that are implemented when shad are detected in the forebay:

- (i) When river flow is less than Project capacity, prioritization of powerhouse generation through units 1 through 6 (propeller units) on a first-on/last-off basis, followed by units 7 through 20 (Francis);
- (ii) Opening of the forebay sluice gate for downstream fish passage located in the lower forebay corner adjacent to unit 1; and
- (iii) Utilization of temporary lighting above the debris sluice gate to aid in attracting alosine fish to the sluice gate exit.

YHPC included in the Final License Application the proposal to continue implementation of the existing downstream American shad passage protocol.

b. Summary of License Measures

Section 3.1.6 of the Settlement Agreement provides for measures to be implemented during two different periods: (1) from license issues through NLF Facility completion; and (2) after NLF Facility completion.

Between issuance of the new license through completion of the NLF Facility, YHPC will continue to implement certain protocols to facilitate downstream passage of juvenile American shad during the Downstream Juvenile American Shad Passage Period. Those protocols include: (i) operating Project units in certain order of priority depending on available river flow (with the stipulated priority order targeted to prefer use of the propeller units (1-6), which have highest survival for juvenile shad, on a first-on/last-off basis); (ii) opening and spilling water equal to approximately 370 cfs⁷³ via the forebay sluice gate during specific evening hours to facilitate shad movement downstream; and (iii) opening and spilling water equal to approximately 370 cfs via the forebay sluice gate, for one to two hours during the morning (subject to Project access requirements), if river flow exceeds the sum of Project Hydraulic Capacity, required flows through the NLF facility, required flows through the east Channel, and required flows (if any) over the Main Dam.⁷⁴

After completion of the NLF facilities, similar but updated protocols will apply, under which YHPC will (i) operate the Project units according to the order of priority specified in the Settlement Agreement, depending on available river flow; (ii) open and spill water equal to approximately 370 cfs via the forebay sluice gate during specific evening hours; and (iii) the NLF Facility will be operated to maintain a flow through the fishway of approximately 200 cfs.⁷⁵

⁷³ The stated value of 370 cfs represents the maximum flow through the sluice gate at the estimated normal pool elevation in the forebay of 277.9 feet NGVD. **Exhibit B** to this Explanatory Statement contains a memo providing the a calculation of the flow and depth of water through the sluice gate and passby channel to the downstream plunge pool.

⁷⁴ Settlement Agreement, at Section 3.1.6(a).

⁷⁵ Settlement Agreement, at Section 3.1.6(b).

The goal for juvenile American shad downstream passage is survival of 95% of juvenile American shad from above the Project powerhouse and dam to below the Project powerhouse and dam (the “Downstream Juvenile American Shad Passage Goal”). This goal is derived from and conforms with the 2010 SRAFRC migratory fish restoration plan.⁷⁶ The Settling Parties have recognized that given a variety of factors, measurement of such passage effectiveness and survival is subject to a margin of error. The Settling Parties have agreed that effectiveness of downstream passage operations for juvenile American shad will be determined based upon a combination of (1) confirmation that the Forebay Sluice Gate provides for safe passage through implementation of certain improvements to the Sluice Gate and downstream plunge pool as described in Section 3.1.6(e) of the Settlement Agreement; and (2) a route of passage analysis based on certain assumptions concerning survival rates via various routes of downstream passage coupled with monitoring to determine the ratio of shad entering the forebay that avoid the turbines by passing through the Forebay Sluice Gate / plunge pool pathway.

The Sluice Gate and downstream plunge pool improvements will be completed within four years of License issuance and prior to performance of downstream juvenile shad passage studies as described below. A new chute structure will be designed and installed to convey flows from the Forebay Sluice Gate over and beyond the loading dock roadway on the downstream side of the sluice gate structure. This chute structure is to meet design criteria set forth in Exhibit E to the Settlement Agreement, which were developed by FWS, specifically providing a water depth of at least 12 inches (two times the body depth of an adult American shad). The plunge pool is to be maintained to provide a depth of 1 foot for each 4 feet in drop from the end of the chute to the water surface into which fish would land. These design criteria are expected to provide for ~100% survival of shad passing through the Forebay Sluice Gate, chute and plunge pool

⁷⁶ Settlement, at Section 3.1.6(c).

pathway.⁷⁷ These design plans and proposed implementation schedule are to be provided to FWS and PADEP for their review and approval prior to submission to the Commission for its approval.⁷⁸

Based on the assumptions and analysis discussed below, the Settling Parties agree that the Downstream Juvenile American Shad Passage Goal will be deemed met if at least 60% of tagged juvenile American shad released into the headrace and powerhouse forebay, pass downstream of the Project without passing through the turbines (the “Headrace Shad Turbine Avoidance Target”). Downstream passage efficiency will be tested by a PIT tag monitoring study approved by the Resource Agencies consistent with the design criteria listed in Appendix D to the Settlement Agreement.⁷⁹

The Downstream Juvenile Shad Passage Goal and the associated approach for determining passage efficiency are based on generally-accepted procedures for calculating total Project downstream passage survival using route-of-passage analysis. This route-of-passage analysis assumes that fish are distributed among downstream passage routes at a 1:1 ratio with flow through those passage routes. More specifically, this calculation assumes: (1) juvenile American shad will pass through the NLF Facility, through the East Channel past the East Channel Dam, over the Main Dam, and into the headrace in direct proportion to the amount of flow discharged through each route; (2) any juvenile American shad passing through the NLF Facility, through the East Channel past the East Channel Dam, over the Main Dam, or through the forebay sluice gate will survive; (3) juvenile American shad that do not pass through the NLF Facility, through the East Channel past the East Channel Dam, over the Main Dam, or through the forebay sluice gate will pass through the turbines operated in accordance with the priorities set forth in the Settlement Agreement; and (4) the shad entering the propeller units and Francis units

⁷⁷ Personal communication FWS Region 5 Fishway Engineering plunge pool design criteria.

⁷⁸ Section 3.1.6(e).

⁷⁹ Settlement, at Section 3.1.6(d).

will experience survival at rates based upon previous balloon tag studies and blade strike analyses that are summarized in Table 2. The values shown in bold in Table 2 were those utilized in the survival calculation.

TABLE 2
JUVENILE AMERICAN SHAD SURVIVAL RATES FOR PROJECT TURBINES

Turbine Type (Unit Nos.)	Survival Percentage *					
	Empirical Studies American Shad Juveniles			Turbine Blade Strike American Shad Juveniles		
	Mean	Min	Max	Mean	Min	Max
Kaplan (1-4)	<u>92.7%</u>	82.0%	100.0%	95.9%	91.6%	98.0%
Propeller (5)	-	-	-	<u>95.3%</u>	91.3%	97.4%
Propeller (6)	-	-	-	<u>96.5%</u>	93.5%	98.0%
Double-Francis (7-13 and 15-20)	<u>77.1%</u>	66.0%	88.0%	93.6%	92.4%	94.9%
Single Francis (14)	-	-	-	<u>92.5%</u>	90.9%	94.1%

* Mean values in **underlined bold** to be used in calculations of overall Project survival rates.

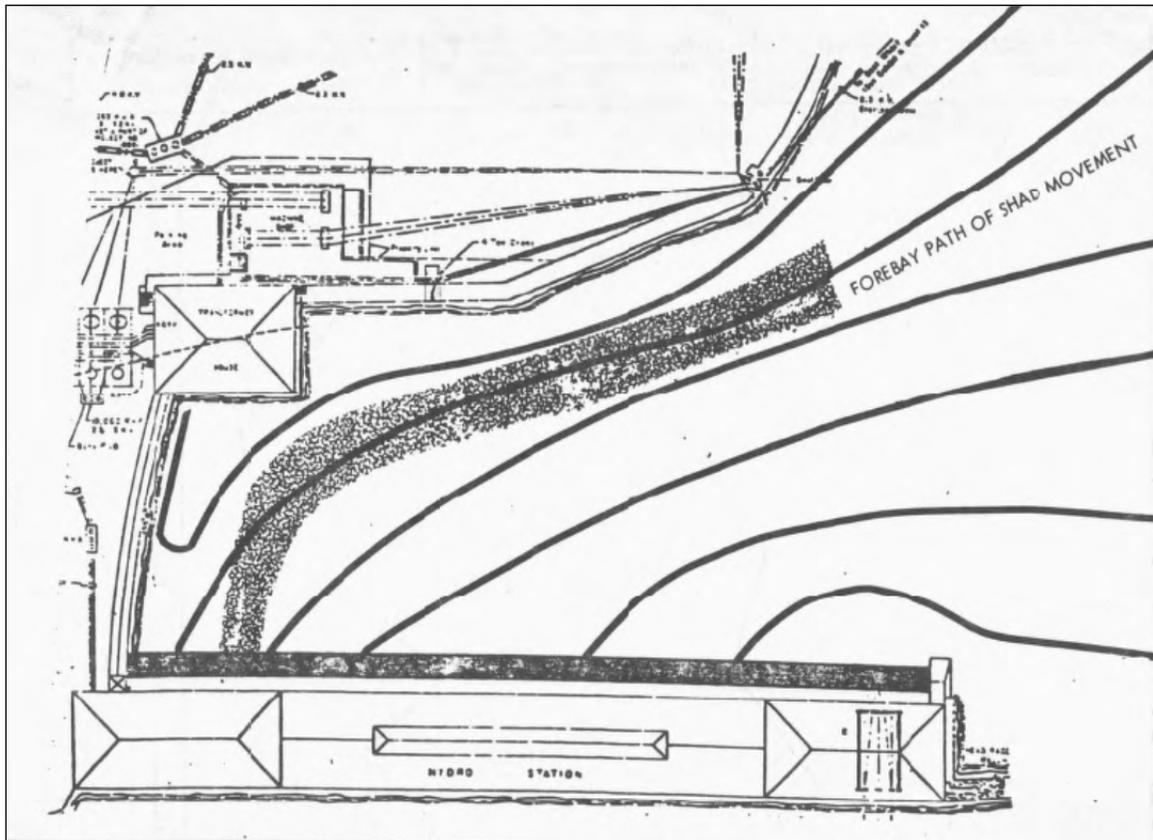
Source: Offer of Settlement, Appendix D

Using these assumptions and generally-accepted procedures for calculating total Project downstream passage survival,⁸⁰ YHPC calculated the survival rate for juvenile American shad to be 90.8% for the October through November juvenile American shad downstream passage period under future baseline conditions, including operation of the NLF Facility.

⁸⁰ FWS, Region 5, Fish Passage Engineers reviewed this methodology and spreadsheet model and concluded that the survival estimates derived by this method were reasonable and acceptable in the absence of direct measurements at the Project.

Note that the overall 90.8% survival rate calculated would be expected to increase if a higher proportion of fish entering the headrace use the Forebay Sluice Gate and a lower proportion of fish are passed through the turbines – a pattern observed in previous downstream passage studies performed at the Project as depicted in Figure 1. YHPC believes that if this pattern continues, the 95% juvenile downstream passage survival target may already be met.

FIGURE 1
THE LOCATION OF JUVENILE AMERICAN SHAD AND THE MAIN CURRENT OBSERVED IN THE FOREBAY AT THE YORK HAVEN PROJECT IN 1986



Source: Barnes-Williams Consultants (BWEC). 1986. Hydroacoustic Evaluation of Juvenile Shad Movement and Passage at the York Haven Power Station. October-November 1986. Job V – Task 2 in the 1986 SRAFR Annual Report published by the U.S. Fish and Wildlife Service, Susquehanna River Coordinator's Office, Harrisburg, PA.

To evaluate if the existing and proposed measures provide for downstream passage survival by 95%⁸¹ of juvenile American shad at the Project, the Settlement Agreement provides for monitoring of juvenile shad sluice gate bypass effectiveness using a tagged sample population of 100 juvenile shad released into the headrace, just upstream of the powerhouse forebay. Because the proportion of downstream migrating juvenile shad entering the powerhouse forebay at the Project varies with river flow, the forebay sluice gate bypass effectiveness required to meet the overall 95% survival goal also varies with river flow. The spreadsheet model used to estimate survival allows for this variance. This model (i) estimates the distribution of fish passing via the forebay (turbine bays and sluice gate) versus non-forebay routes (East Channel, NLF Facility, spillway) based on a 1:1 distribution of fish to flow route (P_{Flow}); and (ii) allocates the subset of fish entering the forebay among the turbines that would be operating at any given river flow (based on the priority of turbine operations protocol) and sluice gate to simulate a given sluice gate bypass effectiveness (P_{shad}).

Example:

For example, as indicated in Table 3, at a river flow of 30,000 cfs, the total Project survival rate would reach 95% if 47% of the juvenile American shad entering the forebay pass downstream through the sluice gate.

⁸¹ The 95% downstream passage survival is a goal determined by the SRAFRFC, as outlined in their 2010 SRAFRFC migratory fish restoration plan.

TABLE 3
TOTAL PROJECT SURVIVAL BASED ON INCREASED SLUICEWAY PASSAGE
EFFECTIVENESS AT A RIVER FLOW OF 30,000 CFS

Passage Route	Total River Flow			
	30,000			
	cfs	P _{Flow}	P _{shad}	P _{Surv}
Spillways	12,258	0.41	0.41	1.00
East Channel Fishway	267	0.01	0.01	1.00
Nature-Like Fishway	200	0.01	0.01	1.00
Powerhouse Trash Sluiceway	370	0.01	0.27	1.00
PH Kaplan Units 1-4	4,400	0.15	0.08	0.93
PH Propeller Unit 5	800	0.03	0.01	0.95
PH Propeller Unit 6	800	0.03	0.01	0.97
PH Single Francis Unit 14	700	0.02	0.01	0.93
PH Tandem Francis Units 7-13	5,495	0.18	0.10	0.77
PH Tandem Francis Units 15-20	4,710	0.16	0.08	0.77
Sum	30,000	1.00	1.00	NA
Total Project Survival (P_{shad})	95.0%			

RESULTS

Total River Flow	30,000
Flow at Forebay	17,275
Total Project Survival	95.0%
Number of <u>Total Shad</u> Approaching the Project	100
Number of Shad Approaching the Forebay	58
Percent of <u>Total Shad</u> Passing Through the Sluiceway	27
Percent of Forebay Shad Passing Through the Sluiceway	47

This is determined by

- (i) using the 1:1 fish to flow ratio (P_{Flow}), to determine that 58% of fish would pass via the forebay (the ratio of 17,275 cfs turbine plus sluice gate flow to: 30,000 cfs total flow) and 42% of the fish would pass via non-forebay routes (12,725 cfs/30,000 cfs);
- (ii) using the model to determine the proportion of total downstream migrating juvenile shad in the Susquehanna River would need to use the sluice gate in order to achieve 95% total survival; this turns out to be 27%.; and

(iii) determining the portion of the fish that enter the headrace to the portion that must exit the sluice gate, by dividing the 27% of shad passing through the sluice gate by the subpopulation entering the forebay ($27/58 = 47\%$).

Thus at a river flow of 30,000 cfs, 47% of the juvenile shad entering the forebay (or in a test, 47% of the tagged shad released into the forebay) would need to pass through the sluice gate bypass to achieve an overall total Project survival rate of 95%.⁸²

Similarly, if the river flow were 15,000 cfs, the model indicates that 66% of shad entering the forebay need to pass through the sluice gate to achieve a 95% survival rate (see Table 4).

**TABLE 4
TOTAL PROJECT SURVIVAL BASED ON INCREASED SLUICEWAY PASSAGE
EFFECTIVENESS AT A RIVER FLOW OF 15,000 CFS**

Passage Route	Total River Flow			
	15,000			
	cfs	P _{Flow}	P _{shad}	P _{Surv}
Spillways	0	0.00	0.00	1.00
East Channel Fishway	267	0.02	0.02	1.00
Nature-Like Fishway	200	0.01	0.01	1.00
Powerhouse Trash Sluiceway	370	0.02	0.63	1.00
PH Kaplan Units 1-4	4,400	0.29	0.10	0.93
PH Propeller Unit 5	800	0.05	0.02	0.95
PH Propeller Unit 6	800	0.05	0.02	0.97
PH Single Francis Unit 14	700	0.05	0.02	0.93
PH Tandem Francis Units 7-13	5,495	0.37	0.13	0.77
PH Tandem Francis Units 15-20	1,968	0.13	0.05	0.77
Sum	15,000	1.00	1.00	NA
Total Project Survival (P_{shad})	94.9%			

RESULTS

Total River Flow	15,000
Flow at Forebay	14,533
Total Project Survival	94.9%
Number of <u>Total Shad</u> Approaching the Project	100
Number of Shad Approaching the Forebay	97
Percent of <u>Total Shad</u> Passing Through the Sluiceway	63
Percent of Forebay Shad Passing Through the Sluiceway	66

⁸² *Id.*

At lower river flows, such as 9,000 and 6,000 cfs, the percentage of shad that must exit via the sluice gate to achieve 95% survival is lower, largely due to the fact that at those flows, the propeller units are operating, and these units have higher survival rates for juvenile shad (which also reflects the reasonableness of the turbine protocol).

Based on this methodology, a series of simulated river flows were run through this model to illustrate how the forebay bypass metric will vary with total river flow (Table 5).

TABLE 5
ESTIMATED SLUICEWAY BYPASS EFFECTIVENESS METRICS AT VARIOUS
RIVER FLOWS OF 6,000 TO 30,000 CFS

Total River Flow	30,000	27,000	24,000	21,000	18,000	15,000	12,000	9,000	6,000
Flow at Forebay	17,275	17,275	17,275	17,275	17,275	14,533	11,533	8,533	5,533
Total Project Survival	95%	95%	95%	95%	95%	95%	95%	95%	95%
Number of Total Shad Approaching the Project	100	100	100	100	100	100	100	100	100
Number of Shad Approaching the Forebay	58	64	72	82	96	97	96	95	92
Percent of Total Shad Passing through the Sluiceway	27	33	42	52	65	63	58	42	20
Percent of Forebay Shad Passing through the Sluiceway	47	52	58	63	68	66	60	44	22

Table 6 provides the summary of the monthly flow in cfs during the passage season and associated exceedance values.

TABLE 6
ANNUAL AND MONTHLY FLOW EXCEEDANCE VALUES
FOR YORK HAVEN DAM, PRORATED FROM USGS GAGE 01570500
AT HARRISBURG, PERIOD OF RECORD = 1931-2010

% Exceedance	October	November
80%	4,736	9,243
50%	9,067	21,450
20%	22,486	39,812

Use of the flow measurements in Table 6 together with the metrics in Table 5, enable determination of the percentage of shad that need to pass through the forebay to achieve the 95% survival target. Thus, for example, at the October median (50% exceedance) flow of ~9,000 cfs in Table 6, the survival target should be met if just 44% of the shad passing through the forebay exit via the sluice gate.

Examining Table 5 (above), also demonstrates two important factors with regard to the relationships between river flow, sluice gate bypass effectiveness and the overall goal of achieving 95% juvenile shad downstream passage survival. First, the highest required forebay bypass effectiveness to achieve 95% survival is 68% at 18,000 cfs.⁸³ Second, the total Project survival has relatively low sensitivity to changes in the percentage of those shad entering the forebay that use the sluice gate.⁸⁴ This sensitivity decreases even further at lower or higher river flows, so that changes in the bypass effectiveness measured by the number of shad passing

⁸³ At 18,000 cfs, there is no spill over the Main Dam and all 20 powerhouse units are operating at hydraulic capacity. If the river flow drops below 18,000 cfs, Francis units are shutting down, thereby increasing survival and decreasing the required forebay bypass effectiveness required to attain 95% total survival. Likewise if river flow exceeds 18,000 cfs, more fish pass over the spillway, increasing survival and decreasing the required forebay bypass effectiveness required to attain 95% total survival. At a river flow of 50,000 cfs only 12% bypass effectiveness is required to achieve 95% total survival.

⁸⁴ As an example, if at a river flow of 18,000 cfs bypass effectiveness drops from 68% to 58% the change in total Project survival is only from 94.9% to 93.3%.

through the sluice gate are largely “fine tuning” the total Project survival rate within the range of 90 to 95%.

The overall metric that the Settling Parties have agreed upon (60% of tagged shad released to the forebay passing downstream via the sluice gate) represents an approximated average of the values shown in Table 5 over the range of flows (20-80% exceedance values) expected in the downstream passage period of October through November. The metrics reflected in the Settlement Agreement are, thus, clearly tailored to maximize benefits and efficiencies.

Certain adaptive measures are required pursuant to the Settlement Agreement if monitoring nonetheless shows that the Headrace Shad Turbine Avoidance Target is not met.⁸⁵ Under Section 3.1.6(f) of the Settlement Agreement, YHPC would implement the following sequence of adaptive measures in the next passage season: (1) open the NLF supplemental flow gate (800 cfs) during the same schedule as the Forebay Sluice Gate is opened; (2) suspend operation of certain Francis turbine units during the hours of 5-11 pm EST when river flows are between 15,000 and 22,000 cfs during the downstream passage seasons, up to a total generation loss of 1,000 MWh, and (3) such other measures as agreed to by YHPC, FWS and PADEP, after consultation with the other Resource Agencies.

The initial adaptive measures are premised on several considerations. Opening the supplemental flow gate at the NLF would be expected to provide an additional route for downstream shad to travel and provide some attraction flow drawing downstream migrating shad toward the NLF Facility. Suspending operation of certain Francis units (which have relatively lower survival rates) during evening hours, when juvenile shad are most likely to be present in the Forebay, would tend to encourage higher numbers of shad to use the Sluice Gate pathway. Such turbine operation suspension would be targeted to those River flows when such suspensions would be anticipated to have the greatest benefit (i.e., within the range of 15,000-22,000, just

⁸⁵ Section 3.1.6(f).

above and below Project hydraulic capacity). The 1,000 MWh cap on resulting generation loss represents a balancing of aquatic benefits compared to electric generation production and revenue loss. As greater information is gained, the parties may identify other mutually-agreed measures, and the Settlement Agreement provides for a process for agreeing on such measures.

The above-described adaptive measures, if applied, would be followed by a repeat Headrace Shad Turbine Avoidance Study to determine if the turbine avoidance target is met by having sufficient numbers of tagged juvenile shad use the Sluice Gate pathway.

If by January 1, 2028, (a) the Headrace Shad Turbine Avoidance Studies have not shown that the Headrace Shad Turbine Avoidance Target is met through the adaptive measures, and (b) based on available information and consultation with YHPC and the other Resource Agencies, FWS and/or NMFS determine that YHPC has not demonstrated that the adaptive measures will meet the Downstream Juvenile American Shad Passage Goal and that additional measures are reasonably required to achieve the goal, then YHPC is required, in consultation with the Resource Agencies, to prepare a design and schedule for additional structural and operational measures anticipated to meet the goal that are feasible, appropriate under the circumstances, reasonable and technically sound. That design and schedule would be subject to approval by FWS and PADEP; and such measures would be implemented by December 31, 2030 or such other date as agreed to by YHPC and FWS, after consultation with the other Resource Agencies or as approved by FERC.⁸⁶

Among other options, YHPC will evaluate options for a fish guidance system. During the course of settlement discussions, YHPC conducted an initial evaluation as to the feasibility of such fish guidance systems. This initial fish guidance system feasibility study looked at current technologies and recent experience, and evaluated the technical feasibility and estimated costs of 9 potential configurations. The fish guidance feasibility study noted particular constraints and

⁸⁶ Section 3.1.6(g) and (h).

design issues surrounding consideration of any fish guidance system at the Project, including headrace geometry and dimensions, bathymetry, forebay flow characteristics, debris and ice issues, portage area locations, and other constraints. Although the FWS generally favored consideration of a fish guidance system option, some of the other Resource Agencies, including PFBC and PADEP, expressed serious doubts concerning the feasibility or benefits of a fish guidance system approach. The Settlement Agreement retains the fish guidance system option for potential future consideration, to be evaluated after other adaptive measures have been tried, at a point in the future where technologies and experience with such systems may have improved.

Thus, the downstream juvenile American shad passage provisions provide specific enforceable, measurable, and adaptive measures to address this resource issue.

6. Downstream passage of silver stage American eel.⁸⁷

Section 3.1.7 of the Settlement Agreement addresses downstream passage of silver stage American eels.

As noted above, substantial American eel populations have not existed in the Susquehanna River for many decades due to the inability of eels to migrate upstream past the series of high dams on the lower Susquehanna below the York Haven Project. Commencing in 2007, a program is being conducted by FWS in cooperation with MDNR and PFBC providing for upstream trap and transport of juvenile American eels from below Conowingo Dam to tributary streams both above and below the York Haven Project. With implementation of that trap and transport program, a growing number of American eels are expected to be maturing and will eventually require downstream passage seven to ten years after their release to upstream locations in the trap and transport effort. This will create the need for safe downstream passage of silver American eels at the Project at approximately the same time as the NLF Facility construction is

⁸⁷ Settlement Agreement, at Section 3.1.7.

completed. The Settlement Agreement has therefore integrated downstream eel passage concerns into the proposed resource measures.

The Settlement Agreement provides an overall goal of effective downstream passage and survival of 85% of silver eels from above the Project dams and powerhouse to below the Project dams and powerhouse (the “Downstream Eel Passage Goal”).⁸⁸ This Downstream Eel Passage Goal is based on Resource Agency population restoration models and is consistent with the 2010 SRAFRC migratory fish restoration plan Task A5. The Settling Parties recognize that due to a variety of factors, measurement of passage effectiveness and survival is subject to a margin of error.⁸⁹

YHPC is required under the Settlement Agreement to cooperate with Resource Agencies and other interested parties (and to provide certain material financial support) in the conduct of certain studies in accordance with the criteria in Appendix G of the Settlement Agreement. Those studies will include (i) cooperating with the FWS on a Lower Susquehanna River Downstream Eel Study to evaluate the timing, magnitude, duration, annual variation and environmental conditions associated with active migration of silver eels from tributaries above York Haven through the Lower Susquehanna River to the Chesapeake Bay, and (ii) a Site-Specific Route of Passage study conducted by YHPC to evaluate the route of passage selected by migrating silver eels in the vicinity of the Project.⁹⁰ It is expected that the FWS will take the lead in conducting the first study, evaluating overall migration patterns of silver eels in the Lower Susquehanna, with YHPC committed to provide and maintain antennas to gather data on those movements that occur in the vicinity of the Project. The Settling Parties anticipate that the overall Lower Susquehanna downstream eel passage study will be conducted in a two year period in the 2017 to 2020 timeframe.

⁸⁸ Settlement Agreement, at Section 3.1.7(a).

⁸⁹ Settlement Agreement, at Section 3.1.7(a).

⁹⁰ Settlement Agreement, at Section 3.1.7(b).

Following the overall Lower Susquehanna River Downstream Eel Study and completion of the NLF Facility, YHPC will conduct a Site-Specific Downstream Eel Study, consisting of a site-specific route of passage study and an eel survival study. The content and design criteria for these two studies are set forth in Appendix G and Appendix H of the Settlement Agreement, respectively. Prior to completion of the NLF facility, YHPC will prepare a plan and schedule for the two elements of a Site-Specific Downstream Eel Study in accordance with the provisions of Appendices G and H of the Settlement Agreement for review and comment by the Resource Agencies and for approval by FWS and PADEP. Once the NLF facility is completed, the Site-Specific Route of Passage Study will be completed to confirm the pathways by which silver eels traverse from above to below the Project. Separately, YHPC will perform a survival study, using a sample of a minimum of 50 eels each to measure survival through one representative Francis turbine unit and one representative propeller unit.

The Site-Specific Route of Passage data and Survival Study data will be combined to produce a model as to the anticipated survival rates for silver eels passing through the Project Area. If those results show that the Project has met the Downstream Eel Passage Goal, then the existing operating measures and protocols shall be continued.⁹¹

If the Site-Specific Downstream Eel Passage Study (route of passage plus survival study) shows that existing operations do not achieve the Downstream Eel Passage Goal, the Settlement Agreement provides for adaptive measures. YHPC will prepare a plan and schedule for evaluating potential modifications to the Project to facilitate eel passage (“Downstream Eel Improvements Study”). That Downstream Eel Improvements Study plan will be subject to review and approval by PADEP, PFBC, and FWS, and will consider a range of specific options listed in Section 3.1.7(e) of the Settlement Agreement for improving downstream eel passage

⁹¹ Settlement Agreement, at Section 3.1.7(c) and (d).

survival.⁹² The Settling Parties have stipulated that the study is not required to consider, as part of such adaptive measures, the curtailment of electric generating operations.

If any of the specific options listed in Section 3.1.7(e) are feasible, appropriate under the circumstances, reasonable and technically sound, and expected to contribute toward achievement of the Downstream Eel Passage Goal, YHPC is mandated to prepare a plan and schedule for implementation of such measures. Upon FWS and PADEP approval of such measures, YHPC will implement those approved adaptive measures. If YHPC does not submit a plan and schedule, then FWS may establish such a plan, subject to dispute resolution procedures.⁹³ After implementation of adaptive measures, YHPC must evaluate their effectiveness and provide a report to the Resource Agencies regarding that effectiveness in relation to achievement of the Downstream Eel Passage Goal. If the adaptive measures are not achieving success, YHPC and the Resource Agencies will on an annual basis consult as to potential additional studies or adaptive measures that are or may over time become feasible, appropriate under the circumstances, reasonable and technically sound.⁹⁴

Measures proposed for downstream passage of silver eels at the Project reflect the uncertainty of not currently having an eel population of sufficient size to study in the Susquehanna River, and the unknowns associated with proposed future restoration efforts. The proposed measures for downstream eel passage carefully balance the facts, concerns, and uncertainties to reach just and reasonable results.

7. Resident fish passage.

Resident fish passage is addressed in Section 3.1.8 of the Settlement Agreement, with provisions for measures both before and after NLF Facility completion.

⁹² Settlement Agreement, at Section 3.1.7(e) (noting however, that the Downstream Eel Improvements Study shall not be required to evaluate curtailment of generation).

⁹³ Settlement Agreement, at Section 3.1.7(f).

⁹⁴ Settlement Agreement, at Section 3.1.7(g) and (h).

Prior to construction and operation of the NLF facility, YHPC will operate the East Channel Fish Passage System per the 2010 Consent Order and Agreement between PADEP and YHPC. During this period (April 1 – December 15), resident fish passage is facilitated by keeping the East Channel Fish Passage Facility open before and after the upstream American shad passage season until the onset of winter as described previously.

After completion and operation of the NLF Facility, the NLF Facility will be operated as summarized above and remain open year round (except when temporarily closed for repairs or maintenance). The NLF Facility is designed to emulate the natural riffle and rocky shoal river habitat with a variety of hydraulic conditions to facilitate free upstream and downstream movement of mobile aquatic life year round. As such, the NLF Facility not only functions in the restoration of migratory fish past the Project, but restores the connectivity between aquatic habitats above and below York Haven Dam.

The NLF facility will become the primary site for fish passage at the Project, and the East Channel Fish Passage System will become the secondary fish passage site. The East Channel Fish Passage System shall be open for passage of resident fish between April 1st and the end of the resident fish passage season (except when closed for repairs or maintenance).⁹⁵ It is the intentional design of the NLF Facility to try to minimize attraction of fish to the East Channel and the East Channel Fish Passage Facility. Therefore, attraction flows will be reallocated to provide attraction to the NLF Facility in the Main Channel as the primary fish passage site, but maintain enough flow through the East Channel Fish Passage Facility to provide functional passage for fish that continue to make their way to the East Channel (See Flow Management, *infra* Section II.B.7).

The resident fish passage measures in Settlement Agreement are intended for inclusion in the License Article 3, and specifically address a resource issue associated with existing Project

⁹⁵ Settlement Agreement, at Section 3.1.8.

operations. Enforceability of these measures is ensured by provisions as set forth in the Settlement Agreement including provisions for the operation and maintenance of the East Channel Fish Passage Facility, the operation and maintenance of the NLF, and specific time lines for completion of the NLF.

8. Flow management.

Section 3.1 of the Settlement Agreement describes the agreed-upon flow management regime for the Project, including flow management targets to be implemented before NLF completion and targets after NLF completion.

The Project uses the Susquehanna River gage at Harrisburg, Pennsylvania, 17 miles upstream from the Project, to estimate the inflows to the Project.⁹⁶ According to records from the Susquehanna River gage, the mean annual flow for the Project between 1931 and 2010 is 35,469 cfs. Mean monthly flows at the Project between 1931 to 2010 ranged from 11,625 cfs in August to 74,407 cfs in April.⁹⁷

The current Project license requires the Project to discharge from the combination of the Powerhouse, over the Main Dam and East Channel Dam, a continuous minimum flow of 1,000 cfs and an average daily flow of not less than 2,500 cfs, except if the inflow to the impoundment is less than these amounts, in which case the discharge from the Project must not be less than the inflow.⁹⁸ This is accomplished by maintaining at least two of the Project turbines operating at full gate and supplementing the turbine discharge with spill over the Main Dam spillway, when necessary. In addition, under the prior settlements for YHPC, the Project has been required to provide a minimum flow of 2,000 cfs in the East Channel and spill 4,000 cfs at the Main Dam, as

⁹⁶ York Haven License Application, at Exhibit B, Section 2.3.

⁹⁷ York Haven License Application, at Exhibit B, Section 2.5.1.

⁹⁸ See York Haven License Application, at Exhibit B, Sections 2.1 and 2.5.1 (flows may also be temporarily modified if required by operating emergencies beyond the Project's control).

well as maintaining the lake level at 277.8 feet or above while the upstream fish passage facility is operating for passage of American shad.⁹⁹

As stated above, the Project is a run-of-river hydroelectric project and the quantity of water flowing into and out of the Project is similar. Current incoming flows at the Project are distributed between the Powerhouse, Main Channel and East Channel, but river discharge equal to inflow is generally maintained just downstream of the Project powerhouse tailrace. Therefore, the Project has no effect on water quantity in the Susquehanna River.¹⁰⁰

Pursuant to the terms of the Settlement Agreement, YHPC shall operate the Project consistent with the flow management targets set forth in Section 3.2 of the Settlement Agreement. Those targets are summarized in Table 7, below. It is very difficult, and not practicable or cost-effective, to directly measure flow at various locations at and below the Project, due to the channel configuration, flows under and through the dam, and other factors. As recognized in the Settlement Agreement, the flow regimes described in the Settlement Agreement are based on reasonable engineering estimates, which by their nature include some margin based on assumed hydrologic conditions (upstream flow, head, etc.) and engineering factors. This approach has been implemented over the past 30 years of Project operations. With the addition of flow through the NLF (whose flow rates are governed by design channel configuration, head and attraction flow gates), continuation of the same reasonable engineering estimate approach should continue to meet the Resource Agencies' objectives.

⁹⁹ See York Haven License Application, at Exhibit A, Section 2.10; *and id.*, at Exhibit B, Section 2.4.

¹⁰⁰ York Haven License Application, at Exhibit E, Section 3.4.

TABLE 7
SUMMARY OF FLOW MANAGEMENT DISTRIBUTION AT
YORK HAVEN PROJECT BEFORE AND AFTER PROPOSED NLF CONSTRUCTION

<i>Location and Season</i>	<i>Before NLF Construction (cfs)</i>	<i>Following NLF Construction (cfs)</i>	<i>Reason for Change</i>
Minimum flow below Project (Powerhouse + Main Dam + East Channel) (all year)	Continuous: 1,000 or inflow from upstream (whichever is less) Average Daily: 2,500 or inflow from upstream (whichever is less)	Continuous: 1,000 or inflow from upstream (whichever is less) Average Daily: 2,500 or inflow from upstream (whichever is less)	No change. These flows may be delivered via turbines alone or by the Project's spills and gates.
East Channel Dam Resident Fish Passage (April 1 – Shad Passage Season)	400	267	Flow shift to NLF as primary resident fish passage route; discourage migration into East Channel
East Channel Dam American Shad Upstream Passage Season (~mid April – ~mid June)	2,000	267	Flow shift to NLF, to maximize attraction of shad to NLF; discourage shad migration into East Channel
East Channel Dam After American Shad Upstream Passage season until end of resident fish passage season (~Dec. 15)	400	267	Flow shift to NLF as primary resident fish passage route; discourage migration into East Channel
East Channel Dam Winter (~Dec 15 – April 1)	0	267	Enhance East Channel winter habitat conditions. East Channel system to be left open during winter
Main Channel Dam / NLF Facility American Shad	4,000	1,000 - through NLF channel and NLF supplemental attraction flow channel	Provide attraction flow to NLF at Main Dam apex; maintains habitat and adequate migration

<i>Location and Season</i>	<i>Before NLF Construction (cfs)</i>	<i>Following NLF Construction (cfs)</i>	<i>Reason for Change</i>
Upstream Passage Season (~mid April – ~mid June)		Passage channel + supplemental attraction flow channel design to provide $\geq 5\%$ of river flow above Project between 5,000 - 150,000 cfs.	flow below Main Dam
Main Channel Dam / NLF Facility Resident Fish (mid June - mid April)	0	200 minimum through NLF channel When flows > hydraulic capacity of generating units + required flows in East Channel, Main Dam/NLF , manage flows above hydraulic capacity to maintain minimum East Channel flow of 267 cfs, and maximize remainder of flows over the Main Dam and through NLF, with supplemental attraction flow channel operated (except Dec. 15 - to the earlier of April 1 or the start of the American Shad Upstream Passage Season) with objective of maintaining maximum attraction flow through NLF	Provides attraction flow to NLF at Main Dam apex for resident fish; enhance main channel habitat conditions; maintain NLF as resident fish passage route year route

As an additional note, § 3.2.1(c)(iii) of the Settlement Agreement stipulates that whenever inflow from upstream of the project is less than 3,000 cfs, the Project will be operated on a run-of-river basis, adding or suspending operations at turbines to reflect, to the extent practicable, inflow from upstream and without adding or suspending turbine operations to

deliberately drawdown or store water for purposes of generating electricity in particular time period. This stipulation reflects what has been current practice.

No evidence exists from relicensing studies to show any deleterious Project effects to water quality, water resources, or associated aquatic biological resources within the impoundment. YHPC proposes to continue using existing equipment to monitor headpond levels to document the current normal run-of-river operation of the Project.¹⁰¹

The Settlement Agreement directly addresses the findings of the biological, hydrologic and hydraulic investigations conducted by YHPC during relicensing by requiring YHPC to maintain seasonal minimum flows in the East Channel, American shad attraction flows at the Main and East Channel Dams, and spill/leakage of the main channel at the Main Dam year round. As part of the proposals for the NLF Facility, YHPC and the Resource Agencies have also reached accord on a revised allocation of flows to be implemented in conjunction with the NLF Facility, which would focus flows in a manner that would enhance fish attraction to the NLF Facility. This approach is more robust than the current process. For example, while at present there are no required minimum flows for the East Channel during winter, under the revised regime, there would be minimum flows required for the East Channel year round and this will provide permanent habitat for fish and other aquatic life.

Enforceability of these commitments is ensured by reporting obligations, FERC approval requirements, and the sharing of flow data with FERC and the Resource Agencies

9. Water quality and debris management.

a. Water Quality

The Settlement Agreement does not contain a separate provision regarding water quality, which will be addressed in the §401 Water Quality Certification to be issued by PADEP. Studies conducted as part of the licensing process addressed the Project's potential impact on water

¹⁰¹ York Haven License Application, at Exhibit E, Section 3.5.1.3.

quality standards and whether Project operations impacted the attainment of state instream water quality standards. The instream standards evaluated were primarily temperature and dissolved oxygen (“DO”). As reported in the *Water Quality Monitoring Study Report* performed in 2010 and included in the ISR (“*Water Quality Report*”),¹⁰² YHPC gathered site-specific information and data related to water quality conditions at the Project, both upstream (in Lake Frederic) and downstream (in the tailrace and East Channel). That study specifically gathered data concerning DO, pH, and temperature over a range of river and operational conditions in order to evaluate these conditions compared to applicable state water quality standards.¹⁰³ The *Water Quality Report* found that although water temperature, pH, and DO concentrations did not in limited instances meet state water quality criteria at some sampling locations, water quality between most sites was consistent with historical data and did not differ substantially among sites. Study results indicated that water quality in the Project area is not altered by the Project or its operation and is consistent with the water quality of the lower Susquehanna River, which is primarily driven by natural environmental and biological factors as well as anthropogenic factors/disturbance within the larger context of this regional portion of the river basin.¹⁰⁴ Study results support the conclusion that the Project has little to no effect on the overall water quality in the river, which is consistent with a run-of-river hydroelectric project.¹⁰⁵ No further measures have been demonstrated to be necessary or should be required.

¹⁰² ILP Initial Study Report, Docket No. P-1888-000 (filed Apr. 4, 2011), at Appendix F *Water Quality Monitoring Study Report* (“*Water Quality Report*”).

¹⁰³ *Id.*.

¹⁰⁴ Hoffman, J.L.R. 2008. *The 2008 Susquehanna River Basin Water Quality Assessment Report*. Susquehanna River Basin Commission (Publication No. 255), Harrisburg, Pennsylvania.; Shank, M.K. 2009. *Assessment of Interstate Streams in the Susquehanna River Basin, Monitoring Report #22, July 1, 2007 through December 31, 2008*. Susquehanna River Basin Commission (Publication No. 266), Harrisburg, Pennsylvania.; and Shenk, T. 2009. *Susquehanna Large River Assessment Project*. Susquehanna River Basin Commission (Publication No. 265), Harrisburg, Pennsylvania.

¹⁰⁵ See *Water Quality Report*.

b. Debris Management

Alteration of instream flows can influence instream transport of debris. The Project traps an estimated 5,000 cubic yards of debris in the powerhouse trashracks annually. Debris is an important source of food and habitat for macroinvertebrates and other aquatic organisms. Currently, almost all of the debris arrives at the Project during high flow events when river flows far exceed the hydraulic capacity of the Project. Much of that debris simply passes over the Main Dam. A relatively small percentage of the debris accumulates in the forebay. Non-natural debris is removed from the accumulated debris in the forebay and the remaining organic debris material is sluiced downstream through a gated opening in the masonry non-overflow “cable alley” wall located at the downstream end of the forebay. Prior to opening the sluice gate, YHPC notifies PPL’s Brunner Island Station that debris is to be sluiced.

In 2010, YHPC and PADEP reached an agreement that is reflected in the Project’s current NPDES Permit and in Section 3.3 of the Settlement Agreement, providing for an annual payment to finance debris removal in the Lower Susquehanna River Watershed.¹⁰⁶ The Settlement Agreement requires YHPC to continue its current debris management practices, including prior notice to PPL's Brunner Island Station when debris are to be sluiced (absent extraordinary or emergency conditions).¹⁰⁷

The debris management provisions of the Settlement Agreement, which are intended to be included within License Article 8, are enforceable not only via YHPC's obligations under the License, but also ensured by YHPC’s existing debris management program and the agreement between YHPC and the PADEP as part of the Project’s NPDES Permit.

10. Endangered species and species of special concern.

There are no endangered species or species of special concern at this time which may be impacted by the Project. Currently, there are no aquatic species federally listed under the

¹⁰⁶ York Haven License Application, at Exhibit B, Section 2.1.

¹⁰⁷ Settlement Agreement, at Section 3.3.

Endangered Species Act (“ESA”) found within, or in the vicinity of the Project Boundary (FWS 2010).

FWS is in the process of preparing a finding in response to a petition to list the American eel under the Endangered Species Act and on August 12, 2013, the NMFS issued a determination that river herring do not warrant inclusion under the ESA at this time. American eel are currently subject to a 12-month status review to determine if listing the species is warranted. These species were not found within or in the vicinity of the Project Boundary during extensive surveys conducted in support of the relicensing. In fact, no American eels have been reported in the annual fish passage reports since 2000, and only seven river herring were observed since 2000, all between 2000 and 2002.¹⁰⁸

¹⁰⁸ Kleinschmidt Associates, Inc. 2000. *Report Summary of Operation at the York Haven Fishway in 2000*. Prepared for York Haven Power Company by Kleinschmidt Associates, Inc., Strasburg, Pennsylvania; Kleinschmidt Associates, Inc., 2002. *Report Summary of Operation at the York Haven Fishway in 2001*. Prepared for York Haven Power Company by Kleinschmidt Associates, Inc., Strasburg, Pennsylvania; Kleinschmidt Associates, Inc. 2003. *Summary of Upstream and Downstream Fish Passage at the York Haven Hydroelectric Project FERC Project 1888 for the Year 2002*. Prepared for York Haven Power Company by Kleinschmidt Associates, Inc., Strasburg, Pennsylvania; Kleinschmidt Associates, Inc. 2004. *Summary of Upstream and Downstream Fish Passage at the York Haven Hydroelectric Project in 2003*. Prepared for York Haven Power Company by Kleinschmidt Associates, Inc., Strasburg, Pennsylvania. Kleinschmidt Associates, Inc., 2005a. *Assessment of the Effectiveness of the York Haven Upstream Fish Passageway using radio telemetered American shad during spring, 2005*. Report prepared for York Haven Power Company. Kleinschmidt Associates, Inc. 2005b. *Summary of Upstream and Downstream Fish Passage at the York Haven Hydroelectric Project in 2004*. Prepared for York Haven Power Company by Kleinschmidt Associates, Inc., Strasburg, Pennsylvania; Kleinschmidt Associates, Inc. 2005c. *Summary of Upstream and Downstream Fish Passage at the York Haven Hydroelectric Project in 2005*. Prepared for York Haven Power Company by Kleinschmidt Associates, Inc., Strasburg, Pennsylvania; Kleinschmidt Associates, Inc. 2006. *Summary of Upstream and Downstream Fish Passage at the York Haven Hydroelectric Project in 2006*. Prepared for York Haven Power Company by Kleinschmidt Associates, Inc., Strasburg, Pennsylvania; Kleinschmidt Associates, Inc. 2007. *Fish Passage at the York Haven Hydroelectric Project in 2007*. Prepared for York Haven Power Company by Kleinschmidt Associates, Inc., Strasburg, Pennsylvania; Kleinschmidt Associates, Inc. 2008. *Summary of Upstream and Downstream Fish Passage at the York Haven Hydroelectric Project in 2008*. Prepared for York Haven Power Company by Kleinschmidt Associates, Inc., Strasburg, Pennsylvania; Kleinschmidt Associates, Inc. 2009. *Summary of Upstream and Downstream Fish Passage at the York Haven Hydroelectric Project in 2009*. Prepared for York Haven Power Company by Kleinschmidt Associates, Inc., Strasburg, Pennsylvania; Kleinschmidt Associates, Inc. 2011. *Summary of Upstream and Downstream Fish Passage at the York Haven Hydroelectric Project in*

Also note that while according to the FWS (2010), two federally listed terrestrial species potentially occur near the Project Boundary: the Indiana bat and the bog turtle, these species were considered during the literature review, data research, and extensive surveys conducted in support of Project relicensing and not found within or near the Project Boundary.¹⁰⁹ Further, while there is one known bald eagle nest located on the Southern End of TMI,¹¹⁰ the precise location of the nest is unknown and the bald eagle is no longer listed under the ESA.¹¹¹

In the event that YHPC plans to conduct a major project (e.g., construction of the NLF Facility), YHPC will consult with applicable agencies prior to conducting any major Project alterations that could affect a listed rare, threatened, or endangered plant or animal. The Settlement Agreement recognizes that: (i) the FWS is in the process of preparing a 12-month finding in response to a petition to list the American eel under the federal ESA; (ii) in response to a petition filed by various parties, on August 12, 2013, the NMFS issued a determination that river herring (alewife and blueback herring) do not warrant listing under the ESA at this time; (iii) the FWS will require American eel passage and river herring passage at York Haven Dam consistent with the terms of Section 3.0 of the Settlement Agreement; and (iv) the plans contemplated in this Offer of Settlement and related prescriptions, including provisions for installation and operation of the NLF Facility and provisions relating to downstream passage, are conservation measures that are expected to expand access to currently available habitat for the American eel and river herring and, therefore, benefit the American eel and river herring populations.

2010. Prepared for York Haven Power Company by Kleinschmidt Associates, Inc., Strasburg, Pennsylvania.

¹⁰⁹ See York Haven License Application, at Exhibit E, Section 3.7.2.1. No specific surveys were conducted for these particular species by themselves.

¹¹⁰ Pennsylvania Game Commission (“PGC”) Wildlife Biologist D. Gross, personal communication, April 6, 2010

¹¹¹ Notice issued on July 9, 2007 [72 Fed. Reg. 37346], effective August 8, 2007. The species remains protected under the Bald and Golden Eagle Protection Act of 1940, as amended. See also Final License Application.

In light of current data and the conservation measures discussed above, the Settling Parties do not expect any future ESA consultation for the Project to result in new or expanded obligations beyond those already reflected in the Settlement Agreement.

11. Summary

As reflected above, the Settlement Agreement sets forth narrowly tailored conditions and balanced measures with a specific nexus between the Project and the measures, and the conditions and measures are geographically proximate to the project. The Commission should accept the terms under Section 3.0 of the Settlement Agreement for inclusion in the new license as proposed by the Settling Parties.

C. Reservation of Commission Compliance Authority

The Commission's authority over administration of hydroelectric licenses cannot be delegated to another entity.¹¹² However, within this overall framework, the Commission permits conditions requiring the filing of subsequent plans pertaining to operational measures reflected in a license. The Commission has also acknowledged that settlements often contemplate ongoing adjustments to measures required under license terms based on additional information obtained by ongoing monitoring or studies. Such adjustments are termed “adaptive management.”¹¹³

Specifically, the Commission has stated that:

[S]ettlement conditions that provide that the licensee must file specified plans after obtaining the approval of other parties, such as resource agencies...are acceptable if they provide that the plans will be filed with the Commission for its approval, and that the Commission will have the right to revise the plans as it deems necessary. Provisions that envision plans (or operational changes outside

¹¹² See e.g., *Settlement Policy*, at P 37 (citing *Virginia Electric Power Co.*, 110 FERC ¶ 61,241, P 35 (2005); and *New York Power Authority*, 105 FERC ¶ 61,102, P 65 (2003)).

¹¹³ See also *Settlement Policy*, at P 39 (noting that provisions providing for certain adjustments to measures due to ongoing monitoring, termed “adaptive management” may be permitted, while adding that a committee or management group should still not be allowed to alter the terms of a license without obtaining the Commission's approval because it is “the Commission's role and responsibility to give prior approval, through appropriate license amendments, for all material amendments to the project and the license”).

of the parameters approved in the license) being approved by other entities but not the Commission are not acceptable.¹¹⁴

The Commission has also stated “[f]or the Commission to exercise its oversight authority [over adaptive management measures], it is necessary that license conditions embodying these measures provide for Commission review and, where required, modification of proposed actions that go beyond the limits imposed by the license.”¹¹⁵

In accordance with the precedent and the *Settlement Policy*, the Settlement Agreement preserves the Commission's compliance authority where subsequent plans for resource measures are required or where adaptive management is concerned. For example, while YHPC will be required develop final plans and specifications for the NLF Facility and submit such plans to the Resource Agencies, the “plan shall not be implemented until the Licensee is notified that the plans are approved by the Commission.”¹¹⁶ Similarly, the plan for monitoring the effectiveness of the shad passage shall be submitted to the Commission.¹¹⁷ Later, with regard to adaptive management, the Settlement Agreement provides that if the Headrace Shad Turbine Avoidance Target is not achieved, Licensee shall implement certain delineated adaptive measures or such other measures agreed to with Resource Agencies “and (to the extent required) approved by the Commission.”¹¹⁸

D. Dispute Resolution

The Commission's *Settlement Policy* states that settlements may include provisions on dispute resolution.¹¹⁹ The Settlement Agreement includes provisions regarding a consultation and

¹¹⁴ *Settlement Policy*, at P 37. See also *Settlement Policy*, at P 39.

¹¹⁵ *Id.* (quoting *Virginia Electric Power Co.*, 110 FERC ¶ 61,241, P 13 (2005)).

¹¹⁶ Settlement Agreement, at Section 3.1.1(b).

¹¹⁷ Settlement Agreement, at Section 3.1.3(b)(iv).

¹¹⁸ Settlement Agreement, at Section 3.1.6(f).

¹¹⁹ *Settlement Policy*, at P 15 (citing *Erie Boulevard Hydropower, LP*, 100 FERC ¶ 61,321 at 62,502 (2002)) (noting, however, that the Commission cannot require a federal or state resource agency or non-governmental entity to comply with such dispute resolution provisions).

dispute resolution process.¹²⁰ That process provides that any dispute among the Settling Parties will first be addressed among the Settling Parties' designated representatives, and then escalated through subsequent dispute resolution procedures if necessary. If dispute resolution is unsuccessful:

“any Party may seek specific performance of the terms of this Offer of Settlement by any other Party at FERC or in a court of competent jurisdiction, or, to the extent allowed by applicable law, may seek other remedies. If the dispute relates to a possible exercise of authority by an agency Party, the agency may proceed with its exercise of authority under its usual regulations and the Licensee retains any rights it may have to challenge that exercise of authority.”¹²¹

As a result, the Settlement Agreement dispute resolution provisions also acknowledge FERC's authority over administration of hydroelectric licenses. The dispute resolution provisions of the Settlement Agreement are therefore permissible for inclusion as part of the settlement.

E. License Term¹²²

The Project's new license should continue for a term of 50 years from the date of license issuance. Under the Settlement Agreement the Settling Parties support a new license term of at least 45 years and would not oppose a new license term of 50 years. A license term of 50 years is appropriate due to the various measures required under the Settlement Agreement to protect, mitigate harm to, and enhance aquatic resources in the lower Susquehanna River basin. The development and installation of the NLF will provide material expected public benefits but will cause YHPC to incur considerable new costs in the form of capital investments, foregone energy and capacity, and reduced flexibility of Project operations. As noted above, the annual costs expected for the project, with the enhanced FPOP measures reflected in the Settlement Agreement are expected to substantially increase. A longer license term will afford YHPC more time to recoup its costs. Thus, the length of the license term is an important part of the overall

¹²⁰ Settlement Agreement, at Section 2.9.

¹²¹ Settlement Agreement, at Section 2.9.3.

¹²² Settlement Agreement, at Section 2.1.

settlement package reflected in the Settlement Agreement and reflects a careful balancing of interests. Therefore, the Commission should accept the Settlement Agreement and issue a new license term of 50 years.

III. CONCLUSION

WHEREFORE, for the foregoing reasons, the Settlement Agreement is within the public interest, supported by substantial evidence, meets the Commission's standards for hydroelectric licensing (including the comprehensive development/equal consideration standard), includes enforceable terms and conditions, and reflects a nexus between a proposed measure and the Project's effects or purposes, with such measures being as tailored as possible. The Settlement Agreement also reflects reservation of the Commission's authority with regard to compliance with hydroelectric licensing. As a result, YHPC respectfully requests that the Commission accept the proposed Offer of Settlement, without modification or condition, as a reasoned resolution to the issues involved in this proceeding and issue the Project a new license with a term of 50 years from the date of license issuance.

Respectfully submitted,

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EXHIBIT A
OF THE EXPLANATORY STATEMENT

York Haven Nature-Like Fishway Task Schedule

Task	Proposed Date (Start/End)	Duration of Task	Trigger (if any)	Constraints
FERC License Related Tasks				
FERC issues license	September 2014			
Field Surveys (2013 and 2014)				
YHPC conducts field surveys	September – November 2013; May – October 2014	2 field seasons		Weather and flows permitting
YHPC conducts geologic and geotechnical investigations including rock inventory and mapping of useable rock	September – October 2013	60 days	2013 field surveys	Weather and flows permitting
YHPC conducts field ground survey and bathymetry	October 2013	30 days	Completion of geologic and geotech investigation	Weather and flows permitting; availability of contractor
YHPC conducts consultation in support of 2014 environmental/field surveys	February 2014- April 2014	90 days	2014 field season preparation	
YHPC conducts environmental/field surveys	February 2014- September 2014	240 days	2014 field season	Must occur February to September, weather and flows permitting
YHPC conducts bald eagle nest survey	February 2014 – April 2014	90 days	2014 field season	Weather and flows permitting
YHPC conducts bog turtle habitat assessment	April 2014– June 2014	90 days	2014 field season	Weather and flows permitting
YHPC conducts RTE survey	June 2014 – August 2014	90 days	2014 field season	Weather and flows permitting
YHPC conducts vegetation cover	July 2014 –	60 days	2014 field season	Weather and flows permitting

Task	Proposed Date (Start/End)	Duration of Task	Trigger (if any)	Constraints
type mapping	August 2014			
YHPC conducts wetlands survey	July 2014 – August 2014	60 days	2014 field season	Weather and flows permitting
YHPC conducts invasive species survey	July 2014 – August 2014	60 days	2014 field season	Weather and flows permitting
YHPC conducts dam stability evaluation	July 2014 – August 2014	60 days	Completion of geologic and geotech investigation	Weather and flows permitting; availability of contractor
Mapping and Reports Related to Environmental/Field Surveys				
Preparation of baseline surveys, maps and reports related to 2013/2014 surveys	2014	At various times over 2014	Completion of environmental/field surveys	Ability to complete environmental/field surveys in 2013/2014
YHPC prepares geotechnical report	November 2013 – December 2013	60 days	Completion of geologic and geotechnical survey	Ability to complete environmental/field surveys in 2014
YHPC prepare topos resulting from ground survey and bathymetry survey	November 2013- December 2013	60 days	Completion of environmental/field survey and bathymetry survey	Availability of contractor
YHPC prepares hydraulic design report, including supplemental flow design	January 2014 – April 2014	120 days	Completion of 2013 surveys	Feedback from Agencies
YHPC prepares existing conditions plan (including bathymetry)	January 2014 – April 2014	120 days	Completion of ground survey in 2013	Ability to complete ground survey in 2013
YHPC prepares final access road layout	January 2014 – April 2014	90 days	Completion of geologic and geotechnical study, site survey and bathymetry study, and environmental/field surveys	Ability to complete environmental/field surveys in 2013
YHPC prepares rock inventory and mapping	November 2014 – December 2014	60 days	Completion of geologic and geotechnical survey and October site visit	Ability to complete environmental/field surveys in 2013/2014

Task	Proposed Date (Start/End)	Duration of Task	Trigger (if any)	Constraints
YHPC prepares rock retrieval plan (rock characterization, excavation, access roads)	November 2014 – December 2014	90 days	Completion of access road study, geologic and geotechnical study, site survey and bathymetry study	Ability to complete environmental/field surveys in 2014
YHPC prepares vegetation cover type mapping	November 2014 – January 2015	90 days	Completion of environmental/field surveys	Ability to complete environmental/field surveys in 2014
YHPC prepares wetlands report	November 2014 – January 2015	90 days	Completion of environmental/field surveys	Ability to complete environmental/field surveys in 2014
YHPC prepares invasive species report	November 2014 – January 2015	90 days	Completion of environmental/field work	Ability to complete environmental/field surveys in 2014
YHPC prepares RTE report	November 2014 – January 2015	90 days	Completion of environmental/field work	Ability to complete environmental/field surveys in 2014
YHPC prepares bog turtle habitat report	November 2014 – January 2015	90 days	Completion of environmental/field surveys	Ability to complete environmental/field surveys in 2014. This report will utilize the results of the wetland survey
YHPC prepares bald eagle nest report	November 2014 – January 2015	90 days	Completion of environmental/field surveys	Ability to complete environmental/field surveys in 2014
Engineering Design				
<i>(Select tasks concurrent with those listed in Army Corps Permit Related Tasks section)</i>				
YHPC prepares fish passage functional engineering design	November 2014 – March 2015	150 days	Completion of environmental/field surveys, site plans, mapping and reports	Ability to complete environmental/field surveys in 2013/2014
YHPC prepares draft elements of ACOE permit application	November 2014 – March 2015	150 days	Completion of 2013/2014 environmental/field surveys	Completed environmental/field surveys and engineering design
YHPC provides fish passage functional engineering design to	March 31, 2015	1 day	Completion of fish passage functional engineering design	Ability to complete environmental/field surveys in

Task	Proposed Date (Start/End)	Duration of Task	Trigger (if any)	Constraints
USFWS (and other resource agencies) for review including hydrologic and hydraulic analyses, NLF configuration and dimensions, general arrangement drawing with plan and profile views, and draft elements of application for an ACOE Clean Water Act § 404 Permit, a § 401 Water Quality Certification, and a NPDES Permit				2013/2014
USFWS (and other resource agency) review and comment	April 2015 – May 2015	60 days	Completion of fish passage functional engineering design	Ability to complete environmental/field surveys in 2013/2014
YHPC reviews comments and modifies functional design as necessary	June 2015	30 days	Completion of agency review	Timely review by resource agencies
USFWS (and other resource agency) reviews modified design	July 2015	30 days	Completion of YHPC review	Timely review by resource agencies
YHPC conducts final engineering design	August 2015 – January 2016	180 days	Completion of agency review	Timely review by resource agencies
YHPC submits final design drawings to FERC	January 31, 2016 ¹	1 day	Completion of final design drawings	No major adjustments to final design drawings
Army Corps (ACOE) Permit Related Tasks				
YHPC prepares draft elements of applications for an ACOE Clean Water Act §404 Permit, a §401 Water Quality Certification,	November 2014 – March 2015	120 days	Completion of environmental/field surveys	Ability to complete environmental/field surveys in 2014

¹ If the ACOE §404 Permit is issued after January 31, 2016, YHPC shall submit the ACOE §404 Permit to FERC and, to the extent necessary, promptly prepare and submit to FERC any changes to the engineering designs necessitated by the ACOE §404 Permit.

Task	Proposed Date (Start/End)	Duration of Task	Trigger (if any)	Constraints
and a NPDES Permit for Stormwater Discharge ²				
YHPC submits draft elements of applications for an ACOE Clean Water Act §404 Permit, a §401 Water Quality Certification, and a NPDES Permit for Stormwater Discharge to ACOE and PaDEP	March 31, 2015	1 day	Completion of environmental/field surveys	Ability to complete field surveys in 2014
YHPC prepares final submittal of §404 permit application to ACOE ¹	November 2014 – July 15, 2015	255 days	Completion of 2013/2014 studies; comments on draft elements of application	Ability to complete field studies in 2013/2014
YHPC submits (i) application to the ACOE for a Clean Water Act §404 Permit; (ii) application to PaDEP for a §401 Water Quality Certification; and (iii) an Erosion and Sedimentation Control Plan and application to PaDEP for an NPDES Permit for Stormwater Discharge Associated with Construction Activities.	July 15, 2015	1 day	Completion of permit requirements	Completion of 2013/2014 field studies; timely comment on draft application and plans by resource agencies
ACOE review of §404 permit application (includes Section 7 and Section 106 consultation, public hearings, public comment periods)	July 2015 – September 2016	420 days	Submittal of §404 permit application to ACOE	Complete application package
ACOE reviews application for completeness and issues	August 2015	30 days	Filing of ACOE permit	AIR from ACOE

² Elements of the draft and final Water Act §404 Permit and §401 Water Quality Certification contain the following: coordination and correspondence with resource agencies, pre-application meeting with ACOE, PNDI search, bog turtle habitat screening, cultural resource notice, environmental assessment form, hydrologic and hydraulic analysis, stormwater management analysis, erosion and sediment control plan and approval letter, alternatives analysis, mitigation plan, floodplain management analysis, risk assessment, cumulative impact screening form, and general information form.

Task	Proposed Date (Start/End)	Duration of Task	Trigger (if any)	Constraints
Additional Information Request (AIR)				
YHPC prepares and files AIR response with the ACOE	September 2015	30 days	ACOE issuance of AIR	ACOE review time
ACOE accepts permit filing, issues public notice, notice of intent in the Federal Register, and provides a 30 day public scoping and comment period	October 2015- November 2015	60 days	Submittal of AIR	ACOE review time
ACOE prepares and issues Scoping Report	December 2015	30 days	ACOE acceptance of permit filing	ACOE review time
ACOE conducts Section 7 and Section 106 consultation	January 2016 – April 2016	120 days	After 30 day comment period of issuance of Scoping Report	No additional ESA species found and ACOE accepts Historic Properties Management Plan (HPMP)
ACOE prepares and issues Draft Environmental Impact Statement (EIS)	January 2016 – April 2016	120 days	Done concurrently with Section 7 and Section 106	ACOE efficiency in preparing EIS
ACOE holds public hearing and public comment period on Draft EIS	May 2016	30 days	ACOE issuance of Draft EIS	ACOE review time
ACOE prepares and issues Final EIS	June 2016	30 days	ACOE holds public hearing and public comment period on Draft EIS	No adverse comments and no interventions
ACOE holds public comment period on Final EIS	July 2016	30 days	ACOE issues Final EIS	
ACOE prepares issues decision with permit conditions	August 2016	30 days	ACOE holds public comment period on Final EIS	Favorable decision, no adverse comments on interventions
ACOE issuance of §404 permit	September 2016	1 day	ACOE completion of §404 permit application review	Complete application package
YHPC prepares and submits to FERC complete engineering designs for the NLF Facility and	January 31, 2016			

Task	Proposed Date (Start/End)	Duration of Task	Trigger (if any)	Constraints
a request for construction approval. ³				
YHPC completes any required adjustments to final design drawings and files with FERC	October 2016 – November 2016	60 days	ACOE issuance of §404 permit	Timely ACOE review of permit application
FERC reviews submitted design drawings	December 2016- January 2017	60 days	Submittal of final design drawings	No major adjustments to final design drawings
FERC issues approval to build	February 2017	1 day	Final engineering design to 100%	FERC finds design acceptable
Bids / Contractor Selection / Contracts Execution				
YHPC issues bid documents, evaluate bids, select contractor, and execute contract	April 2017 – August 2017	150 days	Issuance of all required governmental approvals for construction of the NLF Facility (including the ACOE §404 Permit, the §401 Water Quality Certification, the NPDES Permit for Stormwater Discharge Associated with Construction Activities, and FERC approval of construction plans)	Receipt of acceptable bids
Rock Retrieval				
Rock retrieval year 1	July 2018 – December 2018	150 days	Executed contract and FERC approval of design drawings	Weather and river flow permitting
Rock retrieval year 2	July 2019 – December 2019	150 days	Executed contract and FERC approval of design drawings	Weather and river flow permitting.
Rock retrieval year 3	July 2020 – December 2020	150 days	Executed contract and FERC approval of design drawings	Weather and river flow permitting

³ If the ACOE §404 Permit is issued after January 31, 2016, YHPC will submit the ACOE §404 Permit to FERC and, to the extent necessary, promptly prepare and submit to FERC any changes to the engineering designs necessitated by the ACOE §404 Permit.

Task	Proposed Date (Start/End)	Duration of Task	Trigger (if any)	Constraints
Construction, Monitoring and Fishway Modification				
YHPC constructs NLF	May 2020 - November 2020	210 days	Sufficient rocks stockpiled	Weather and river flow permitting. No cofferdam failures
Initial observations of NLF performance and shakedown adjustments	April 2021 – June 2021	90 days	Fishway construction completed	Weather and river flow permitting.
YHPC conducts adult shad radio telemetry study	May 2022 – June 2022	60 days	Fishway construction completed	Weather and river flow permitting.
YHPC conducts fishway modifications based on radio telemetry study	August 2022 – October 2022	90 days	Results from telemetry study and consultation	Weather and river flow permitting.

EXHIBIT B
OF THE EXPLANATORY STATEMENT



DATE: October 17, 2013

MEMORANDUM

TO: Dennis O'Donnell

FROM: John Devine, Project Manager

SUBJECT: Determination of Flow and Depth in Proposed Fish Bypass Channel at Powerhouse Sluice Gate, York Haven Hydroelectric Project

A calculation was completed to determine the flow and depth of flow in a proposed fish bypass channel through the sluice gate at the downstream end of the forebay adjacent to the York Haven Project powerhouse. The concept channel is 12-ft wide and abuts the downstream edge of the gate sill, extending a sufficient distance, approximately 55 ft, from the edge of the sill into the tailrace to accommodate safe fish passage. The maximum flow at the estimated normal pool elevation in the forebay of 277.9 ft NGVD is approximately 370 cfs, assuming that flow in the downstream channel is supercritical. Critical depth in the channel would be 3.1 ft and the critical slope for that depth and flow is 0.0021 ft/ft. The velocity at critical depth is approximately 10 ft/s. The maximum slope to maintain a depth of 2 ft is 0.0075 ft/ft.

The following explanation provides the calculations used to estimate the flow through the sluice gate and critical depth and slope in the downstream channel. When the downstream channel is designed for supercritical flow, discharge through the sluice gate is maximized and can be calculated using the weir equation:

$$Q = CL_e H^{3/2},$$

where C is the weir coefficient, estimated to be 3.08 based on representative values for a sloping broad-crested weir, H is the total head on the gate sill, and L_e is the effective length of the weir defined by:

$$L_e = L - 2K_a H$$

K_a accounts for horizontal contraction of flow at the entrance to the gate and is estimated to be 0.1, representative of rounded edges and a headwall at 90 degrees to the direction of flow. The velocity head in the forebay is negligible, so H represents the elevation of the forebay water surface minus the elevation of the sill, or 4.9 ft. The resulting effective weir length is 11.02 ft. These values yield the estimated Q of 368 cfs, say 370 cfs rounded.

When the channel slope is greater than or equal to the critical slope the water surface elevation at the gate exit (top of the channel) is defined by the critical depth:

$$D_c = \sqrt[3]{(Q^2/(L^2g))},$$

where the channel width is equivalent to the gate width, L, assumed equal to 12 ft, g is the acceleration of gravity, and Q was calculated above using the weir equation.

The critical slope, S_c , can be determined from the Manning's equation using the calculated flow and critical depth and solving for the slope:

$$Q = 1.4859 * A * r^{2/3} * S_c^{1/2} / n,$$

where n is Manning's roughness coefficient, estimated based on representative values for pvc and steel. A higher roughness will result in a steeper critical slope. The variable A is the flow area in the channel and r is the hydraulic radius, defined by:

$$A = bD_c,$$

$$r = A / (2D_c + L)$$

Table 1 documents the assumptions and values used for these calculations and Table 2 documents the results.

Table 1. Parameters used in discharge and depth calculations

Parameter	Value	Source
Normal maximum water surface elevation at the Powerhouse	277.9 ft ¹	Exhibit A, Final License Application
Elevation of sluice gate sill	273.0 ft ¹	Stone and Webster Bypass Alternatives for Fish Passage, Figure 3
Height of sluice gate opening	10.5 ft	Exhibit A, Final License Application
Length of sluice gate opening, L	12.0 ft	D. David Correspondence 1/5/2013
Sluice channel Manning's n (pvc or steel)	0.011	Online references
Entrance loss coefficient based on rounded abutments with headwall at 90 degrees to flow, K_a	0.1	USBR Design of Small Dams, p. 369
Weir Coefficient for broad crested weir with rounded sill, C	3.08	Brater, King, Lindell, and Wei, Table 5.3
Acceleration of gravity, g	32.2 ft/s ²	Accepted value
Head on sill crest, H	4.90 ft	Calculated
Effective crest length, L_e	11.02 ft	Calculated

1. Elevations assumed to be in NGVD 29; this is the water level in the forebay.

Table 2. Results

Discharge at normal pool, Q	368 cfs
-----------------------------	---------

Critical Depth, D_c	3.1 ft
Velocity at critical depth, V	10.0 ft/s
Critical slope, S_c	0.0021 ft/ft
Slope at 2 ft depth	0.0075 ft/ft

References:

Brater, E. F., King, H. W., Lindell, J. E., & Wei, C. Y. Handbook of hydraulics for the solution of hydraulic engineering problems. New York: McGraw-Hill. 1996.

Dave David, RE: York Haven Downstream Passage Options - Supporting Information, Email sent January 5, 2013.

Stone and Webster Engineering. Report of Evaluation of Bypass Alternatives for Fish Diversion at the York Haven Hydroelectric Plant. 1992.

USBR (United States Bureau of Reclamation). Design of small dams. Denver, Colorado; 1987.

York Haven Power Company, LLC, York Haven Hydroelectric Project, FERC Project No. 1888, Final Licence Application, York Haven, PA, August 2012.

**YORK HAVEN HYDROELECTRIC PROJECT
OFFER OF SETTLEMENT**

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

York Haven Power Company LLC
Project No. 1888

YORK HAVEN HYDROELECTRIC PROJECT
OFFER OF SETTLEMENT

January 2014

**YORK HAVEN HYDROELECTRIC PROJECT
OFFER OF SETTLEMENT**

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YORK HAVEN HYDROELECTRIC PROJECT OFFER OF SETTLEMENT

1.0 INTRODUCTION

This agreement (the “Offer of Settlement”) is made and entered into pursuant to Rule 602 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission (“FERC” or the “Commission”) (18 C.F.R. § 385.602) by and among the following entities (each of whom individually shall be referred hereafter to as “Party” and collectively as the “Parties”):

- York Haven Power Company, LLC (“YHPC” or “Licensee”)
- United States Department of the Interior, Fish & Wildlife Service (“USFWS”)
- Pennsylvania Fish & Boat Commission (“PFBC”)
- Maryland Department of Natural Resources (“MDNR”)
- Susquehanna River Basin Commission (“SRBC”)

1.1 Term of the Offer of Settlement

This Offer of Settlement shall become effective when it has been executed by the above-referenced Parties and shall remain in effect, in accordance with its terms, throughout the term of the new license including any annual licenses thereafter.

1.2 Agreements to be Incorporated as License Conditions

The agreements in the Offer of Settlement are an integrated and indivisible set of measures intended to address non-power and power values relating to the licensing of the York Haven Power Project (FERC No. 1888) (the “Project”). The Parties agree that each term of this Offer of Settlement is in consideration and support of every other term and that it is essential that FERC, except where expressly noted to the contrary in the Offer of Settlement, incorporate as license conditions in the new license each of the commitments that the Licensee has agreed to undertake in Section 3.0 of this Offer of Settlement. The term “license conditions” is intended to mean numbered articles of the license.

1.3 Purpose and Goals

The purpose of this Offer of Settlement is to document the agreements that have been reached as the result of comprehensive discussions among the Parties with regard to the referenced hydroelectric Project with respect to the relicense application filed with FERC and the application for Water Quality Certification filed with PaDEP. This Agreement resolves among the Parties all issues that have been or could be raised in FERC's issuance of a New License for the Project.¹

The goal of the Offer of Settlement is to provide for the continued operation of the subject Project with appropriate long-term environmental protection, enhancement, and mitigation measures that will meet diverse objectives for maintaining a balance of non-power and power values on the Susquehanna River.

The Parties, having given careful consideration to non-power and power values, provide in this Offer of Settlement the terms and conditions for the resolution of operational, fisheries and aquatic resources, wildlife, and water quality issues raised by and analyzed by the Parties as they are applicable to the issuance of a New License and the Water Quality Certification for the Project.

1.4 Successors and Assigns

The Offer of Settlement shall be binding on the Parties and on their successors and assigns.

1.5 Parties to Support Regulatory Approvals

The Parties agree to support the issuance of a license by FERC, a Clean Water Act §401 water quality certification by PADEP, and a Clean Water Act §404 Permit by the ACOE for the NLF Facility, that are consistent with the terms of this Offer of Settlement. This support shall include reasonable efforts to expedite the National Environmental Policy Act process to be undertaken by FERC with respect to issuance of the New License and by the ACOE with respect to the 404 Permit for the NLF Facility, as well as any regulatory approvals that may be needed to

¹ PaDEP is not a party to this Offer of Settlement, but has participated in the negotiations and the conditions of PaDEP's proposed certification under §401 of the Federal Clean Water Act are expected to be consistent with the terms of Section 3.0 of this Agreement.

implement provisions of the Offer of Settlement. For those issues addressed herein, the Parties agree not to propose or otherwise communicate to FERC or to any other federal or state resource agency with jurisdiction directly related to the relicensing process any comments, certification, or license conditions other than ones consistent with the terms of this Offer of Settlement. However, this Offer of Settlement shall not be interpreted to restrict any Party's participation or comments in future relicensing of the Project.

1.6 Agency Appropriations

Nothing in this Offer of Settlement shall be construed as: obligating any federal, state, or local government to expend in any fiscal year any sum in excess of appropriations made by Congress, state legislatures, or local governing body, or administratively allocated for the purpose of this Offer of Settlement for the fiscal year; or involving the Department of the Interior, Department of Commerce, USFWS, or NMFS in any contract or obligation for the future expenditure of money in excess of such appropriations or allocations.

1.7 Establishes No Precedents

This Offer of Settlement is made with the express understanding that it constitutes a negotiated resolution of issues specific to the Project. Accordingly, nothing in this Offer of Settlement will be construed as a legal precedent that may be cited to FERC or any court with regard to any other proceeding. This Section 1.7 will survive any termination of this Offer of Settlement. Any Party withdrawing from this Offer of Settlement will continue to be bound by this Section 1.7 following withdrawal under Section 2.2.

1.8 Conventions and Definitions

The Parties agree that the following capitalized terms and phrases should have the meanings set forth below throughout this Offer of Settlement:

(a) "ACOE" means the U.S. Army Corps of Engineers.

(b) "Annual License" means any license issued by FERC from year to year, pursuant to section 15(a)(1) of the FPA, effective upon expiration of the Project's original license through the effective date of the New License.

(c) “cfs” means cubic feet per second.

(d) “Downstream Juvenile American Shad Passage Period” at the Project means the period of time of downstream passage of juvenile American shad, that generally runs from October 1 through November 30 of each year.

(e) “Effective Date” means the date on which this Offer of Settlement has been executed by all Parties, as set forth in the opening paragraph above.

(f) “FPA” means the Federal Power Act.

(g) “License Provision” means any term, condition, prescription, measure, alternative, requirement, holding, reservation of authority, or article included in the New License, or any condition, term, reservation or other license requirement adopted or otherwise included in the New License.

(h) “Material Modification” means: (i) any modification to, addition to, expansion of, or deletion of the provisions of Section 3.0, which are intended by the Parties to become License Articles in the New License; or (ii) any PM&E measure other than the provisions set forth in Section 3.0; provided that the following actions will not constitute a Material Modification: (1) FERC’s inclusion in the New License of License Articles that are in all material respects consistent with Section 3.0; (2) PaDEP’s issuance of a Water Quality Certificate with conditions that are in all material respects consistent with Section 3.0; (3) FERC’s inclusion of standard articles from the L-Form (as defined by 18 C.F.R. § 2.9) in the New License; (4) FERC’s insertion of its approval or its reservation of authority to require changes to implementation schedules or plans referenced in Section 3.0 ; (6) FERC’s requirement to file a subsequent license amendment to implement any measure described in Section 3.0; or (5) FERC’s removal of language that sets forth the rationale for a particular measure described in Section 3.0, provided there are no changes to the obligation contained in such measure.

(i) “Material NLF Facility Change” means any material change to the configuration and specifications for the NLF Facility set forth in **Appendix A**.

(j) “New License” means the license, not including any Annual License, issued by FERC to Licensee for the continued operation and maintenance of the Project, pursuant to section 15 of the FPA.

(k) “NMFS” means the National Marine Fisheries Service.

(l) “Other Resource Agencies” means PFBC, MDNR, and SRBC.

(m) “PaDEP” means the Pennsylvania Department of Environmental Protection.

(n) “Party” or “Parties” has the meaning set forth in Section 1.0 of this Offer of Settlement.

(o) “PM&E measures” means protection, mitigation and enhancement measures.

(p) “Project” means the York Haven Hydroelectric Project, FERC Project No. 1888.

(q) “Project Area” for purposes of monitoring upstream passage of American shad means the area upstream of a line drawn across the Susquehanna River from the downstream end of the Powerhouse to the east bank of the River, as depicted in **Exhibit 1** to **Appendix D**.

(r) “Project Hydraulic Capacity” means the maximum rate of water flow that can be used for generating power at the Project, and is measured in cubic feet per second (“cfs”). The current Project Hydraulic Capacity is approximately 17,000 cfs.

(s) “Resource Agencies” means USFWS, PaDEP, PFBC, MDNR, and SRBC.

(t) “Upstream American Shad Passage Season” means the period of time of upstream passage of American shad, which generally runs from mid-April to mid-June. Unless otherwise agreed to by the Parties, the beginning of the Upstream American Shad

Passage Season for the Project is determined by the Fish Passage Technical Advisory Committee (“FPTAC”) based upon the passage of 1000 American shad through the mechanical lift at the Safe Harbor Project. The end of the Upstream American Shad Passage Season for the Project is four (4) days following closure of the fish passage lift at the Safe Harbor Project.

(u) “Water Quality Certification” means the water quality certification(s) to be issued by PaDEP pursuant to Section 401 of the Federal Clean Water Act with respect to the FERC license and the ACOE §404 permit for the NLF Facility.

1.9 Filing of Offer of Settlement

The Parties agree that within 30 days of the Effective Date of this Offer of Settlement, the Licensee shall file this Offer of Settlement with the Commission pursuant to 18 C.F.R. §85.602.

2.0 GENERAL AGREEMENTS OF THE PARTIES

2.1 License Term

This Offer of Settlement includes measures designed to protect, mitigate any adverse effects to, and enhance aquatic resources in, the lower Susquehanna River . The Parties expect these measures to improve habitat conditions for aquatic species in the lower Susquehanna River, contribute to the restoration of American shad, American eel and river herring to a portion of their former range, and improve water quality. All of these measures to create these expected public benefits represent considerable new costs to the Licensee in the form of new capital investments, foregone energy and capacity, and reduced flexibility of Project operations. A longer license term will afford the Licensee more time to recoup these costs. For these reasons, the length of the New License term was an important factor in the negotiations for this Offer of Settlement. Accordingly, the Parties agree that, based upon and in consideration of the Offer of Settlement provisions identified in Section 3.0, they will support the Applicant’s request for a term of a term of at least 45 years from the date of license issuance, and would not oppose a New License term of 50 years.

2.2 Enforceability and Withdrawal Rights

The Parties agree that it is their intent, and this Offer of Settlement is based upon, and in consideration of, their expectation that the provisions of Section 3.0 will be included in any

license issued as numbered License Articles and that the Commission will enforce these provisions. If, in making its licensing decision, the Commission determines that any of the provisions of Section 3.0 are not within its jurisdiction to enforce, the Parties request that it so expressly and clearly notify the Parties in the licensing order. If the Commission does not so expressly identify any of such provisions of Section 3.0 that that are not within its enforcement jurisdiction, then the Parties will, in reliance thereon, proceed as though each of the provisions in Section 3.0 identified herein is enforceable by FERC.

In the event that (i) FERC should, contrary to the integrated and indivisible nature of this Offer of Settlement described herein in Section 3.0, issue a New License which contains a Material Modification of any of the commitments identified in Section 3.0; and (ii) the New License is not thereafter satisfactorily modified as a result of the filing of a request for rehearing as provided in Section 2.3; and (iii) any Party thereafter determines that its interests will be materially and adversely affected by the change or changes so made by the Commission, the adversely affected Party may, after first providing written notice of its intention to do so to the other Parties together with a written explanation of its reasons for doing so, withdraw from this Offer of Settlement. In the event that a Party withdraws from this Offer of Settlement, the Offer of Settlement shall thereafter be null and void, and any Party may take the position before FERC that it is not available to support FERC's public interest determination.

2.3 Rehearings and Judicial Review

The Parties agree not to file a request with FERC for rehearing of any new license unless the license (a) contains a Material Modification or contains conditions which are materially inconsistent with the terms of this Offer of Settlement, or (b) omits as license conditions that the Parties have agreed should be included as license conditions as set forth in Section 3.0. In the event that any Party decides to file a request for rehearing in accordance with the terms of this provision, it will provide written notice of its intention to do so to the other Parties at the earliest practicable time and thereafter the other Parties will support in the rehearing request or file an appropriate and supportive rehearing request of their own.

If any Party, following the issuance of a FERC Order on Rehearing, elects to file a petition for judicial review with respect to the matters covered by this provision, the other Parties

will support such a petition to the extent reasonably possible. The Parties understand that participation in judicial review by the U.S. Department of the Interior or the U.S. Department of Commerce is dependent upon the approval of the U.S. Department of Justice.

2.4 Water-Quality Certification - Withdrawal Rights

The Parties agree that they will support the PaDEP's issuance of a Water Quality Certification for the FERC New License and the ACOE §404 Permit that is consistent with the provisions of this Offer of Settlement.

In the event PaDEP issues a Water Quality Certification for the Project that is materially inconsistent with the provisions of this Offer of Settlement, any Party may (i) seek administrative and judicial review of such action; and (ii) withdraw from this Offer of Settlement by providing written notice of its intention to do so to the other Parties within 60 days from the date of issuance of any such Water Quality Certification or, in the event any Party seeks administrative or judicial or agency review, 60 days from the date of the final determination of such appeal.

2.5 Reopeners and Amendment of the New License

The Parties agree that, except as provided herein, this Offer of Settlement is not intended to limit or restrict the ability of any Party to petition FERC pursuant to any lawful reopener condition or reservation of authority contained in the new license, so long as the Parties adhere to the process identified in Sections 2.5.1 or 2.5.2 below.

2.5.1 Amendments that Do Not Propose a Material Modification

Subject to the notification and consultation process set forth in this Section 2.5.1, Licensee may seek amendments to the New License that do not propose a Material Modification in accordance with FERC procedures. Except for FERC compliance directives addressed in Section 2.5.2 herein and temporary emergency amendments addressed in Section 2.5.5 herein, as part of any pre-filing consultation for the amendment application, the Licensee shall Notify each Party of the intended proposal, with an explanation, and request the views of the Parties as to whether the proposed amendment would be considered a Material Modification. Each Party reserves all rights under applicable law to challenge or comment on any application for a license amendment. If a Resource Agency believes the proposed amendment is a Material Modification,

it may invoke the dispute resolution procedures in Section 2.9 herein and may file documents with FERC as necessary to meet comment or intervention deadlines established by FERC.

2.5.2 Compliance with FERC Public Health and Safety Directives

Licensee reserves the right to fully and timely comply with any FERC directive pertaining to dam safety, flood flows, Project security or any similar public health and safety requirement, including but not limited to any license amendment involving a Material Modification that is necessary or appropriate to implement such FERC directive. Each Party reserves all rights under applicable law to challenge or comment on any such application for a license amendment.

2.5.3 License Amendments Where There is Agreement

If the Parties mutually agree that an amendment is warranted, then the Party proposing the amendment to the Settlement Agreement may petition the Commission to amend the License Articles to reflect the mutually-agreed amendment. The Parties acknowledge that the Licensee shall not be obligated to implement any agreement among the Parties regarding a proposed change in License terms until the effective date of the FERC amendment of the License.

2.5.4 License Amendments Proposing a Materials Modification Where There is Not Agreement

Except as provided in Section 2.5.2, if any Party proposes a license amendment that involves a Material Modification and one or more of the Parties do not agree, then the Parties shall adhere to the following process:

(a) Except as stated in Section 2.8, a Party may only seek an amendment to the License that involves a Material Modification if that Party demonstrates that the proposed modification is based on a material change in the environmental conditions from those in effect or anticipated as of the date the Parties executed the Offer of Settlement.

(b) Before any Party takes any such action described in Section 2.5.4(a) above, such Party must provide at least sixty (60) days prior written notice to the other Parties. If any Party believes that the proposed reopener or amendment is inconsistent with the Settlement Agreement, that opposing Party shall respond to all other Parties in writing within

thirty (30) days of receipt of the written notice. All interested Parties shall then proceed to utilize the dispute resolution procedures set forth in Section 2.9 to attempt to resolve or narrow the scope of the dispute. If the Licensee and the Resource Agencies are unable to reach agreement on the proposed reopener or amendment utilizing the dispute resolution procedures set forth in Section 2.9, then the Party seeking the reopener or amendment shall be permitted to make such filing and all Parties are free to advocate any position they deem appropriate before the Commission or any other regulatory agency.

(c) The Parties acknowledge that (i) based on the record and having given careful consideration to the non-power and power values of the Project, the measures set forth in Section 3 are those that are appropriate to address the operational, fisheries and aquatic resources, wildlife and water quality issues related to the Project, (ii) the Parties do not anticipate the imposition of additional PM&E Measures during the term of the License, and (iii) any additional PM&E Measures would be considered a Material Modification. Without limiting the generality of the foregoing, in consideration of Licensee implementing the NLF Facility, except for such facility and operational adjustments as described in Section 3.1.3(e), the Parties contemplate that Licensee will not be required to design, construct or install any other fish passage facility at the Project before 2041 and any requirement to design, construct or install any other fish passage facility at the Project would be considered a material modification; provided that nothing in this sentence shall constitute a waiver by the USFWS or NMFS of their respective reserved prescription authority under §18 of the Federal Power Act, and Licensee retains all rights to challenge such an exercise of reserved authority.

(d) The Party filing a request for reopener or amendment under this Section shall demonstrate, in its request to reopen or amend, its compliance with this Section 2.5.4 of this Offer of Settlement.

2.5.5 Temporary Emergency Amendments

Notwithstanding Section 2.5.4, the Licensee will not be required to obtain mutual agreement with the Parties, provide advance notice, consult, or participate in the dispute resolution procedures set forth in this Offer of Settlement for any emergency situation requiring a temporary license variance or amendment; provided, however, that (1) the Licensee shall comply

with any statutory or regulatory requirements for notice or consultation; (2) the Licensee will provide Notice to the Parties regarding the temporary, emergency license variance or amendment as soon as practicable, and no later than 10 days after filing the emergency application with FERC.

2.6 Amendment of Offer of Settlement

The Parties agree that nothing in this Offer of Settlement is intended to limit or restrict the ability of any Party to seek an amendment to this Offer of Settlement during the effective period of the license. Any Party proposing such an amendment to this Offer of Settlement shall provide all Parties with at least 60 days written notice of the proposed amendment using updated addresses as needed. If requested to do so by any Party, the initiating Party shall consult with the other Parties regarding the proposed amendment for at least another 30 days. No amendment will be effective if any Party objects to the amendment. This Offer of Settlement may only be amended without the consent of a Party if that Party has made no response to written notice of proposed amendment within 60 days of such notice, thus indicating that it has ceased to exist or be interested in the Project; *provided that* no amendment to this Offer of Settlement shall be effective unless agreed to by the Licensee. After such notice and consultation, if all Parties either concur with or do not object to the proposed amendment, the Party making the proposal shall secure signed agreements to the amendment from all Parties who concur with the proposal. If the amendment would require modification of the license or any other permit, the Licensee shall file all applications to amend any license or permits necessary to effectuate the agreed-upon changes, and the other Parties will support such efforts.

2.7 Filings Prior to Issuance of New License

Prior to the issuance of the new license pursuant to this Offer of Settlement, neither the Licensee nor any Party shall make any filing with FERC seeking a modification of Project works under license or of the operation of the Project unless such a modification involves an emergency or is not materially inconsistent with this Offer of Settlement and the Party who wishes to make the filing provides the other Parties at least 30 days notice of such a filing.

2.8 Compliance with Endangered Species Act

The Parties would recognize that: (i) the USFWS is in the process of preparing a 12-month finding in response to a petition to list the American eel under the federal Endangered Species Act (“ESA”); (ii) in response to a petition filed by various parties, on August 12, 2013, the National Marine Fisheries Service (“NMFS”) issued a determination that river herring (alewife and blueback herring) do not warrant listing under the ESA at this time; (iii) the USFWS will require American eel passage and river herring passage at York Haven Dam consistent with the terms of Section 3.0 of this Offer of Settlement, through its mandatory conditioning authority under Section 18 of the Federal Power Act; and (iv) the plans contemplated in this Offer of Settlement and related prescriptions, including provisions for installation and operation of the NLF Facility and provisions relating to downstream passage, are conservation measures that are expected to expand access to currently available habitat for the American eel and river herring and, therefore, benefit the American eel and river herring populations. Based on current material information related to the American eel and river herring, the Parties do not expect any future Endangered Species Act consultation for Project-related effects to the American eel or river herring to result in the imposition of any additional, new or expanded obligations, beyond those defined in Section 3.0 of this Offer of Settlement. However, as these species are not listed, that USFWS and NMFS have not engaged in any formal or informal ESA consultation with respect to these species or determined that the incidental take of such species would be acceptable under the ESA, and retain their ESA authority should they or any other species be listed and future analysis or evidence suggest that additional measures are necessary under the ESA.

2.9 Consultation and Dispute Resolution Process

2.9.1 General Applicability

Unless otherwise provided herein, the Parties will use the following procedures to avoid and resolve disputes related to this Offer of Settlement. Such disputes may be, but are not limited to, (i) a Party’s proposal, advocacy, or support for a Material Modification; (ii) FERC’s issuance of a New License containing a Material Modification; (iii) the Licensee’s implementation of, or compliance with, the New License; (iv) FERC’s enforcement of conditions of the New License; (v) PaDEP, the Corps, or any other agency with jurisdiction issuing

conditions that would be materially inconsistent with this Agreement; or (vi) any dispute relating to any process requiring Resource Agency consultation, concurrence or approval. The Parties intend that disputes under this Agreement be resolved as informally and expeditiously as possible. The Parties will devote such time and attention to the dispute resolution procedures as necessary and reasonable to attempt to resolve the dispute at the earliest time possible; and each Party will cooperate in good faith promptly to schedule, attend in person or by telephone, and participate in dispute resolution. Each Party will promptly implement all final agreements reached, consistent with its applicable statutory and regulatory responsibilities. Nothing in this Section is intended or will be construed to affect or to limit the authority of FERC, the Resource Agencies or any other agency or any court with jurisdiction over the Project to resolve a dispute brought before it in accordance with its own authorities and procedures, or to alter the statute of limitations or other requirements for administrative or judicial review or appeal of any action.

2.9.2 Process.

Except where dispute resolution is expressly not authorized by another provision of this Agreement, any dispute among the Parties will first be addressed among the Parties' designated representatives, and thereafter, if necessary, be referred to the Management Representatives Committee. Each Party's representative to the Management Representatives Committee will be an upper-level management person. To initiate dispute resolution, a Party claiming a dispute will give notice of the dispute to the other Parties within 30 days of such Party's knowledge of the act, event, or omission that gives rise to the dispute, unless this Agreement provides otherwise. Within 20 days after such notice of a dispute, Licensee will convene at least one meeting of the Parties to attempt to resolve the dispute. If the dispute is not resolved within 15 days after the meeting, a Party may notify the other Parties that resolution of the dispute has failed, in which case the dispute will be referred to the Management Representatives Committee. Within 20 days after referral of a dispute, Licensee will schedule a meeting or conference call of the Management Representatives Committee. The Parties may, by unanimous agreement of the members participating in the dispute resolution process, attempt to resolve the dispute using a neutral mediator agreeable to all participating Parties.

2.9.3 Enforcement of Agreement After Dispute Resolution.

If dispute resolution under Section 2.9 does not resolve a dispute, any Party may seek specific performance of the terms of this Offer of Settlement by any other Party at FERC or in a court of competent jurisdiction, or, to the extent allowed by applicable law, may seek other remedies. If the dispute relates to a possible exercise of authority by an agency Party, the agency may proceed with its exercise of authority under its usual regulations and the Licensee retains any rights it may have to challenge that exercise of authority.

2.9.4 Review of Agency Actions.

Any agency (including any federal, state, or multi-state agency) which is a Party to this Agreement and which has authority under any statute or regulation to make a determination which would be binding on Licensee, shall make such determinations on the record and in accordance with its procedural and substantive regulations, provided, however, that, the Parties will use these dispute resolution procedures in an effort to amicably resolve the issues presented. To the extent and in the manner provided by applicable law, any Party may pursue an appeal of any action by any agency that is inconsistent with this Offer of Settlement, or by which the Party is otherwise aggrieved. These dispute resolution procedures do not preclude any Party from timely filing and pursuing an appeal under any applicable statutes, regulations and rules for any such action that is inconsistent with the Offer of Settlement. However, the Parties will follow the dispute resolution procedures set forth above while any such appeal is pursued.

2.9.5 Actions After Making FERC Filing.

If, after Licensee files an application or petition with FERC, any Section 401 Certification, ESA Biological Opinion and incidental take statement, or other permit is denied or issued with any provision, term or condition that is constitutes a Material Modification, or if any Party takes an action inconsistent with this Offer of Settlement (including submitting any inconsistent recommendation, condition, prescription, or comment in any proceeding related to issuance of the New License), then any Party may initiate dispute resolution as provided in this Section 2.9. Any other Parties may participate in the dispute resolution. In addition to the dispute resolution process, a Party may pursue rehearing, administrative or judicial petition or appeal, or other formal agency adjudication available at law or in equity.

2.9.6 Third Party Actions.

If, after issuance of the New License, any action by a third party not a Party to this Offer of Settlement (including FERC, another agency or a court) results in the imposition of any commitment that any Party believes is inconsistent with the Offer of Settlement, then that Party may provide notice that it objects and may initiate dispute resolution as provided in this Section 2.9 and, if applicable, may pursue an appeal. If, after conclusion of dispute resolution and conclusion of any appeals, the commitment remains inconsistent with this Offer of Settlement, or as modified remains inconsistent with the Offer of Settlement, and the Parties cannot reach agreement on a resolution to the inconsistency, any Party who participated in dispute resolution may pursue any remedy available under applicable law (except specific performance); provided, each other Party reserves all claims and defenses regarding any of these actions, including but not limited to the affirmative defense that the new commitment conflicts with or prevents implementation of the commitments made in this Offer of Settlement.

2.10 Renewable Energy Credits

If the New License is issued without any Material Modification, the Resource Agencies agree to support Licensee's application for Tier 1 renewable energy credits.

2.11 Force Majeure

(a) In the event that Licensee is prevented from complying in a timely manner with any obligations or time limit imposed under this Offer of Settlement because of a strike, fire, flood, tornado, hurricane, landslide or other act of God, denial or conditioning of any governmental approval, or other conditions beyond Licensee's reasonable control, and which, by the exercise of all reasonable diligence, Licensee is unable to prevent, Licensee may petition the Commission for an extension of time. An increase in the cost of performing the obligations stipulated in Offer of Settlement agreement or Licensee's economic inability to comply would not constitute a force majeure event.

(b) Licensee shall notify the Resource Agencies within ten days of the date Licensee becomes aware of or reasonably should have become aware of the event impeding performance, including information regarding the reasons for the delay, the expected duration of the delay, and the efforts which have been made and are being made by Licensee to minimize the

length of delay. Licensee shall periodically report to the Resource Agencies and FERC concerning the progress of efforts to minimize and eliminate the impact of such event on performance of Licensee's obligations under this Offer of Settlement.

3.0 MEASURES THAT THE PARTIES AGREE SHOULD BE INCORPORATED IN THE TERMS OF THE LICENSE

The Parties agree that the following provisions should be incorporated in the terms of the New License as License Articles.

3.1 Fish Protection and Passage

3.1.1 Upstream Fish Passage / Nature-Like Fishway Construction.

(a) Licensee shall finance, design, permit and install a nature-like fishway facility (the "NLF Facility") in the vicinity of the apex of the Main Dam and Three Mile Island ("TMI"), in substantial compliance with the design criteria for the NLF Facility set forth in **Appendix A**. Licensee shall complete engineering design, apply for and obtain required governmental approvals, construct, and place into operation the NLF Facility by November 30, 2021. This schedule is premised upon timely review and approval of plans and governmental approvals by the involved agencies. If due to circumstances beyond the reasonable control of Licensee, Licensee is unable to complete construction of the NLF Facility by November 30, 2021, Licensee may submit a request to FERC for a reasonable extension of time.

(b) In consultation with the USFWS, NMFS, PaDEP and PFBC, Licensee shall develop the final plans and specifications for the NLF Facility consistent with the design concept and design criteria in **Appendix A**, and shall submit such plans and specifications to the Resource Agencies, Licensee shall provide a minimum of 60 days for the Resource Agencies to submit comments on such plans and for review and approval of such plans by USFWS and PaDEP. Such comments, review and approval shall not result in a Material NLF Facility Change. After approval of such plans by PaDEP and USFWS, Licensee shall submit such plans to the Commission for approval. Licensee shall include with the final plans submitted to the Commission evidence of approval by PaDEP and USFWS and copies of the Other Resource Agencies' comments and recommendations. If Licensee does not adopt a recommendation made by a Resource Agency other than PaDEP and USFWS, the filing shall

include the Licensee's reasons together with supporting information. The plans shall not be implemented until the Licensee is notified that the plans are approved by the Commission. Upon Commission approval and the receipt of all other required governmental approvals, the Licensee shall implement the plans, including any changes required by the Commission.

3.1.2 NLF Facility Operations.

Following construction of the NLF Facility, Licensee shall perform all required routine maintenance of the NLF Facility. Licensee shall (i) conduct periodic inspections of the NLF Facility; and (ii) manage and remove debris from the NLF Facility to maintain the functioning and operability of the NLF Facility sufficient to allow and not significantly impede the passage of fish.

Licensee shall prepare an NLF Facility operations and maintenance plan (the "NLF O&M Plan"), and will submit the NLF O&M Plan for review by the Resource Agencies and for approval by PaDEP and the USFWS. Following review and comment by the Resource Agencies, and approval by PaDEP and USFWS, YHPC shall submit the NLF O&M Plan to FERC, and shall implement the NLF O&M Plan for the duration of the License. Licensee shall include in the NLF O&M Plan submitted to the Commission documentation of approval by PaDEP and USFWS, consultation with the Other Resource Agencies, copies of the Resource Agencies' comments and recommendations, and a description of how the Other Resource Agencies' comments are accommodated. Licensee shall provide a minimum of 30 days for review and approval of the NLF O&M Plan by PaDEP and USFWS and for review and comment by the Other Resource Agencies.

Any amendment to the NLF O&M Plan that materially alters the operation, maintenance, monitoring or reporting procedures relating to the NLF Facility shall be subject to review and approval by PaDEP and the USFWS, and review and comment by the Other Resource Agencies.

Licensee shall provide copies of the approved NLF O&M Plan and all amendments thereto to the Commission and the Resource Agencies.

3.1.3 Monitoring of Shad Passage Effectiveness & Subsequent Actions

The Licensee shall perform post-construction monitoring of the NLF Facility in accordance with the following provisions in consultation with the Resource Agencies and submit the results of such monitoring to the Resource Agencies and the Commission.

(a) The period from completion of construction through the end of the first American shad upstream shad passage season following completion of the NLF Facility will be a “shake-down” period, during which Licensee shall conduct visual observations and make adjustments to the NLF Facility to address any unanticipated inhibitions or barriers that impede the NLF Facility’s performance.

(b) Starting in the second American shad upstream passage season following completion of the NLF Facility, Licensee shall commence telemetry studies to monitor the overall effectiveness of the NLF Facility, consistent with the following:

(i) The telemetry studies will be conducted for at least two years, and potentially a third year if, after consultation with the Resource Agencies, determined to be necessary by the Licensee or either the USFWS or PaDEP in order to obtain observations over a range of high and low flows typical of American shad passage seasons on the Susquehanna River. In general, the range defining typical high and low flows during the American shad upstream passage season would be anticipated to be as follows:

- Typical low flow range: 22,000 to 35,300 cfs.
- Typical high flow range: 35,300 cfs to 55,600 cfs.

(ii) The telemetry studies will be planned to be conducted during successive shad passage seasons, but may be performed on a non-successive basis under the following circumstances:

- (1) Licensee may postpone conduct of the telemetry studies, after consultation with the Resource Agencies and with the concurrence of USFWS and PaDEP, in the event that extenuating circumstances (such as the unusual flows, construction at downstream dams or other conditions) are interfering or expected to interfere with upstream shad passage. The Resource Agencies agree that in the event that they become aware of circumstances that would warrant postponement of the telemetry studies, they will promptly notify the Licensee, with the objective of providing notice to the Licensee to the extent practicable at least 90 days prior to the anticipated start of the shad passage season.
- (2) Licensee may postpone a successive season's telemetry study if Licensee determines, after consultation with the Resource Agencies and with the concurrence of USFWS and PaDEP, that some physical adjustment to the NLF Facility is advisable based on the observations during the prior shad passage seasons, in which case Licensee shall will implement the physical adjustments and perform the telemetry study in the American shad upstream passage season following implementation of the physical adjustment.
- (iii) The telemetry studies will utilize American shad tagged at the Safe Harbor Project, provided that access is granted by the owner of such Project.

(iv) The telemetry studies shall utilize radio telemetry, acoustic telemetry, or such other technologies as Licensee proposes and PaDEP and USFWS, after consultation with the Other Resource Agencies, approve. The general parameters and protocols for such telemetry studies (number of fish, fish release sites, target areas for telemetry antennas) are described in **Appendix D**. At least 10 months prior to the start of the second Upstream American Shad Passage Season following completion of the NLF Facility, Licensee shall prepare and submit to the Resource Agencies for review an NLF Facility Monitoring Plan (the “NLF Monitoring Plan”) containing detailed protocols for the telemetry studies. Licensee shall confer with the Resource Agencies regarding the NLF Monitoring Plan, and shall provide for at least 90 days for PaDEP and USFWS to review and approve, and for the Other Resource Agencies to review and comment on, the NLF Monitoring Plan. At least five (5) months prior to the start of the second American shad upstream passage season following completion of the NLF Facility, Licensee shall submit the NLF Monitoring Plan to the Commission for approval. If Licensee does not adopt a recommendation made by an Other Resource Agency, the filing with the Commission shall include the Licensee’s reasons together with supporting information.

(c) Upstream American Shad Passage Target and Effectiveness

Criteria:

(i) The target established by the Resource Agencies is for at least 75% of the upstream migrating American shad passing the Safe Harbor Dam to pass upstream of the York

Haven Project through the combination of the NLF Facility and the East Channel Fishway (the “Upstream Shad Passage Target”). The NLF Facility shall be designed and operated to be capable of achieving the Upstream Shad Passage Target, provided that adequate numbers of upstream migrating American shad reach the Project Area. The Licensee shall not be deemed in violation of this condition if the Upstream Shad Passage Target is not achieved for reasons beyond the reasonable control of the Project, provided that the Licensee complies with Sections 3.1.3(c)(ii)-(v) and (d)-(f) below.

- (ii) The NLF Monitoring Plan will be designed to investigate several issues: (i) whether the upriver migrating American shad passing the Safe Harbor Dam are reaching the Project Area; (ii) whether upriver migrating American Shad entering the Project Area are attracted to the downstream entrance of the NLF Facility; and (iii) whether there are barriers to American shad entering into and passing through the NLF Facility (e.g., velocity barriers or other constraints).
- (iii) The NLF Facility will be deemed to be effective if: (1) in two consecutive years after installation or subsequent modification of the NLF Facility, (A) the Upstream Shad Passage Target is achieved or (B) 85% of the tagged American shad that enter the Project Area exit the combination of the NLF Facility and the East Channel Fishway (the “Project Area Passage Success Criterion”); and (2) Licensee complies with Section 3.1.3(d) below.

- (iv) If the telemetry studies show that the Project Area Passage Success Criterion is achieved in two successive American shad upstream passage seasons which reflect a range of flows typical of shad passage seasons on the Susquehanna River, the Project Area Passage Success Criterion will be deemed achieved and YHPC may terminate the telemetry studies.
- (v) If the telemetry studies show that the Project Area Passage Success Criterion is not achieved in two successive American shad upstream passage seasons, and such failure was not due to unusual or extenuating circumstances (such as unusual flow or temperature conditions), YHPC will undertake the actions set forth in Section 3.1.3(e) and then perform a telemetry study for at least two additional American shad upstream passage seasons to confirm achievement of the Project Area Passage Success Criterion.

(d) Licensee shall, in consultation with the Resource Agencies, evaluate the fish movement data from the NLF Monitoring Plan to determine if there are barriers to timely passage of upstream migrating American shad within the Project Area. If such barriers to timely passage of upstream migrating American shad are identified within the Project Area, Licensee shall prepare and submit to the Resource Agencies a plan and schedule for those actions to address such conditions that are feasible, appropriate under the circumstances, reasonable and technically sound, provided that the Project shall not be required to undertake the curtailment of electric generating operations. Such plan shall be subject to review and approval by PaDEP and USFWS and review and comment by the Other Resource Agencies. Following approval by PaDEP and USFWS, and as necessary FERC, Licensee shall implement the approved plan in accordance with the approved schedule.

(e) If the Project Area Passage Success Criterion is not achieved, Licensee shall take the following measures, as appropriate and necessary, after consultation with the Resource Agencies:

- Evaluate fishway hydraulics and access for velocity and shear stress barriers, recognizing that hydraulics of the NLF Facility will vary with river flow and flow through the NLF Facility.
- Adjust positions of rock weirs and attraction water discharge if necessary.
- Adjust timing of supplemental attraction flows.
- Install ultrasound to deter fish from an area (such as the Powerhouse or East Channel).
- Reduce flows in the East Channel to reduce attraction of American shad to the East Channel.
- Adjust amount of supplemental attraction flows in the NLF Facility up to the Potential Increased Attraction Flow Value.
- Evaluate whether potential barriers exist in the channel downstream of the Main Dam hindering fish movement to the entrance of the NLF Facility, and if reasonably necessary undertake feasible and cost-effective modifications to the channel to remove such barriers.

(f) The upstream end of NLF Facility shall be designed to accommodate installation of Passive Integrated Transponder (“PIT”) tag monitoring devices at such time as such PIT tag monitoring devices become available and feasible for reliably monitoring American shad exiting the NLF Facility. At such time as requested by PaDEP or the USFWS, Licensee shall conduct a feasibility study to evaluate whether a PIT tag monitoring facility can be successfully installed and maintained near the upper end of the NLF Facility to reliably monitor American shad exiting the NLF Facility. Licensee shall install PIT tag readers, or such other monitoring technology as may be agreed upon, after consultation with the Resource Agencies, by the Licensee, USFWS and PaDEP, at the upstream end of the NLF Facility when such technology becomes available, feasible, and technically sound for measuring American shad passage in the conditions of the NLF Facility as mutually agreed to, after consultation with the Resource Agencies, by Licensee, USFWS and PaDEP. The Parties contemplate that such

monitoring will use American shad tagged at Conowingo or Safe Harbor to monitor overall effectiveness of American shad upstream passage within the lower Susquehanna River.

3.1.4 Upstream Passage of Eels

Licensee shall provide for upstream passage of juvenile American eels through maintenance of the existing Project and installation of the NLF Facility. Based upon their present understanding of the behavior of juvenile American eels and the design of the NLF Facility, the Parties contemplate that the existing design of the Project in conjunction with the installation of the NLF Facility will be adequate to provide for successful upstream passage of juvenile American eels past the Project, and no other PM&E measures are presently believed to be necessary for such upstream passage of juvenile American eels.

3.1.5 Downstream Post-Spawning Adult American Shad Passage

(a) Licensee shall provide for downstream passage of post-spawning adult American shad through maintenance of the existing Project, installation and operation of the NLF Facility, and implementation of the protocol set forth in Section 3.1.5(b).

(b) During the period of May 1 to June 30, if River Flow exceeds the sum of Project Hydraulic Capacity, required flows through the NLF Facility, required flows through the East Channel, and required flows (if any) over the Main Dam, YHPC will open and spill water via the Forebay Sluice Gate (~370 cfs) to the extent practicable during one to two hours during the morning during weekdays, subject to Project personnel availability and access requirements for operations and maintenance purposes. Such spilling may be provided in connection with opening of the Forebay Sluice Gate for purposes of passing debris, it being understood by the Parties that during the passage of debris, it will not be feasible to utilize the chute structure referenced in Section 3.1.6(e).

3.1.6 Downstream Juvenile American Shad Passage

(a) After issuance of the New License and until completion of the NLF Facility, Licensee shall implement the following protocol to facilitate downstream passage of juvenile American shad during the Downstream Juvenile American Shad Passage Period:

- (i) During the entire Downstream Juvenile American Shad Passage Period, YHPC will operate the Project units in the following order of priority, depending upon available River flow: (1) Unit 1-6 (Propeller units) may be operated without restriction up to available river flow; (2) Unit 14 (larger single Francis unit) may be operated if river flow exceeds capacity of Units 1-6; (3) Units 7-13 and 15-30 (double Francis units) may be operated in ascending order if river flow exceeds capacity of Unit 1-6 and 14.
- (ii) During the entire Downstream Juvenile American Shad Passage Period, YHPC will open and spill water via the forebay sluice gate (~ 370 cfs) between the hours of 5 pm to 11 pm Eastern Standard Time (“EST”).²
- (iii) If River flow exceeds the sum of Project Hydraulic Capacity, required flows through the East Channel, and required flows (if any) over the Main Dam, YHPC will open and spill water via the forebay sluice gate (~370 cfs) to the extent practicable for one to two hours during the morning, subject to Project access requirements for operations and maintenance purposes, in order to provide for downstream juvenile American shad passage.

(b) After completion of the NLF Facility, Licensee shall implement the following protocol to facilitate downstream passage of juvenile American shad during the Downstream Juvenile American Shad Passage Period:

² Note: During the Downstream Juvenile American Shad Passage Season, a portion of the period is in daylight savings time and a portion is in standard time. All timeframes stated in this Offer of Settlement are stated in Eastern Standard Time. During October, sunset in the central Pennsylvania area is in a range of 5:50-5:05 pm EST. During November, sunset in central Pennsylvania occurs in a range of 5:05 pm to 4:42 pm EST.

- (i) During the entire Downstream Juvenile American Shad Passage Period, YHPC will operate the Project units in the following order of priority, depending upon available River flow: (1) Unit 1-6 may be operated without restriction up to available river flow); (2) Unit 14 may be operated if river flow exceeds capacity of Units 1-6; (3) Units 7-13 and 15-30 may be operated in ascending order if river flow exceeds capacity of Unit 1-6 and 14.
- (ii) During the entire Downstream Juvenile American Shad Passage Period, YHPC will open and spill water via the forebay sluice gate (~ 370 cfs) between the hours of 5 pm to 11 pm EST.
- (iii) The NLF Facility will be operated to maintain a flow through the fishway of approximately 200 cfs.
- (iv) If River flow exceeds the sum of Project Hydraulic Capacity, required flows through the NLF Facility, required flows through the East Channel, and required flows (if any) over the Main Dam, YHPC will open and spill water via the forebay sluice gate (~370 cfs) to the extent practicable for one to two hours during the morning, subject to Project access requirements for operations and maintenance purposes, in order to provide for downstream juvenile American shad passage.

(c) The overall goal for juvenile American shad downstream passage is to achieve survival of 95% of juvenile American shad from above the Project powerhouse and dam to below the Project powerhouse and dam (the “**Downstream Juvenile American Shad Passage Goal**”). The Parties recognize that given a variety of factors, measurement of such passage effectiveness and survival is subject to a margin of error. The effectiveness of downstream passage operations for juvenile American shad will be determined based upon (1) a

route of passage analysis as described in Section 3.1.6(d), and (2) confirmation that Forebay Sluice Gate provides for safe passage as described in Section 3.1.6(e).

(d) For purposes of the route of passage analysis, the Parties will assume that (1) juvenile American shad will pass through the NLF Facility, through the East Channel past the East Channel Dam, over the Main Dam, and into the head race in direct proportion to the amount of flow via each such route; (2) any juvenile American shad passing through the NLF Facility, through the East Channel past the East Channel Dam, over the Main Dam, or through the forebay sluice gate will survive; (3) juvenile American shad that do not pass through the NLF Facility, through the East Channel past the East Channel Dam, over the Main Dam, or through the forebay sluice gate will pass through the turbines that are being operated in accordance with the priorities set forth in Section 3.1.6(b), and absent observations to the contrary, are allocated between the operating turbines in proportion to the flow through each turbine; and (4) the survival rate of juvenile American shad passing through individual turbines (based on previous balloon tag and blade strike analyses) are as stated in **Appendix D**. Based upon the foregoing assumptions and confirmation that Forebay Sluice Gate provides for safe passage as described in Section 3.1.6(f), the juvenile American shad passage goal of 95% would be met if at least 60% of the tagged juvenile American shad released into the headrace exit via the Forebay Sluice Gate (that is, pass downstream of the Project headrace without passing through the turbines) (the “Headrace Shad Turbine Avoidance Target”). Licensee shall test the downstream passage efficiency of the operating protocols described above by a PIT tag monitoring study. Licensee shall, in consultation with the Resource Agencies, prepare a plan and schedule for the Headrace Shad Turbine Avoidance Study for review and approval of the Resource Agencies, consistent with the design criteria set forth in **Appendix D**. The Project will be deemed to meet the Downstream Juvenile American Shad Passage Goal if (1) the Headrace Shad Turbine Avoidance Study shows that the Headrace Shad Turbine Avoidance Target is achieved and (2) the Licensee complies with the provisions of Section 3.1.6(f) to establish conditions under which the Forebay Sluice Gate provides for safe passage of juvenile American shad.

(e) Within four (4) years following License issuance and prior to performance of the downstream juvenile American shad studies referenced in Section 3.1.6(d),

License shall prepare and submit to the Resource Agencies: (i) designs for a chute structure to convey flows beyond the roadway on the downstream side of the Cable Alley structure, meeting the design criteria set forth in Appendix E allowing juvenile and adult American shad to land unimpeded in the downstream pool; and (ii) removal of obstructions in or deepening of the downstream pool into which flows from the Forebay Sluice Gate land to provide an adequate depth of 1 foot for each 4 feet of drop into which juvenile or adult American shad may land. Licensee shall submit any design plans for improvements as described in this Section 3.1.6(e) and a proposed implementation schedule to USFWS and PaDEP for review and approval and to the Other Resource Agencies for review and comment, and shall implement the proposed improvements in accordance with the approved designs and schedule. Any such required improvements shall be completed coincident with completion of the NLF Facility, and in advance of commencement of the monitoring described in Section 3.1.6(d).

(f) If the effectiveness monitoring conducted pursuant to Section 3.1.6(d) shows that the Headrace Shad Turbine Avoidance Target is not achieved, Licensee shall implement the following sequence of adaptive measures in the next passage season:

- (i) Open the NLF supplemental flow gate (800 cfs) during the same schedule as the Forebay Sluice Gate is opened.
- (ii) Suspend operation of certain Francis turbine units during the hours of 5-11 pm EST when river flows are between 15,000 cfs and 22,000 cfs during the Downstream Juvenile American Shad Passage Period, up to a total generation loss of 1,000 Megawatt hours (“MWh”).
- (iii) Such other measures as may be agreed to by the Licensee, USFWS and PaDEP, after consultation with the Other Resource Agencies, and (to the extent required) approved by the Commission.

(g) Within two years of implementing the adaptive measures referenced in Section 3.1.6(f), Licensee shall conduct a follow-up Headrace Shad Turbine

Avoidance Study following the protocols referenced in Section 3.1.6(d). If the follow-up Headrace Shad Turbine Avoidance Study shows that Headrace Shad Turbine Avoidance Target is achieved, such adaptive measures shall continue to be implemented for the duration of the License.

(h) If by January 1, 2028, (a) the Headrace Shad Turbine Avoidance Studies have not shown that Headrace Shad Turbine Avoidance Target is being achieved by adaptive measures implemented at the Project, and (b) based on all available information and after consultation with Licensee and the other Resource Agencies, the USFWS and/or NMFS renders a determination on the basis of the record reasonably finding that (i) Licensee has not demonstrated that the adaptive measures implemented at the Project are reasonably anticipated to meet the Downstream Juvenile American Shad Passage Goal considering the Shad Tolerance Factor, and (ii) additional measures that are reasonably required to achieve the Downstream Juvenile American Shad Passage Goal (the “Additional Measures Determination”) (which Additional Measures Determination shall be subject to the dispute resolution / appeal procedures set forth in Section 2.9):

- (i) Within 12 months of the Additional Measures Determination, Licensee shall, in consultation with the Resource Agencies, prepare a design and schedule for implementation of additional structural and operational measures reasonably anticipated to meet the Downstream Juvenile American Shad Passage Goal that are feasible, appropriate under the circumstances, reasonable and technically sound. Licensee shall evaluate, among other options, options for a Fish Guidance System (“FGS”) as described in the report entitled *Evaluation of Fish Guidance Systems* (Draft April 2013), or other appropriate technology to achieve the Downstream juvenile American shad Passage Goal. As part of the evaluation report, Licensee shall provide sufficient information to demonstrate the reasonably likelihood of the proposed

option and measures to meet the Downstream Juvenile American Shad Passage Goal.

- (ii) Following approval of the design and schedule by USFWS and PaDEP, after consultation with the Other Resource Agencies, Licensee shall prepare and submit the applications for all required governmental approvals, including FERC approvals, and procure, install and implement the approved structural and/or operational measures in accordance with the approved schedule. Such approved measures shall be implemented by December 31, 2030 or such other date as agreed to by Licensee and USFWS, after consultation with the Other Resource Agencies, or as approved by FERC.
- (iii) If Licensee does not present a design and schedule for implementing additional structural and operational measures reasonably anticipated to meet the Downstream Juvenile American Shad Passage Goal that are feasible, appropriate under the circumstances, reasonable and technically sound, or based on all available information and after consultation with Licensee and the Resource Agencies, USFWS does not approve the Licensee's design and schedule for additional measures submitted pursuant to Section 3.1.6(h)(i), USFWS may elect to exercise its reserved authority to prescribe such measures as the USFWS determines are necessary for safe and effective passage of downstream migrating American shad; and Licensee retains all rights to challenge any such exercise of reserved authority.

(i) Within one year after the implementation of the structural and operational measures implemented under Section 3.1.6(h), Licensee shall perform a follow-up Headrace Shad Turbine Avoidance Study to evaluate the number of tagged juvenile American shad that exit the Forebay without exposure to the turbines.

3.1.7 Downstream Passage for Silver Eels

Licensee shall provide for the downstream passage of silver eels in accordance with this Section.

(a) The overall goal for silver American eel passage shall be to achieve effective passage and survival of 85% of silver eels from above the Project dams and powerhouse to below the Project dams and powerhouse (the “Downstream Eel Passage Goal”). The Parties recognize that given a variety of factors, measurement of such passage effectiveness and survival is subject to a margin of error.

(b) Licensee shall cooperate with the Resource Agencies and other interested parties in the conduct of (1) a Lower Susquehanna River Downstream Eel Study to evaluate the timing, magnitude, duration, annual variation and environmental conditions associated with active migration of silver eels from tributaries stocked with elvers, through the lower Susquehanna River to the Chesapeake Bay; and (2) a Site-Specific Route of Passage Study to evaluate the route of passage selected migrating silver eels in the vicinity of the Project. The design criteria for the Lower Susquehanna River Downstream Eel Study and the Site-Specific Route of Passage Study are described in **Appendix G**.

(c) At least 12 months prior to the anticipated date for completion of the NLF Facility, in consultation with the Resource Agencies, Licensee shall prepare a plan and schedule for conducting a discrete downstream passage effectiveness study (“Site-Specific Downstream Eel Study”), consisting of a Site Specific Route of Passage Study as described in **Appendix G** and an Eel Survival Study as described in **Appendix H**. Licensee shall submit the Site-Specific Downstream Eel Study plan and proposed schedule to the Resource Agencies, for review and approval by USFWS and PaDEP and for review and comment by the Other Resource Agencies. Licensee, in cooperation with the Resource Agencies, shall conduct the Site-Specific Route of Passage Study following completion of the NLF Facility in accordance with the

approved plan and schedule, and Licensee shall conduct the Eel Survival Study in accordance with the approved plan and schedule.

(d) If the results of the Site-Specific Downstream Eel Passage Study indicate that the then existing Project operating measures and protocols achieve the Downstream Eel Passage Goal, then YHPC shall continue to implement those protocols and measures.

(e) If the results of the Site-Specific Downstream Eel Passage Study do not indicate that the Project's existing operating measures and protocols do not achieve the Downstream Eel Passage Goal, YHPC will prepare and submit to the Resource Agencies a plan and schedule for evaluating the feasibility and costs of potential physical and/or operational modifications to the Project to facilitate downstream eel passage (the "**Downstream Eel Improvements Study**"). The Downstream Eel Improvements Study plan and schedule shall be subject to review and approval by PaDEP and USFWS and review and comment by the Other Resource Agencies. Licensee shall conduct the Downstream Eel Improvements Study in accordance with the approved plan and schedule. The Downstream Eel Improvements Study will consider and evaluate whether any of the following adaptive measures to facilitate downstream eel passage, which may be implemented in a sequence or in combination, are feasible, appropriate under the circumstances, reasonable and technically sound and are reasonably expected to contribute toward achievement of the Downstream Eel Passage Goal:

- (i) Adjustment to NLF Facility operations.
- (ii) Installation of current inducers.
- (iii) Modifications to the juvenile American shad protection measure.
- (iv) Installation of a fish guidance system.
- (v) Replacement of turbine runner systems with units designed to have a lower mortality impact upon silver eels.

- (vi) Other measures mutually agreed to by the Licensee, USFWS and PaDEP, after consultation with the Other Resource Agencies.

(f) If the Downstream Eel Improvements Study identifies physical or operational adaptive measures listed in Section 3.1.7(e) to facilitate downstream eel passage that are feasible, appropriate under the circumstances, reasonable and technically sound, Licensee shall prepare a plan and schedule for implementing such measures and an estimation as to the ability of such measures to achieve the Downstream Eel Passage Goal, and will submit the plan and schedule to the Resources Agencies for review and approval by USFWS and PaDEP and review and comment by the Other Resource Agencies. Following approval of such plan and schedule, Licensee shall implement the measures described in the approved plan in accordance with the approval schedule. If Licensee does not present such a plan and schedule for implementing physical or operational adaptive measures listed in Section 3.1.7(e) that are feasible, appropriate under the circumstances, reasonable and technically sound, and reasonably anticipated to meet the Downstream Eel Passage Goal, or based on all available information and after consultation with Licensee and the Resource Agencies, USFWS does not approve the Licensee's plan and schedule for such measures submitted pursuant to this Section, USFWS may elect to exercise its reserved authority to prescribe such measures as the USFWS determines are necessary for safe and effective passage of downstream migrating American eel; and Licensee retains all rights to challenge any such exercise of reserved authority.

(g) Within 12 months following implementation of any such improvements, Licensee shall evaluate and provide a report to the Resource Agencies regarding the effectiveness of the measures in relation to achievement of the Downstream Eel Passage Goal.

(h) If the adaptive measures implemented pursuant to the Downstream Eel Improvements Study do not result in achievement of the Downstream Eel Passage Goal, YHPC and the Resource Agencies shall on an annual basis consult as to potential additional studies or adaptive measures that are or may become feasible, appropriate under the

circumstances, reasonable and technically sound, and reasonably expected to contribute toward achievement of the Downstream Eel Passage Goal.

3.1.8 Resident Fish Passage

(a) Prior to completion and operation of the NLF Facility, Licensee shall operate the East Channel Fish Passage System according to the provisions set forth in the Consent Order and Agreement between PaDEP and YHPC dated June 16, 2010, which is attached as **Appendix I**.

(b) After completion and operation of the NLF Facility:

- (i) Licensee shall operate the NLF Facility for passage of American Shad as provided in Section 3.1.2, other migratory fish, and resident fish. Except during periods when the NLF Facility must be closed for repairs or maintenance (e.g., debris or sediment removal), the NLF Facility will remain open year round for passage of migratory and resident fish.
- (ii) Except during period when the East Channel Fish Passage System must be closed for repairs or maintenance, Licensee shall leave the East Channel Fish Passage System open for the passage of resident fish during the period of April through the end of the resident fish passage season (earlier of December 15 or until the average daily river temperature is ≤ 40 degrees Fahrenheit for three consecutive days).

3.2 Flow Management

Licensee shall operate the Project consistent with the flow management targets set forth below. The flow values set forth in this section are understood to be approximate and based upon reasonable engineering estimates.

3.2.1 Prior to NLF Facility Completion.

Prior to completion and operation of the NLF Facility, Licensee shall operate the Project consistent with the following flow management criteria:

(a) During the American Shad Upstream Passage Season, the Project shall be operated to provide:

- (i) An average daily minimum flow in East Channel below East Channel Dam of 2,000 cfs.
- (ii) Spill over Main Dam of equal to or greater than 4,000 cfs.

(b) After American Shad Upstream Passage Season until end of resident fish passage season (earlier of December 15 or until the average daily river temperature is ≤ 40 degrees Fahrenheit for three consecutive days):

- (i) The Project shall be operated to provide a minimum stream flow in East Channel below East Channel Dam of 400 cfs.
- (ii) When river flows exceed hydraulic capacity of all available hydroelectric generating units, Licensee shall manage flows above the hydraulic capacity of available units in accordance with the following objectives:
 - (1) To maintain the minimum flow in the East Channel of 400 cfs.
 - (2) To maintain sufficient flow at the Main Dam to assure flow is released to the main channel in accordance with the existing Fish Passage Operational Plan (“FPOP”), except during times of maintenance work on the Main Dam when reservoir levels are lowered to permit such maintenance to occur safely.

- (3) To provide additional attraction flows to the East Channel Fish Passage System through operation of the wheel gates within their design capacity.

(c) The Project shall be operated to maintain the following minimum flows below the Project (the total of flows through the Powerhouse, over the Main Dam and East Channel Dam):

- (i) 1,000 cfs or inflow from upstream, whichever is less, at all times.
- (ii) An average daily minimum flow of 2,500 cfs or inflow from upstream, whichever is less.
- (iii) Whenever inflow from upstream is less than 3,000 cfs, the Project shall be operated on a run-of-river basis, adding or suspending operations at turbines to reflect, to the extent practicable, inflow from upstream and without adding or suspending turbine operations to deliberately drawdown or store water for purposes of generating electricity in particular time periods.
- (iv) Minimum flows may be temporarily modified if required by operating exigencies beyond the control of the Licensee.

3.2.2 After NLF Facility Completion.

After completion and operation of the NLF Facility, Licensee shall operate the Project consistent with the following flow management criteria:

- (a) During the American Shad Upstream Passage Season, the Project shall be operated to provide:
 - (i) An average daily minimum flow in East Channel below East Channel Dam of a minimum of 267 cfs, understanding

that as river flow increases above 21,000 cfs, flows over the East Channel Dam will occur in excess of the minimum of 267 cfs.

- (ii) Flow through the NLF Facility (passage channel plus supplement attraction flow channel) equal to at least 5% of river flow when river flows above the Project are between 5,000 and 150,000 cfs.

(b) During the remainder of the year (other than the American Shad upstream passage season), the Project shall be operated to provide:

- (i) An average daily minimum flow in East Channel below the East Channel Dam of 267 cfs.
- (ii) The NLF Facility will be designed and operated to convey a minimum of 200 cfs when the river elevation is at the elevation of the Main Dam.
- (iii) When river flows exceed the hydraulic capacity of all available hydroelectric generating units, the Licensee shall manage flows above the hydraulic capacity of available units in accordance with the following objectives:
 - (1) To maintain a minimum flow in the East Channel of 267 cfs, understanding that as river flow increases above 21,000 cfs, flows over the East Channel Dam will occur in excess of the minimum of 267 cfs.
 - (2) To maximize the remainder of flows above hydraulic capacity flowing over the Main Dam and through the NLF Facility. Within the limits of available flows in excess of the hydraulic capacity, except during the period of December 15 to the

earlier of April 1 or the start of American Shad Upstream Passage Season, the supplemental attraction flow channel will be operated with the objective of maintaining a maximum attraction flow through the NLF Facility.

(c) The Project shall be operated to maintain the following minimum flows below the Project (the total of flows through the Powerhouse, over the Main Dam and East Channel Dam):

- (i) 1,000 cfs or inflow from upstream, whichever is less, at all times.
- (ii) An average daily minimum flow of 2,500 cfs or inflow from upstream, whichever is less.
- (iii) Whenever inflow from upstream is less than 3,000 cfs, the Project shall be operated on a run-of-river basis, adding or suspending operations at turbines to reflect, to the extent practicable, inflow from upstream and without adding or suspending turbine operations to deliberately drawdown or store water for purposes of generating electricity in particular time periods.
- (iv) Minimum flows may be temporarily modified if required by operating exigencies beyond the control of the Licensee.

3.3 Debris Management.

(a) Licensee shall (1) continue to implement its existing debris management program as described below; and (2) on or before January 15 of each calendar year, provide an annual contribution of \$25,000 per year to the York County Conservation District or such other entity identified in writing by PaDEP for the purposes of debris removal in the Lower Susquehanna River Watershed. It is the understanding of the Parties that the York County

Conservation District or such other identity identified by PaDEP shall administer and utilize such funds for the sole purpose of debris removal in the Lower Susquehanna River Watershed.

(b) Under the Project's debris management program, almost all of the debris arrives at the Project during high flow events when river flows far exceed the Project Hydraulic Capacity. Under such debris management program, much of that debris passes over the Main Dam and East Channel Dam, and debris that does not pass over the Main Dam or East Channel Dam accumulates in the forebay. Of the debris that enters the forebay, non-natural debris is removed from the accumulated debris in the forebay to the extent that safety considerations permit, and the remaining (primarily organic) debris material is sluiced downstream through the Forebay Sluice Gate in the masonry non-overflow "cable alley" wall located at the downstream end of the forebay. Prior to opening the Forebay Sluice Gate for debris passage, Licensee shall notify PPL's Brunner Island Station that debris is to be sluiced at least one-hour prior to debris sluicing, absent extraordinary or emergency circumstances.

4.0 MISCELLANEOUS PROVISIONS

4.1 Cooperation Relating to Lower Susquehanna River Downstream Eel Study

4.1.1 Contribution to Lower Susquehanna River Downstream Eel Study

(a) Licensee shall contribute the sum of \$25,000 to [agency or trust fund vehicle to be discussed] to be utilized by the Resource Agencies to conduct the Lower Susquehanna River Downstream Eel Study.

(b) If the Resource Agencies are able to perform the collection and tagging of silver eels in the performance of the Site-Specific Downstream Eel Study, either concurrently with or in an mutually-agreed upon period after the Lower Susquehanna River Downstream Eel Study as contemplated in ¶4 of Appendix G, Licensee shall contribute an additional \$50,000 to the [agency or trust fund vehicle].

4.1.2 Coordination Regarding Lower Susquehanna River Downstream Eel Study

(a) The Licensee shall coordinate with the Resource Agencies with the objective that the Lower Susquehanna River Downstream Eel Study and the Site Specific Route

of Passage Study are conducted to be concurrent with each other or the Site Specific Route of Passage Study within a mutually agreed period after the Lower Susquehanna River Downstream Eel Study. During performance of the Lower Susquehanna River Downstream Eel Study, Licensee shall monitor silver eel passage at the Project as provided in **Appendix G**.

4.2 Counterparts.

This Agreement may be executed in any number of counterparts, all of which taken together shall constitute one and the same instrument.

[signature pages follow]

APPENDIX A - DESIGN CRITERIA FOR NATURAL LIKE FISHWAY

The NLF Facility will be designed and constructed consistent with the following requirements:

1. The NLF Facility will consist of an in-river nature-like fishway with its downstream terminus at or near the toe of the Main Dam at or near the apex between the Main Dam and TMI, reaching upstream from the Main Dam, with a varying width of approximately 300 feet, a thalweg channel width of approximately 65 feet, and a supplemental attraction flow channel on the TMI side of the NLF Facility, as described in Section 3.0 (Option 4 Conceptual Design) of the York Haven Project Nature-Like Fishway Conceptual Design Report, submitted by YHPC to FERC on March 15, 2013 (the “NLF Conceptual Design Report”). Refer to the conceptual plans provided in Appendix B for additional detail on the design of the NLF Facility.

2. The fishway channel in combination with the supplemental attraction flow facility will be designed to be capable of conveying during the Upstream American Shad Passage Season at least 5% of the River flow when River flows are between 5,000 and 150,000 cfs. Of this amount, the supplemental attraction flow channel and related control structures would be designed to convey variable attraction flow volumes of up to 800 cfs (the “Planned Attraction Flow Maximum Value”), but with the capacity to be readily modified to convey, if needed, a variable flow volume of up to 1,000 cfs (“Potential Increased Attraction Flow Value”).

3. The NLF shall include a supplemental attraction water facility (SAWF) that will be capable of providing additional flows within and/or near the entrance to the fish passage channel.

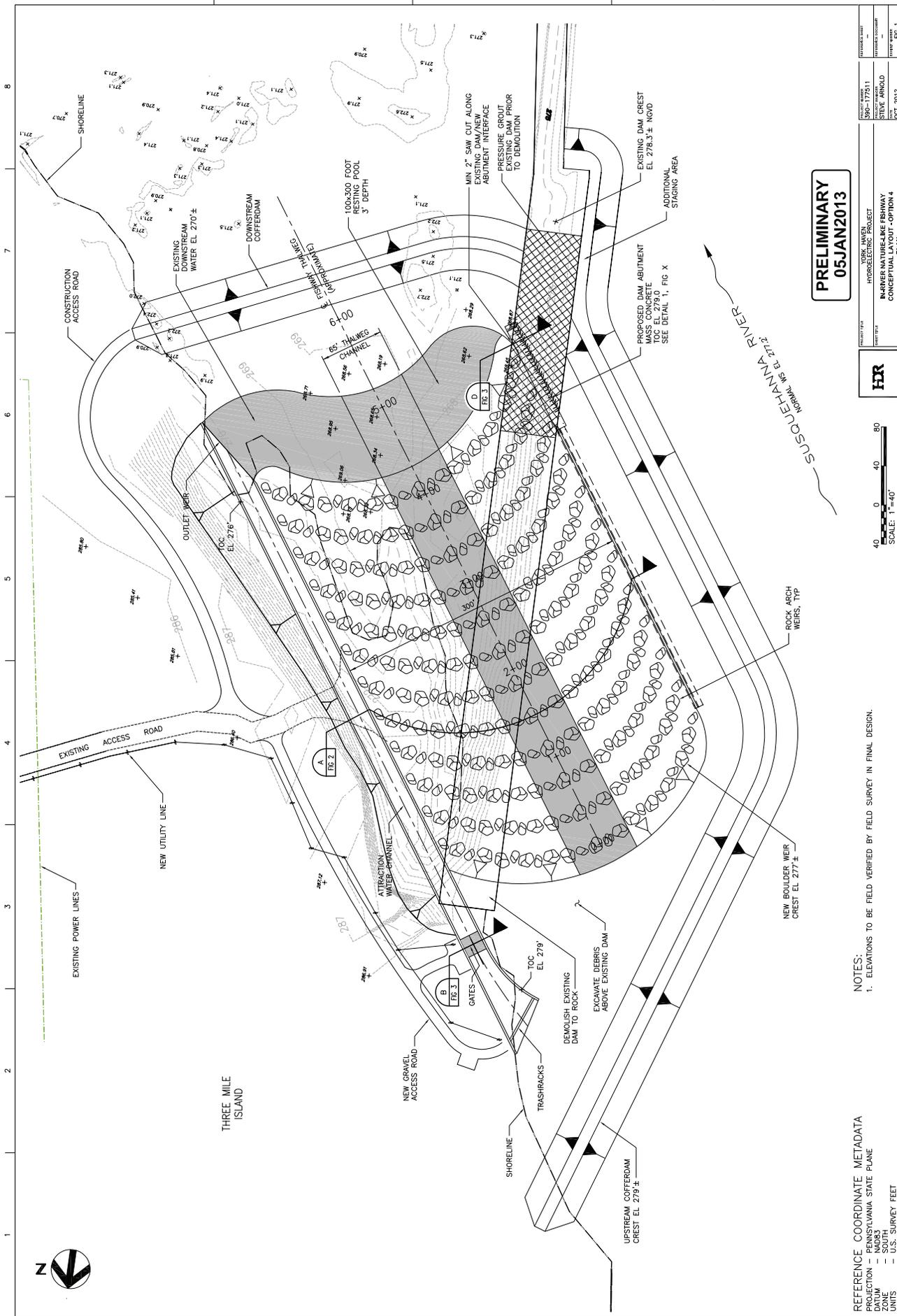
- a. The SAWF shall be located on the land side of the fish passage channel and have a maximum discharge capacity of 1,000 cfs (i.e., accommodating both the Planned Attraction Flow Maximum Value and the Potential Increased Attraction Flow Value) when the reservoir is at its normal headwater elevation of 277.2 ft.
- b. The upstream entrance to the SAWF shall be located approximately 75 ft upstream of the nearest constructed upstream exit from the fish passage channel to minimize the chance for fall back through the SAWF. The upstream entrance to the SAWF shall contain a trash rack to impede debris passage into the SAWF.

- c. An inlet gate structure of either the underflow or overflow type shall control and regulate flow to the SAWF, allowing some adjustment of flow volumes available for attraction flow purposes. The current plan is to install two inlet gates; however, the final number of gates will be subject to operational and economic considerations, but in no case shall the SAWF design discharge capacity be less than 1,000 cfs at normal pond level (and thus able to accommodate both the Planned Attraction Flow Maximum Value and the Potential Increased Attraction Flow Value).
- d. Downstream of the inlet gates, flow in the SAWF will travel in a rectangular concrete channel approximately 25 to 30 feet wide and 6 to 8 feet deep. Water from the SAWF may be delivered along the length of the SAWF channel through a series of weirs fitted with stop logs discharging to different points within the fish passage channel, over a sharp-crested weir or weirs at the downstream end of the SAWF delivering water to the holding pool at the entrance to the fish passage channel, and/or to a combination of both of these delivery mechanisms.
- e. The final design of the flow dispersal mechanisms shall (1) minimize the chance for delay to American shad entering the fish passage channel from the resting pool; and (2) prevent or minimize the entry of American shad into the SAWF through creation of a localized flow disturbance zone over the sharp-crested weir, creating an elevation difference between the SAWF water elevation and tailwater of at least 2 feet, and/or providing an exclusion rack between the weir and the resting pool. The final design of the SAWF shall also allow for flexibility in the delivery of the attraction water by adjusting flow directly into the fish passage channel or to the downstream end of the SAWF channel. The downstream end of the SAWF shall also provide for flexibility in the direction of flow delivery ranging from parallel to perpendicular to the resting pool, allowing for varying the direction of a portion of the flow away from discharge directly into the resting pool.

4. The upstream end of the NLF Facility will be designed to accommodate installation of Passive Integrated Transponder (“PIT”) tag monitoring devices at such time as such PIT tag monitoring devices become available and feasible for reliably monitoring American shad exiting the NLF Facility.

APPENDIX B - CONCEPTUAL DESIGN FOR NLF FACILITY

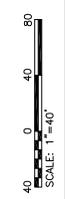
See attached



PRELIMINARY
05JAN2013

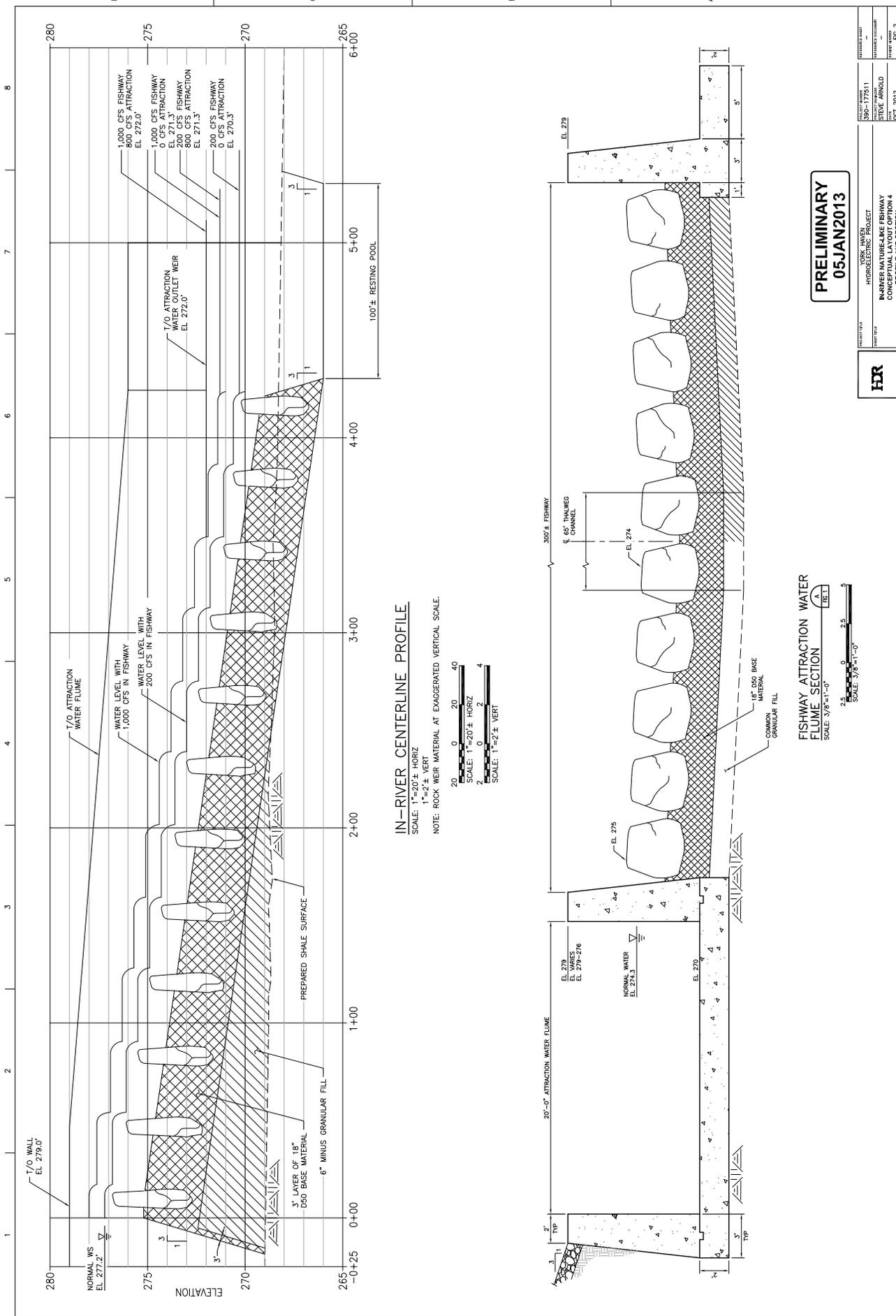
PROJECT NO.	100-17511
PROJECT NAME	IN-RIVER NATURE-LIKE FISHWAY
DATE	OCT 2012
FIG. NO.	FIG. 1

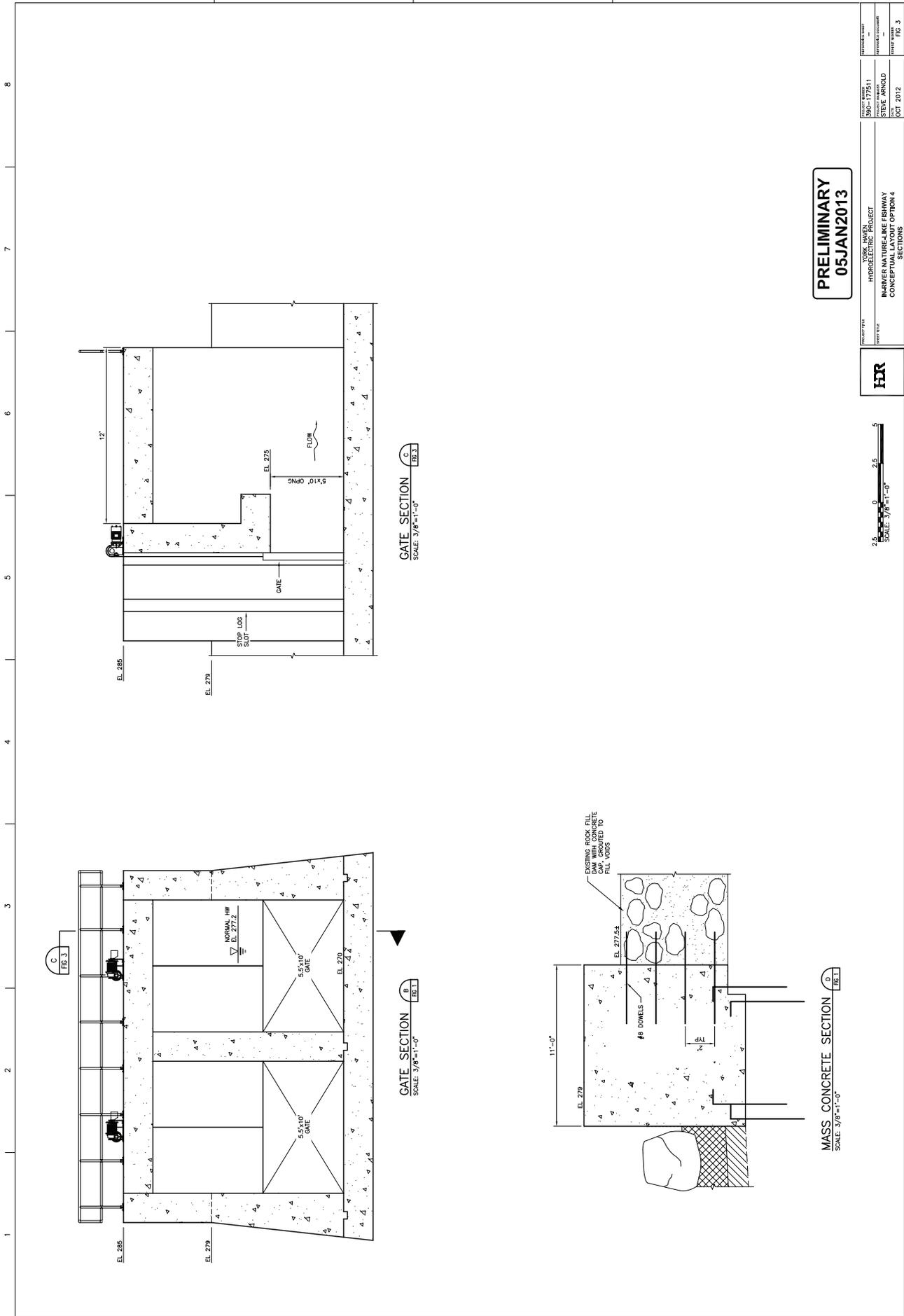
PROJECT NO.	100-17511
PROJECT NAME	IN-RIVER NATURE-LIKE FISHWAY
DATE	OCT 2012
FIG. NO.	FIG. 1



NOTES:
1. ELEVATIONS TO BE FIELD VERIFIED BY FIELD SURVEY IN FINAL DESIGN.

REFERENCE COORDINATE METADATA
PROJECTION - PENNSYLVANIA STATE PLANE
DATUM - NAD 83
ZONE - SOUTH
UNITS - U.S. SURVEY FEET





PRELIMINARY
05JAN2013



PROJECT NO.	172511
PROJECT NAME	YORK HAVEN HYDROELECTRIC PROJECT
DATE	OCT. 2012
DESIGNER	STEVE ARNOUD
PROJECT FILE	CONCEPTUAL LAYOUT OPTION 4 SECTIONS
FIG. NO.	FIG. 3

APPENDIX C - DESIGN CRITERIA FOR NLF FACILITY MONITORING

Monitoring of NLF Facility effectiveness for upstream passage of American shad will be conducted consistent with the following general parameters and protocols:

1. INTRODUCTION

The Nature-Like Fishway (NLF) effectiveness study will be performed with telemetry tracking and monitoring techniques, building upon the site-specific experience and results of successful adult American shad tracking studies performed at York Haven in 2010 and 2012. American shad will be tagged at the Safe Harbor Dam fish lift, approximately 25 miles downstream and allowed to migrate upstream to the York Haven Project on their own volition. Based on the results of the 2010 study, 70 percent of the shad tagged at Safe Harbor are expected to arrive at York Haven. Once at York Haven, a series of 10 monitoring station antennae will record tagged shad as they arrive at the Project, monitor their movements within the Project area, document the tagged shad that arrive at the NLF fishway entrance and document the tagged shad that exit the NLF fishway. Monitoring will also be performed below and above the East Channel Fishway to document tagged shad upstream passage via the East Channel. The study will be performed for at least two years following NLF construction as further described in Section 3.1.3 of the Offer of Settlement.

2. STUDY GOALS

- Determine the proportion of American shad tagged at Safe Harbor arriving at the York Haven Project.
- Of the tagged shad arriving at York Haven, determine the proportion arriving at the lower entrance of the new NLF.
- Of the tagged shad arriving at York Haven, determine the proportion exiting the NLF into the York Haven impoundment.
- Of the tagged shad arriving at York Haven, determine the proportion that passes upstream via the East Channel Fishway.
- Evaluate movement patterns and travel times of tagged shad within the York Haven Project area.

3. STUDY EQUIPMENT

Radio telemetry techniques, similar to those utilized for the 2010 and 2012 York Haven shad telemetry studies, are envisioned as the primary equipment for the fishway effectiveness studies. However, similar tracking technologies (e.g., acoustic telemetry) or new fish tracking technologies that are functionally equivalent (or superior) to and of comparable cost to radio telemetry techniques may be substituted upon consultation with the Resource Agencies and the agreement of Licensee, USFWS and PaDEP.

4. FISH TAGGING

American shad will be tagged at the fish lift at Safe Harbor Dam (assuming owner approval), similar to the 2010 American shad telemetry study. A target sample size of 150 American shad will be tagged for study. Assuming a drop-off rate similar to that observed in 2010 during volitional migration from Safe Harbor to York Haven (30%), this would result in a sample size of approximately 100 tagged shad arriving at York Haven. Two telemetry receivers will be installed at Safe Harbor during shad tagging operations; one at the fishway exit to confirm tagged shad have traveled through the fishway flume and entered into Lake Clarke, and a second in the Safe Harbor tailrace to detect any tagged shad that fall back downstream through Safe Harbor Dam. Efforts will be made to spread out tagging over the early, middle, and later portions of the shad run and to tag representative numbers of both male and female shad.

5. YORK HAVEN MONITORING

A network of 10 remote telemetry monitoring locations is proposed as illustrated in the attached Project area map. The location and purpose of each is described below:

1. Cross river monitoring at south end of powerhouse; documenting downstream Project study reach entry and exit
2. Tailrace monitoring; documenting tailrace presence, subdivided in to a) southern half and b) northern half of tailrace
3. Cross river monitoring just above the powerhouse; documenting movement upstream out of the tailrace or downstream into tailrace area
4. Cross river monitoring at upper end of headrace wall; documenting arrival/departure at the base of a steeper gradient channel reach

5. Cross mouth of East Channel; documenting arrival/departure at the lower end of the East Channel
6. TMI to Main Dam spillway; documenting arrival/departure to the Main Dam apex region at the upper extent of the steeper gradient channel reach
7. Across lower end of NLF; documenting tagged shad entry into NLF
8. Across upper end of NLF; documenting passage above York Haven Dam
9. Cross channel monitoring immediately below the East Channel Dam; documenting arrival at base of dam
10. Cross channel monitoring just above the East Channel Dam; documenting passage above the dam.

Monitoring will be performed from the day the first shad are tagged and released until the end of the upstream passage season. Manual ground-based tracking with a hand held receiver may also be conducted on an as-needed, discretionary basis, if it is deemed helpful to better define tagged shad locations or behavior within the Project area.

6. DATA MANAGEMENT AND ANALYSIS

Telemetry receiver data will be periodically downloaded and detection capabilities will be checked with a hand held transmitter on weekly intervals, and more frequently as appropriate during peak migration periods. Downloaded data files will be backed-up with duplicate files the same day. Upon completion of the field season data will be QC checked and processed for analysis.

7. REPORTING

A study summary report will be prepared and submitted for agency review within six (6) months following the completion of each year's monitoring program. Individual fish movement graphics, data summary graphics, and appropriate statistical treatment similar to the 2010 study supplemental data analysis, will be prepared and presented in the study report.

EXHIBIT 1 TO APPENDIX C



APPENDIX D - JUVENILE AMERICAN SHAD SURVIVAL RATES FOR PROJECT TURBINES

Turbine Type (Unit Nos.)	Survival Percentage *					
	Empirical Studies American Shad Juveniles			Turbine Blade Strike American Shad Juveniles		
	Mean	Min	Max	Mean	Min	Max
Kaplan (1-4)	<u>92.7%</u>	82.0%	100.0%	95.9%	91.6%	98.0%
Propeller (5)	-	-	-	<u>95.3%</u>	91.3%	97.4%
Propeller (6)	-	-	-	<u>96.5%</u>	93.5%	98.0%
Double- Francis (7-13 and 15-20)	<u>77.1%</u>	66.0%	88.0%	93.6%	92.4%	94.9%
Single Francis (14)	-	-	-	<u>92.5%</u>	90.9%	94.1%

* Mean values in **underlined bold** to be used in calculations of overall Project survival rates.

APPENDIX E - FOREBAY SLUICE GATE CHUTE DESIGN CRITERIA

The Forebay Sluice Gate Chute improvements shall be designed constructed consistent with the following requirements.

1. The Forebay Sluice Gate Chute shall be capable of maintaining a depth of water of at least 12 inches.
2. The landing pool below the downstream end of the Forebay Sluice Gate Chute shall have a depth of at least 1 foot for each 4 feet of drop, with a minimum of 4 feet of depth, in which adult or juvenile American shad may land.

APPENDIX F – HEADRACE JUVENILE AMERICAN SHAD TURBINE AVOIDANCE STUDY DESIGN

1. INTRODUCTION

The purpose of this study is to document the proportion of juvenile American shad arriving in the York Haven powerhouse forebay that pass downstream via the forebay sluice gate during the outmigration season. This information will be used in turn to evaluate whether or not the Project is achieving the desired overall juvenile American shad downstream survival goal of 95 percent. Modeling of juvenile American shad downstream passage has shown that the required sluice gate passage rate, to reach the overall Project survival goal of 95 percent, varies widely with river discharge and Project turbine operations. The worst case scenario is when no spill is occurring and all turbines are operating (17,000 cfs), plus the Nature-Like Fishway flow (200 cfs), East Channel minimum flow (200 cfs), and sluice gate flow (370 cfs), or approximately 18,000 cfs total river flow. Under this worst case condition 68 percent of shad in the forebay must pass through the sluice gate to achieve the overall 95 percent survival goal. The required forebay sluice gate passage rate to achieve the 95 percent goal declines at flows both above and below 18,000 cfs as illustrated in the summary table below of model results:

Estimated sluiceway bypass effectiveness metrics at various river flows of 6,000 to 30,000 cfs.

Total River Flow	30,000	27,000	24,000	21,000	18,000	15,000	12,000	9,000	6,000
Flow at Forebay	17,275	17,275	17,275	17,275	17,275	14,533	11,533	8,533	5,533
Total Project Survival	95%	95%	95%	95%	95%	95%	95%	95%	95%
Number of Total Shad Approaching the Project	100	100	100	100	100	100	100	100	100
Number of Shad Approaching the Forebay	58	64	72	82	96	97	96	95	92
Percent of Total Shad Passing	27	33	42	52	65	63	58	42	20

through the Sluiceway									
Percent of Forebay Shad Passing through the Sluiceway	47	52	58	63	68	66	60	44	22

Based on this analysis, an overall target of 60 percent of forebay juvenile American shad passing through the sluice gate has been established to represent the overall conditions necessary to meet the 95 percent total survival goal under the variable river flows throughout the entire October through November downstream passage season.

2. STUDY GOAL

The study goal will be to determine the proportion of juvenile American shad confined to the forebay that will pass through the forebay sluiceway (avoiding turbine entrainment) under river flows and operations representative of the October through November downstream passage season.

3. STUDY EQUIPMENT

Due to their small size and fragile nature, out-migrating juvenile American shad are easily injured during handling, and are generally too small to be tagged with conventional telemetry transmitters. However, recent studies have had some success using abdominal implant PIT tags and new smaller radio transmitters (nano-tags) on juvenile American shad and river herring. Generally, the larger the fish the better the post tagging survival and therefore the use of juvenile American shad greater than 100 mm in length is recommended for tagging. Obtaining 100 mm juvenile American shad will likely require the assistance of PFBC to grow juvenile American shad to this size in their shad hatchery facility or obtaining juvenile American shad from another hatchery, since only a small portion of the wild population reaches this size before outmigration. Fish used for the study will be tested for latent tagging mortality to establish a correction factor, which shall be discussed with the Resource Agencies during the performance of the study.

YHPC anticipates using abdominal implant PIT tags or possibly radio transmitter “nano-tags” or both. Telemetry equipment and methods are constantly improving, therefore new equipment that

accomplishes the same study purpose and goals may be substituted, after consultation with the Resources Agencies, and approval by USFWS and PaDEP.

4. STUDY METHODOLOGY

Sluice gate passage rates will be determined by releasing three groups of at least 100 tagged juvenile American shad into the powerhouse forebay and counting those that pass through the sluice gate on each of three separate (but not necessarily consecutive) days in the period of mid-October through mid-November. At least two days will be targeted to a period when river flows equal or exceed the hydraulic capacity of the Project (17,000 cfs) and the Project is operating normally. For purposes of this study, “operating normally” means that no more than two turbine units (that have not been taken permanently out of service) are temporarily out of operation for maintenance or other reasons. Monitoring for tagged shad passage will be performed with an antenna and receiver at the forebay sluice gate and monitoring will continue for at least two weeks after the release of test fish. Test shad will be released at a point far enough upstream of the headrace to avoid bias to their movements downstream.

5. DATA ANALYSIS

Since monitoring the 20 generating turbines for tagged juvenile American shad passage at the York Haven Powerhouse is not practical with current tagging and detection technologies, shad that are not detected passing through the sluice gate will be assumed, by default, to have been entrained through a turbine. This assumption creates the risk of overstating entrainment, as it would not account for potential predation by larger fish on test fish in the forebay, if any tagged fish swim upstream out of the forebay and pass downstream at other locations, or mortality due to handling and tagging. Some of this risk will be managed by keeping a number of control fish that are handled identically to the test fish captive for observation to provide for a handling mortality control estimation. If radio transmitter nano-tagging of some test fish is practical, tracking these fish may provide insight into upstream escape or predation sources of bias. However, eliminating the study bias to overestimate entrainment is not possible with currently available methodologies and study results must be reviewed with this possibility in mind.

6. REPORT

A study report describing study methods and results will be prepared and submitted for Resource Agency review within 90 days following the completion of the field study.

**APPENDIX G - DESIGN CRITERIA AND ELEMENTS OF THE LOWER
SUSQUEHANNA RIVER DOWNSTREAM EEL STUDY AND SITE-SPECIFIC ROUTE-
OF-PASSAGE STUDY**

1. Lower Susquehanna River Downstream Eel Study

a. The Lower Susquehanna River Downstream Eel Study will consist of those elements developed by the USFWS, in consultation with the Licensee and other Resource Agencies.

b. During the Lower Susquehanna River Downstream Eel Study, Licensee shall cooperate and participate by monitoring the tagged eels as they pass the York Haven Project, gathering site specific data on timing and duration of silver eel migration at the Project over a period 2 or more years while the Lower Susquehanna River Downstream Eel Study is being conducted.

2. Site-Specific Downstream Eel Study

a. The Site-Specific Downstream Eel Study will consist of the following elements:

(1) The study will include a site-specific route-of-passage evaluation using radio telemetry, Didson monitoring, or other methods to evaluate the passage routes taken by silver eels migrating in the vicinity of the Project, specifically including passage via the East Channel, through the NLF Facility, over the Main Dam, down the headrace, through powerhouse turbines, and through the Forebay Sluice Gate. The Site Specific Route of Passage study will be conducted during the primary anticipated silver downstream eel passage period(s) as determined by the earlier Lower Susquehanna River Downstream Eel Study.

(2) A study of silver eel survival through the following representative Project turbines: Propeller (Units 1-6), Francis (Units 7-20). Testing shall be conducted in one representative turbine within each category via balloon tag tests or other methods approved by the Resource Agencies.

(3) An analysis based on the results of the route-of-passage and survival evaluations, as to anticipated overall downstream eel passage effectiveness at the Project.

3. Source of Silver Eels.

(a) An in-basin source of silver eel will be utilized for both the Lower Susquehanna River Downstream Eel Study and the Site-Specific Route-of-Passage Study.

(b) Current tributary stocking is conducted in Pine Creek ~165 mi upstream from the York Haven Project and Buffalo Creek ~80 mi upstream from the York Haven Project. These eels may be suitable for the Lower Susquehanna River Downstream Eel Study if a sufficient number of silver phase eels can be located, captured, and radio tagged.

(c) For purposes of Site-Specific Route-of-Passage Study and survival study, a local source of silver eels is needed (avoiding long transit times with higher potential for loss of tagged eels, and long distance transport of eels). For these purposes, the Resource Agencies will consider stocking of Swatara Creek and Conodoguinet Creek, major tributaries entering the Susquehanna River upstream of the Project. Such a stocking program, if commenced in 2014-15, should result in a local supply of silver eels around the 2020 – 2025 timeframe, which would be an ideal source of silver eels for the site-specific route of passage study. The timing and performance of the Site-Specific Route-of-Passage Study is dependent upon the ability to collect and tag an adequate number of such silver eels.

4. Collection and Tagging of Silver Eels for Study.

(a) To facilitate consistency, the Parties contemplate that that the Resource Agencies will perform the collection and tagging of silver eels for studies, using similar tags and techniques; however, the USFWS cannot promise to do so.

(b) It is assumed that the Lower Susquehanna River Downstream Eel Study will utilize silver eels from Buffalo and/or Pine Creeks as these tributaries have been stocked with elvers since 2010 and will be the first available in-basin source of silver eels.

(c) The Site-Specific Route of Passage study would be performed in the year following NLF Facility completion, utilizing silver eels collected from Swatara Creek or Conodoguinet Creek.

(d) In both studies, the preference would be to collect actively outmigrating silver eels by fyke nets. Alternatively, electrofishing or other active sampling methods may be used to pursue eels. Radio tags would be surgically inserted in those eels that exhibit physical characteristics of silver outmigration (movement, size, color, eye size/darkness).

(e) All silver eels captured will be tagged with radio telemetry tags, and released at a site agreed upon by Licensee, USFWS and PaDEP, after consultation with the Resource Agencies.

(f) It is assumed that the Lower Susquehanna River Downstream Eel Study would involve tagging of approximately 100 silver eels in each of two years.

(g) For the Site-Specific Route-of-Passage study, the goal would be to collect and radio tag at least 100 and not more than 150 actively out-migrating silver eels in the months of September – November, with timing related to the start of silver eel natural migration as indicated by results from the Lower Susquehanna River Downstream Eel Study.

5. Monitoring.

(a) During the Lower Susquehanna River Downstream Eel Study, Licensee will perform monitoring via antenna arrays targeted to monitor downstream migrating silver eels at the following locations:

- (i) East Channel
- (ii) Main Dam
- (iii) The Powerhouse Headrace Channel

(b) During the Site-Specific Route-of-Passage Study, Licensee will perform monitoring via antenna arrays targeted to monitor silver eels at the following locations:

- (i) NLF Facility
- (ii) East Channel Dam
- (iii) Main Dam
- (iv) Forebay entrance
- (v) Forebay Sluice Gate
- (vi) Tailrace (in an array to distinguish between Francis and Propeller Turbine Passage)
- (vii) Brunner Island.

(c) In both studies:

- (i) Monitoring for passage at the York Haven Project would be continued until river water temperature falls to 4° C (approximately mid to late December).
- (ii) If a large portion of the tagged eels are missing during the initial fall migration period, consider mobile surveys to locate eels/transmitters and possibly monitoring during spring and following fall.
- (iii) During subsequent years of study, the monitoring period may be further reduced in time if data gathered indicates it is reasonable to do so without missing significant portions of the migration.

5. Analyze data and report.

(a) For the Lower Susquehanna River Downstream Eel Study, Licensee will collect, analyze and share radio telemetry data gathered at the 3 York Haven monitoring stations

with the Resource Agencies within 90 days of the date of completion of the field work each year. Earlier informal sharing of preliminary data may also be arranged.

(b) For the Site-Specific Route-of-Passage Study, the Licensee will collect and analyze the radio telemetry data and submit a report with a report to the Resource Agencies and FERC within 90 days of the date of completion of the field work associated with the study.

APPENDIX H - DESIGN CRITERIA FOR EEL SURVIVAL STUDY

Eel survival studies will be performed according to balloon tagging techniques developed by Normandeau Associates, Inc. at several locations in the USA and France. Based on the frequency of individual turbine passage determined in the route of passage studies, one representative propeller unit and one representative Francis unit will be selected for testing. American eels of similar size to Susquehanna River silver eels will be tested. The number of eels tested at each representative turbine (minimum of 50 each turbine) will be sufficient to calculate appropriate statistical bounds around each survival estimate. Control eels for estimation of tagging-induced mortality will also be held for observation and subsequent adjustment of turbine mortality estimates, as appropriate.

APPENDIX I - CONSENT ORDER AND AGREEMENT DATED JUNE 16, 2010

[see attached]

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

In the matter of:

York Haven Power Company, LLC	:	
York Haven Hydro Station	:	Water Quality Certification
1 Hydro Park Drive & Locust Street	:	Lancaster, Dauphin and
York Haven, Pennsylvania 17370	:	York Counties
	:	

CONSENT ORDER AND AGREEMENT

This Consent Order and Agreement (“COA”) is entered into this *14th* day of *June*, 2010 by and between the Commonwealth of Pennsylvania, Department of Environmental Protection (“Department”), and York Haven Power Company, LLC (“York Haven”).

FINDINGS

The Department has found and determined the following:

A. The Department is the agency with the duty and authority to administer and enforce The Clean Streams Law, the Act of June 22, 1937, P.L. 1987, as amended, 35 P.S. § 691.1 et seq. (“The Clean Streams Law”); Section 1917-A of the Administrative Code of 1929, Act of April 9, 1929, P.L. 177, as amended, 71 P.S. § 510-17 (“Administrative Code”); and the rules and regulations promulgated thereunder. The Department is the state agency charged with the responsibility of making certification decisions under Section 401 of the Federal Water Pollution Control Act, 33 U.S.C. § 1341 (“401 Certification”).

B. York Haven Power Company, LLC is a Delaware limited liability company registered to conduct business in the Commonwealth of Pennsylvania, with a registered business address of 1 Hydro Drive and Locust Street, York Haven, Pennsylvania 17370.

C. York Haven owns and operates a run-of river hydroelectric facility (“York Haven Project”) with a total plant capacity of 19.65 megawatts from its 20 turbines. The average annual generation of the York Haven Project is 130,812 megawatt hours.

D. The York Haven Project is located on the Susquehanna River in York, Dauphin and Lancaster counties, Pennsylvania.

E. York Haven is the licensee under License No. 1888 issued on August 14, 1980, as amended, by the Federal Energy Regulatory Commission (“FERC”) pursuant to the Federal Power Act authorizing the operation of the York Haven Project (the “FERC License”). The current FERC License has a term that expires on August 14, 2014.

F. York Haven is planning to seek a renewal of its FERC License, and has initiated the Integrated Licensing Process pursuant to FERC regulations.

G. As part of that license renewal process, York Haven must conduct certain studies to develop information for FERC to consider as part of the FERC licensing process, including consideration of issues that may be evaluated pursuant to the National Environmental Policy Act. Agencies can submit study requests to FERC and FERC makes a final decision on the studies to be conducted.

H. The Department and the Pennsylvania Fish and Boat Commission requested that York Haven perform a study related to resident (non-migratory) fish passage at the York Haven Project, including specifically the counting of resident fish passing through the East Channel Fish Passage System at the York Haven Project. FERC did not require that study and the Department filed a “Study Dispute”. FERC is working through the process to resolve the study dispute request.

I. York Haven, the Department and the Pennsylvania Fish and Boat Commission met on June 4, 2010 to discuss a resolution of the Study Dispute. At that meeting, the agencies and York Haven agreed to a settlement, in the form of an agreement in principle, that would provide for resident fish passage during the term of the reissued FERC license.

J. The FERC License renewal will require a 401 Water Quality Certification issued by the Department under Section 401 of the Federal Water Pollution Control Act, 33 U.S.C. §1341 and 25 Pa. Code § 105.15(b). Conditions established as part of a valid and final 401 Water Quality Certification become conditions of the FERC license.

K. The 401 Water Quality Certification provides a mechanism to codify the agreement in principle reached by the Department, the Pennsylvania Fish and Boat Commission and York Haven.

ORDER

After full and complete negotiation of all matters set forth in this COA and upon mutual exchange of covenants contained herein, the parties desiring to avoid litigation and intending to be legally bound, it is hereby ORDERED by the Department and AGREED to by York Haven as follows:

1. **Authority.** This COA is an Order of the Department authorized and issued pursuant to Sections 5 and 610 of The Clean Streams Law, 35 P.S. § 691.5 and § 691.610; and Section 1917-A of the Administrative Code, supra.

2. **Findings.**

- a. York Haven agrees that the findings in paragraphs A through K are true and correct and, in any matter or proceeding involving York Haven and the Department, York Haven shall not challenge the accuracy or validity of these findings.
- b. The parties do not authorize any other persons to use the findings in the COA in any matter or proceeding.

3. **Corrective Action.**

- a. Beginning with the effective date of this COA (as set forth in the opening paragraph of this COA), York Haven shall operate the York Haven Project in a manner to meet the standards and requirements of state law listed in Exhibit A, 401 Water Quality Certification Conditions for the York Haven Hydroelectric Project (the "Agreed 401 Certification Conditions").
- b. York Haven shall include the effluent limitations and other appropriate requirements of state law listed in Exhibit A, 401 Water Quality Certification Conditions, as part of the FERC license renewal application.
- c. If the final 401 Water Quality Certification issued by the Department for the York Haven Project relicensing contains effluent limitations and other appropriate requirements of state law and/or conditions that are substantially the same as the Agreed 401 Certification Conditions referenced in Paragraph 3.a., York Haven will not challenge any of those effluent limitations, requirements and/or conditions in an appeal of the 401 Water

Quality Certification filed with the Environmental Hearing Board or in any other administrative or judicial forum.

- d. If the final 401 Water Quality Certification issued by the Department contains effluent limitations, requirements or conditions are not substantially the same as the Agreement 401 Certification Conditions referenced in Paragraph 3.a., York Haven may challenge the effluent limitations and/or conditions only to the extent that they are different.
- e. Nothing herein shall preclude York Haven from challenging any provision of the final 401 Water Quality Certification not set forth in Exhibit A.

4. **Additional Remedies.**

- a. In the event that York Haven fails to comply with any provision of this COA, the Department may, in addition to the remedies prescribed herein, pursue any remedy available for a violation of an order of the Department, including any action to enforce this COA.
- b. The failure of the Department to pursue any remedy shall not be deemed to be a waiver of that remedy. The payment of a stipulated civil penalty, however, shall preclude any further assessment of civil penalties for the violation for which the stipulated penalty is paid.

5. **Reservation of Rights.** The Department reserves the right to require additional measures to achieve compliance with applicable law. York Haven reserves the right to challenge any action that the Department may take to require those additional measures.

6. **Liability of Operator.** York Haven shall be liable for any violations of the COA, including those caused by, contributed to, or allowed by its officers, agents, employees or contractors.

7. **Transfer of Site.**

- a. The duties and obligations under this COA shall not be modified, diminished, terminated or otherwise altered by the transfer of any legal or equitable interest in the site or any part thereof.
- b. If York Haven intends to transfer any legal or equitable interest in the site that is affected by this COA, York Haven shall serve a copy of this COA

upon the prospective transferee of the legal and equitable interest at least 30 days prior to contemplated transfer and shall simultaneously inform the Department of such intent and shall notify the transferee and obtain agreement from the transferee that the duties of this COA transfer to the transferee upon transfer of any legal or equitable interest in the site. This Section 7 does not restrict the sale or transfer of the ownership or membership interests in York Haven Power Company, LLC.

- c. If York Haven complies with the requirements of paragraph 7.b., the Department agrees that that York Haven's duties and obligations under this COA terminate upon transfer of the site.

8. **Correspondence with Department.** All correspondence with the Department concerning this COA shall be addressed to:

James S. Spontak
Watershed Management Program
Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110-8200

and

M. Dukes Pepper, Jr.
Office of Chief Counsel
Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110-8200

9. **Correspondence with York Haven.** All correspondence with York Haven concerning this COA shall be addressed to:

Project Manager
York Haven Power Company, LLC
1 Hydro Park Drive & Locust Street
York Haven, Pennsylvania 17370

York Haven shall notify the Department whenever there is a change in the contact person's name, title or address. Service of any notice or any legal process for any purpose under this COA, including its enforcement, may be made by mailing a copy by first class mail to the above address.

10. Force Majeure.

- a. In the event that York Haven is prevented from complying in a timely manner with any time limit imposed on this COA solely because of a strike, fire, flood, act of God, or other circumstances entirely beyond York Haven's control and which York Haven, by the exercise of all reasonable diligence, is unable to prevent, then York Haven may petition the Department for an extension of time. An increase in the cost of performing the obligations set forth in this COA shall not constitute circumstances beyond York Haven's control. York Haven's economic inability to comply with any of the obligations of this COA shall not be grounds for any extension of time.
- b. York Haven shall only be entitled to the benefits of this paragraph if it notifies the Department within five working days by telephone and within ten working days in writing of the date it becomes aware or reasonably should have become aware of the event impeding performance. The written submission shall include all necessary documentation, as well as a notarized affidavit from an authorized individual specifying the reasons for the delay, the expected duration of the delay, and the efforts which have been made and are being made by York Haven to mitigate the effects of the event and to minimize the length of the delay. The initial written submission may be supplemented within ten working days of its submission. York Haven's failure to comply with the requirements of this paragraph specifically and in a timely fashion shall render this paragraph null and of no effect as to the particular incident involved.
- c. The Department will decide whether to grant all or part of the extension requested on the basis of all documentation submitted by York Haven and other information available to the Department. In any subsequent litigation, the operator shall have the burden of proving that the Department's refusal to grant the requested extension was an abuse of discretion based upon the information then available to it.

11. Severability. The paragraphs of this COA shall be severable and should any part hereof be declared invalid or unenforceable, the remainder shall continue in full force and effect between the parties.

12. Entire Agreement. This COA shall constitute the entire integrated agreement of the parties. No prior or contemporaneous communications or prior drafts shall be relevant

or admissible for purposes of determining the meaning or extent of any provisions herein in any litigation or any other proceeding.

13. **Attorney Fees.** The parties shall bear their respective attorney fees, expenses, and other costs in the prosecution or defense of this matter or any related matters, arising prior to execution of this COA.
14. **Modifications.** No changes, additions, modifications or amendments of this COA shall be effective unless they are set out in writing and signed by the parties hereto.
15. **Titles.** A title used at the beginning of any paragraph of this COA is provided solely for the purpose of identification and shall not be used to interpret that paragraph.
16. **Decisions Under Consent Order.** Any decision which the Department makes under the provisions of this COA, including a notice that stipulated penalties are due, is intended neither as a final action under 25 Pa. Code § 1021.2(2), nor an adjudication under 2 Pa. C.S. § 101. any objection which York Haven may have to the decision will be preserved until the Department enforces the Consent Order and Agreement.
17. **Termination.** This COA shall terminate 60 days after the Commonwealth of Pennsylvania issues the final Water Quality Certification required for relicensing of the York Haven Project.

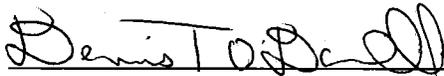
IN WITNESS WHEREOF, the parties hereto have caused this COA to be executed by their duly authorized representatives. The undersigned representatives of York Haven certify under penalty of law, as provided by 18 Pa. C.S. § 4904, that they are authorized to execute this COA on behalf of York Haven; that York Haven consents to the entry of this COA and the foregoing Findings as an ORDER of the Department; and that York Haven hereby knowingly waives its rights to appeal this COA and the foregoing Findings, which rights may be available under Section 4 of the Environmental Hearing Board Act, the Act of July 13, 1988, P.L. 530, No. 1988-94, 35 P.S. § 7514; the Administrative Agency Law, 2 Pa. C.S. § 103(a); and Chapters 5A and 7A, or any other provision of law. Signature by York Haven’s attorney certifies only that the COA has been signed after consulting with counsel.

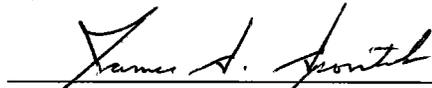
FOR:

FOR:

York Haven Power Company, LLC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL
PROTECTION:


Dennis T. O'Donnell
Authorized Representative


James S. Spontak
Program Manager


R. Timothy Weston
Counsel for York Haven
Power Company, LLC

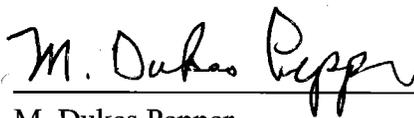

M. Dukes Pepper
Assistant Counsel

EXHIBIT A
401 WATER QUALITY CERTIFICATION CONDITIONS
FOR THE YORK HAVEN HYDROELECTRIC PROJECT

Resident Fish Passage

1. The term “resident fish species” means those fish species that occur in that portion of Susquehanna River that includes the York Haven Project area, excluding anadromous and catadromous fish.

The term “East Channel” means the channel of the Susquehanna River that lies between Three Mile Island and the eastern shore of the Susquehanna River.

The term “East Channel Fish Passage System” means the existing fish passage facilities maintained by the York Haven Project on the East Channel as described and depicted in the attached Exhibit A.1.

2. The York Haven Project shall operate and maintain the East Channel Fish Passage System to allow passage of resident fish species each year from April 1 through the earlier of December 15 or until the average daily river temperature, measured at either the United States Geological Survey gage at Harrisburg or at the temperature sensor at the York Haven Project is equal to or less than 40 degrees Fahrenheit for three consecutive days.

3. During the American shad upstream passage season as defined in the FERC License, the East Channel Fish Passage System shall be operated as required by the FERC License and the Fish Passage Operational Plan, York Haven Doc. 004-001-017-000 and any amendments thereto (“FPOP”) to provide for passage of American Shad.

4. After the American shad upstream passage season and during the resident fish passage period referenced in ¶ 2, the York Haven Project shall maintain a minimum stream flow (“MSF”) of 400 cubic feet per second or greater in accordance with ¶ 5 below in the East Channel below the East Channel Fish Passage System during the period that the East Channel Fish Passage System is operated and maintained to allow passage of resident fish species.

5. After the American shad upstream passage season and during the resident fish passage period referenced in ¶ 2, when river flows in the Susquehanna River exceed the hydraulic capacity of all available hydroelectric generating units, the York Haven Project will manage flows above the hydraulic capacity of the generating units in accordance with the following objectives, with more specific details for such flow management to be developed through further consultation between York Haven and the PFBC and included in the FPOP:

- a. to maintain the minimum flow in the East Channel as described in ¶ 4;
- b. to maintain sufficient flow at the main channel dam to assure flow is released to the main channel in accordance with the FPOP, except during times of maintenance work on the main channel dam when reservoir levels are lowered to permit such maintenance to occur safely;
- c. to provide additional attraction flows to the East Channel Fish Passage System through operation of the wheel gates within their design capacity.

In the event that flow is not sufficient to meet all such objectives a-c above, such objectives will be implemented in the order of precedence listed above.

6. During the period that the East Channel Fish Passage System is in operation for the passage of fish as described in ¶ 2, the York Haven Project shall manage debris to maintain the functioning and operability of the East Channel Fish Passage System sufficient to allow and not significantly impede the passage of fish.

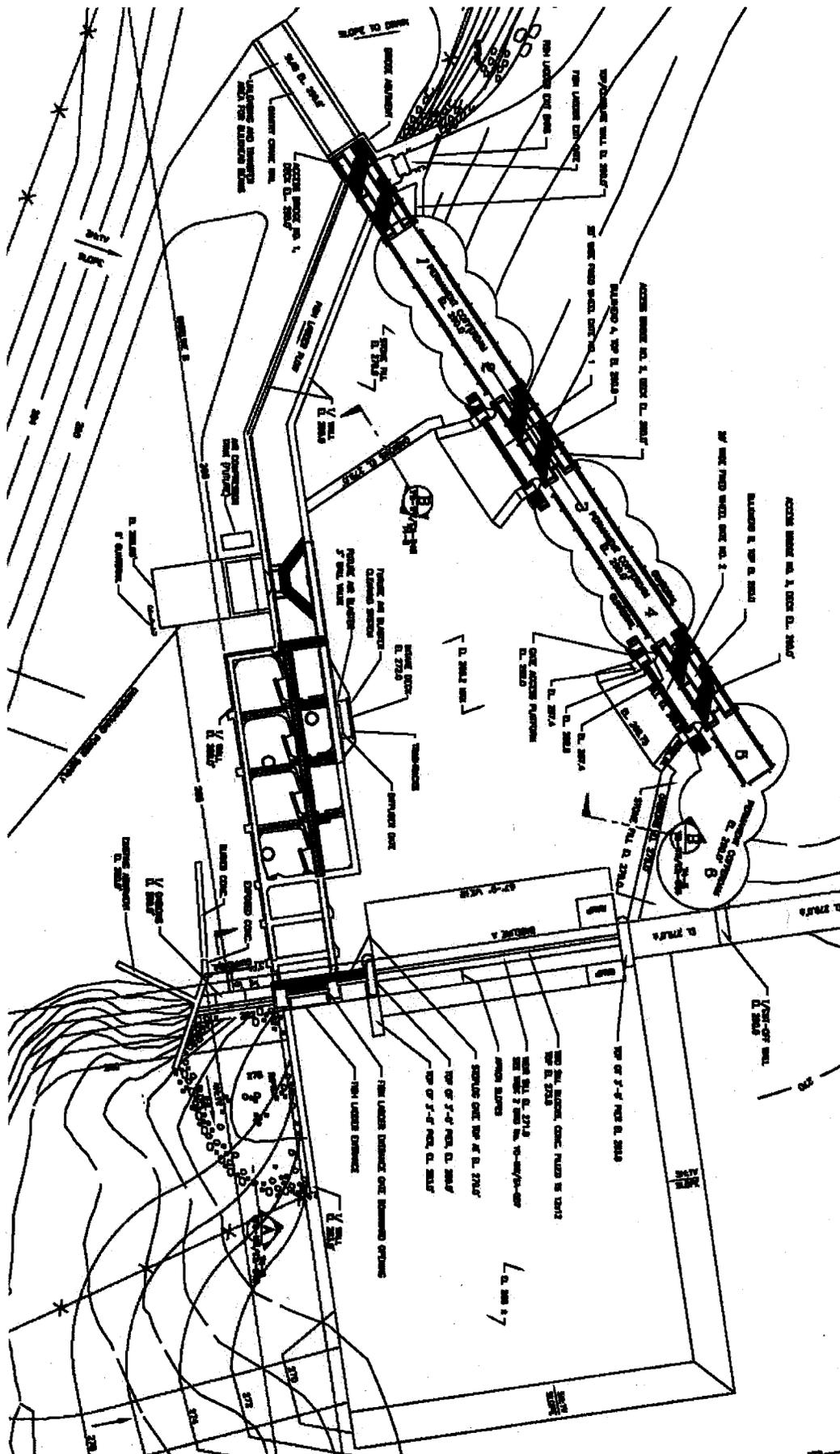
7. The York Haven Project will conduct monitoring and allow the resource agencies to conduct monitoring of the East Channel Fish Passage System as follows:

- a. During 2010, from October 15 through November 15, resident fish shall be counted and the species identified during daylight hours for five days at a period of "normal flows" to be established in consultation with the PFBC in advance of the monitoring period.
- b. Annually during the American Shad migration season, the York Haven Project shall count resident fish and identify the species during the periods when the York Haven Project is visually counting anadromous fish.
- c. For all years after 2010 during October and November, if required by the Department, York Haven Project shall conduct monitoring in accordance with a plan developed by York Haven and approved by the Department, which will provide for counting of resident fish during daylight hours for a period not to exceed five days under flow conditions and timing determined after consultation between the Pennsylvania Fish and Boat Commission and the York Haven Project.
- d. The York Haven Project will allow resource agencies access to the East Channel Fish Passage System counting room with appropriate advance notice to and coordination with the York Haven Project to conduct fish monitoring. Such monitoring may be conducted by remote camera or by personnel.

8. Any requirements for operation and maintenance of the East Channel Fish Passage System as set forth above shall be subject to and conditioned upon compliance with the safety protocols in place for the safety of all personnel and equipment at the York Haven Project.

9. The provisions of this resident fish passage condition shall be included in the FPOP for the York Haven Project.

Exhibit A.1 Existing East Channel Fish Passage System



**YORK HAVEN HYDROELECTRIC PROJECT
OFFER OF SETTLEMENT**

York Haven Power Company, LLC

By: Dennis O'Donnell

Dennis O'Donnell
Authorized Representative

Date: 12/12/13

**YORK HAVEN HYDROELECTRIC PROJECT
OFFER OF SETTLEMENT**
Pennsylvania Fish & Boat Commission

ATTEST:

**COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA FISH AND BOAT COMMISSION**

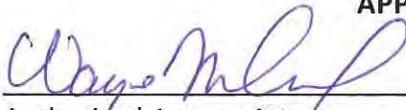


Administrative Secretary (date) 1/7/14



Executive Director (date) 06 JAN 2014

APPROVED AS TO FORM AND LEGALITY



Authorized Agency Attorney (date) 1/6/14
Pennsylvania Fish and Boat Commission

Deputy Attorney General (date)
Office of Attorney General

**YORK HAVEN HYDROELECTRIC PROJECT
OFFER OF SETTLEMENT**

Maryland Department of Natural Resources

By: 

Name: Shawn A. Seaman

Title: Program Manager, Power Plant Research Program

Date: January 29, 2014

**YORK HAVEN HYDROELECTRIC PROJECT
OFFER OF SETTLEMENT**

Susquehanna River Basin Commission

By: Andrew D Dehoff

Name: Andrew D Dehoff

Title: Executive Director

Date: Dec. 19, 2013

Document Content(s)

Offer of Settlement Proj. No. 1888.PDF.....1