

SUPPORTING INFORMATION FOR LOW IMPACT HYDROPOWER INSTITUTE'S CERTIFICATION QUESTIONNAIRE

PREPARED FOR:

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1.0 PROJECT DESCRIPTION

The Holtwood Project is located on the Lower Susquehanna River at approximately River Mile 25 in Lancaster and York Counties in south-central Pennsylvania as shown in Figure 1. The Project is situated approximately seven miles north of the Pennsylvania/Maryland border, and is one of five hydroelectric projects located along the lower Susquehanna River. Four of these projects are mainstem dam projects and one (Muddy Run) is a pumped storage station that uses the Conowingo Pond as its lower storage pond. Moving from downstream to upstream, these Susquehanna River hydroelectric projects are: Conowingo, Muddy Run Pumped Storage Project, Holtwood, Safe Harbor, and York Haven.

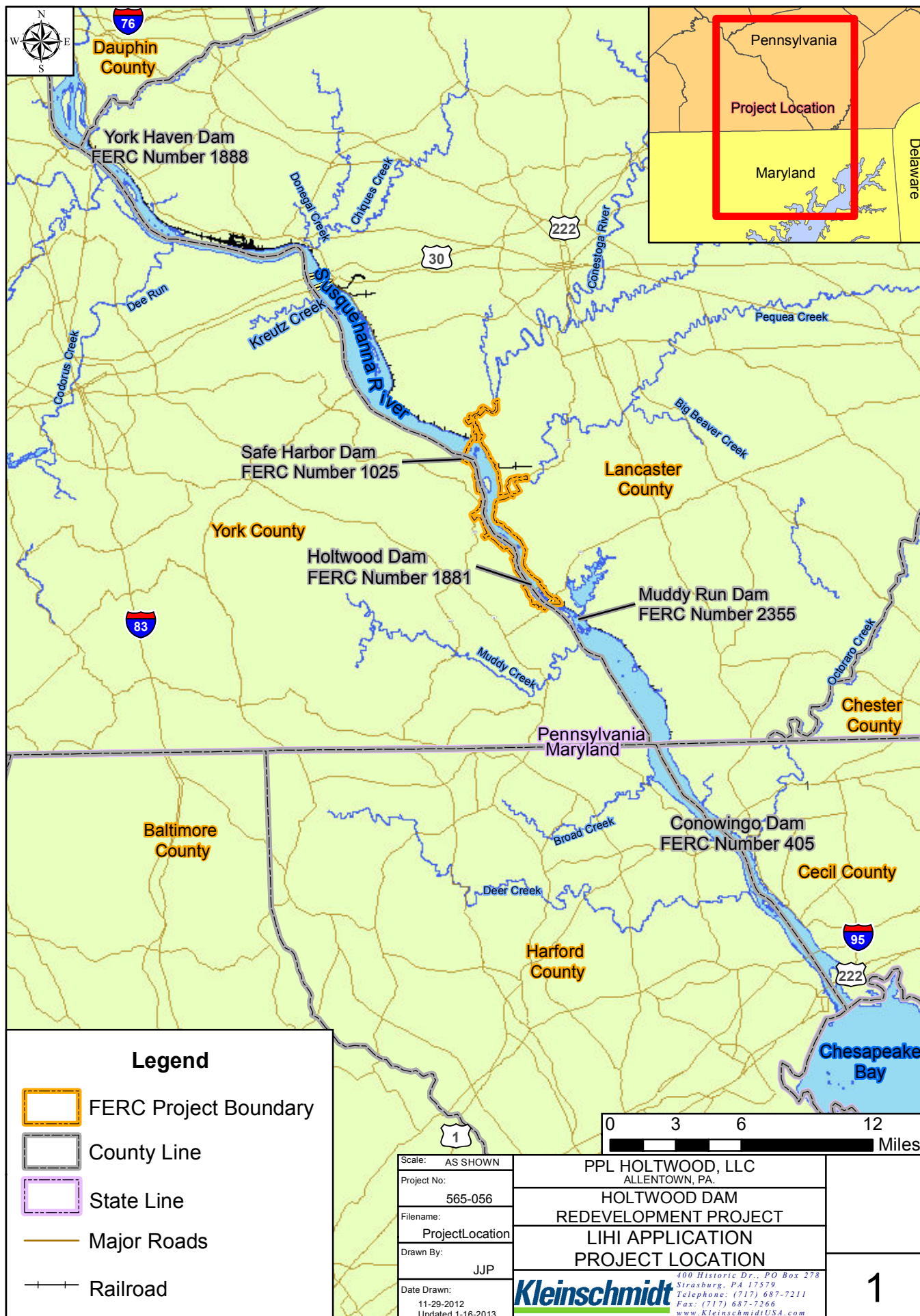
The Holtwood dam is an overflow-type structure that consists of a 2,392 ft long by 55 ft high, low hazard, concrete gravity dam with a spillway crest at El. 165.0'. The top of the dam is raised to an effective elevation of 169.75 ft via the use of wooden flashboards and inflatable rubber dam sections. The dam forms an approximately 8-mile long reservoir, Lake Aldred, with a surface area of approximately 2,600 acres at maximum water level. A skimmer wall located on the upstream side of the forebay protects the powerhouse from debris. The forebay is being expanded and the skimmer wall is being replaced as part of the redevelopment project.

Downstream of the dam, a diversion wall connects the western side of the original powerhouse to a long, narrow river island known as Piney Island, and effectively separates the tailrace from the remainder of the Susquehanna River. Along the western shore of Piney Island, another narrow channel is formed between Piney Island on the east and a series of smaller islands on the west; this channel is referred to as Piney Channel. Excavation in both the tailrace and Piney Channel is underway to reduce backpressure on the generating units and also to improve fish passage. The remainder of the Susquehanna River bed is referred to as the spillway.

The Project powerhouses, including the original powerhouse constructed between 1905 and 1910 as well as the new powerhouse that is currently undergoing construction, are located on the east side of the river along the Lancaster County shoreline. The original powerhouse contains ten similarly-sized vertical Francis turbines, with a total combined hydraulic capacity of 31,500 cfs. The original powerhouse also contained two smaller, and retired, exciter units; PPL Holtwood, LLC is replacing those with two 1.18-MW vertical Francis turbine generator units as part of the redevelopment. The new powerhouse will contain two 40.3-MW vertical Kaplan turbine generating units with a combined hydraulic capacity of 30,500 cfs. All water entering the powerhouse goes to the tailrace with the exception of the westernmost generating unit in the original powerhouse, Unit 1. PPL Holtwood, LLC has rerouted its draft tube so that it flows into Piney Channel. A plan view of the project that provides an overview of important project features is included in Figure 2. Photos 1 through 3 show the dam and powerhouse prior to redevelopment as well as a recent aerial view of construction activities.

The fish passage facilities at Holtwood include a tailrace lift with two entrances and a spillway lift for upstream passage, and a pipe built at the west side of the powerhouse for downstream fish passage and debris sluicing. The two upstream lifts have their own fish handling systems that sluice fish into a common flume through which fish swim into Lake Aldred. The lifts or "hoppers" raise the water (and fish) entering the facility about 50 feet to the level of the forebay. Fish swim through the flume and enter the lake outside the plant skimmer wall. PPL Holtwood, LLC is reconfiguring the existing fish lift to improve migratory fish passage.

At the western end of the dam is a non-functional fish ladder that was constructed in 1914. At that time fish passage technology was immature and the facility was never successful in passing American shad. The facility was abandoned in place around 1920. PPL Holtwood, LLC is installing new whitewater features immediately below this area as discussed later in this document.





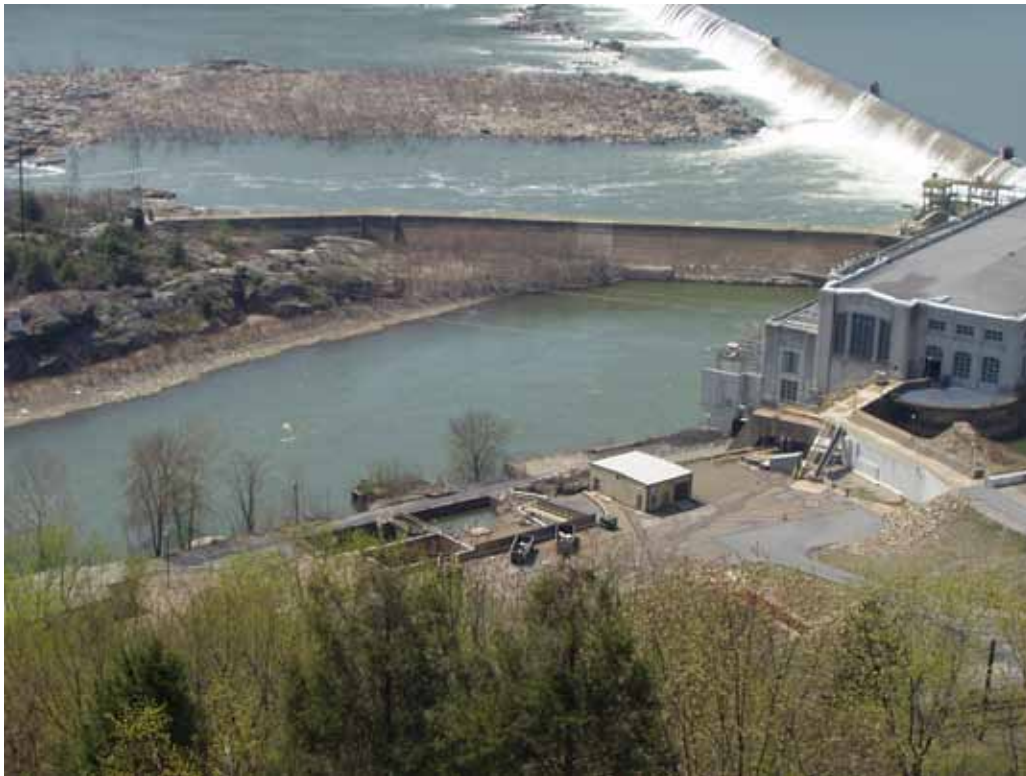


PHOTO 1. EXISTING POWERHOUSE PRE-REDEVELOPMENT



PHOTO 2. EXISTING POWERHOUSE AND DAM PRE-REDEVELOPMENT



PHOTO 3. AERIAL VIEW OF NEW POWERHOUSE CONSTRUCTION ON JUNE 15, 2013

2.0 PROJECT OPERATION

The Holtwood Project operation is coordinated with the other lower Susquehanna River projects. Each project uses its storage capabilities to generate power on a daily and weekly basis, although due to the limited storage ability of Lake Aldred, the Holtwood Project generally operates in a run-of-river mode using flows from the upstream Safe Harbor Project and the approximately 680-square-mile drainage area between the SafeHarbor and Holtwood dams.

Following redevelopment, PPL Holtwood, LLC will continue to operate the Holtwood Project in coordination with the other lower Susquehanna River projects. The generation schedule will continue to be developed on a day-ahead basis. Expecting the new turbine generating units to have higher efficiencies than the existing units, PPL Holtwood, LLC anticipates that the new units will be dispatched first during periods of low flow consistent with the required environmental measures such as the minimum flow and fish passage requirements discussed below.

In addition to the proposed facility modifications to enhance fishery resources as discussed above, PPL Holtwood, LLC will provide minimum flows as part of an agreement with Exelon, owner and operator of the downstream Conowingo Project, and also as part of agreements with agencies for environmental enhancement. PPL Holtwood, LLC also will continue to operate the fish lift. Additional efforts related to environmental resources are discussed in various sections of this LIHI certification application.

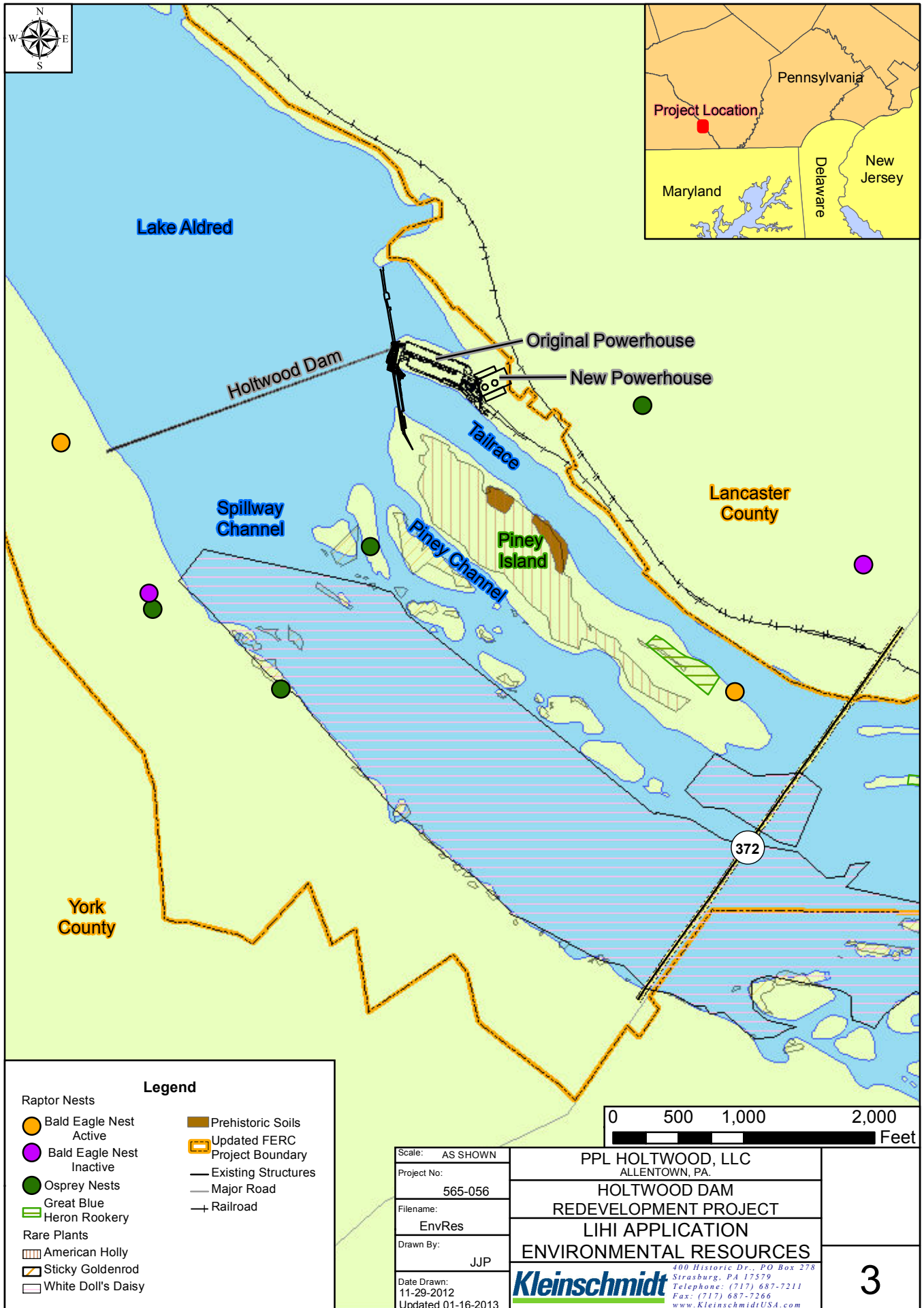
3.0 SUMMARY OF PROJECT REDEVELOPMENT PROCESS AND AGENCY CONSULTATION

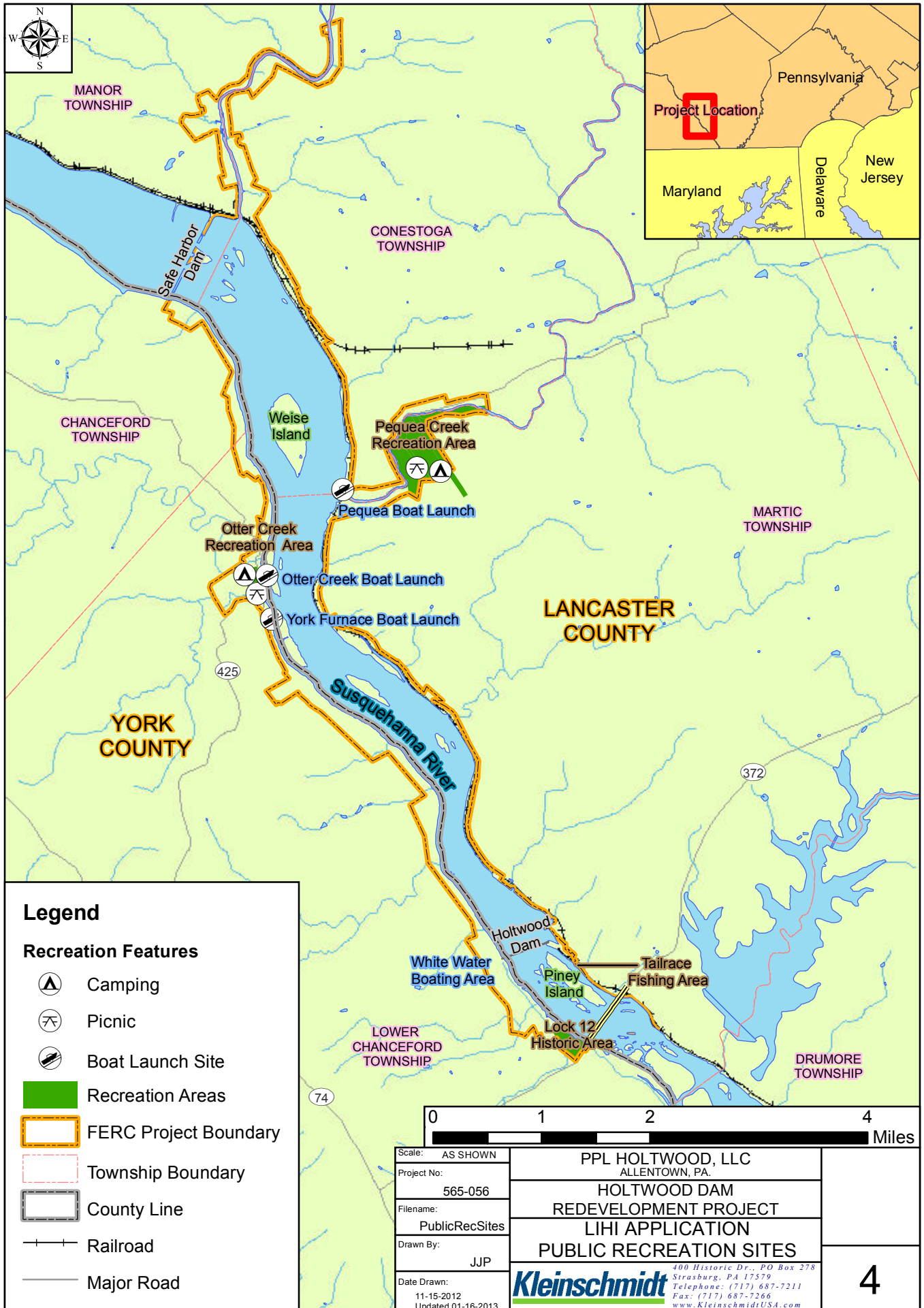
The Holtwood redevelopment effort started in 2004, with a study of redevelopment options that would increase power output at the project while simultaneously improving migratory fish passage. Preliminary plans were shared with resource agencies in early 2005 and a number of baseline environmental studies were conducted to further refine the preliminary redevelopment plan. In March 2006, PPL Holtwood, LLC officially released an Initial Consultation Document (ICD) to begin the license amendment process for the project expansion. This started a series of meetings with resource agencies, the public and other project stakeholders to develop and conduct additional studies and address issues that were raised. The information gained through this process was used to modify and refine the preliminary plans to avoid and minimize environmental impacts and enhance environmental and recreational resources. The final proposed project design and agreements made between PPL Holtwood, LLC and the resource agencies (the PA Department of Environmental Protection (PADEP), the Pennsylvania Fish and Boat Commission (PFBC), the Susquehanna River Basin Commission (SRBC), the Maryland Department of Natural Resources (MDNR), the United States Fish and Wildlife Service (USFWS) and the U.S. Army Corps of Engineers (USACE)) were established in a Consent Order and Agreement dated November 21, 2007 between the PADEP and PPL Holtwood, LLC. This document would form the basis of the Section 401 Water Quality Certification by the PADEP that was ultimately issued on June 15, 2009.

The final FERC amendment application was submitted on December 19, 2007. However, due to the economic downturn in late 2008, PPL Holtwood, LLC withdrew their application in December 2008. Tax incentives that were passed in the stimulus bill of 2009 made the project

economically viable again and PPL Holtwood, LLC reapplied for the License amendment on April 9, 2009. The final FERC order amending the Project license was issued on October 30, 2009.

Additional description of how the project meets Low Impact Hydropower Institute criteria is included below. Figures 3 and 4 provide locations of key environmental and recreational features that are discussed in the following sections.





A. FLOWS

Prior to the license amendment, the Holtwood project had no minimum flow requirements. This was due in part to the fact that the tailrace of the project is backwatered by the downstream Conowingo hydroelectric project reservoir and that inflows are almost completely governed by the upstream Safe Harbor hydroelectric project releases.

During the course of the application process, PPL Holtwood, LLC worked closely with agencies to identify potential impacts that the proposed development may have on downstream flows, as well as the effects that the new flow regime would have on environmental resources. Prior to filing a license amendment application, PPL Holtwood, LLC conducted environmental studies downstream of the Holtwood dam to determine what, if any, environmental effects would result from a modified flow regime in the spillway. Specifically, PPL Holtwood, LLC identified state-listed endangered plants in the spillway including sticky goldenrod and White doll's daisy. PPL Holtwood, LLC and the resource agencies determined that white doll's daisy would have the greatest potential to be impacted by a change in flow regime. However, due to the dynamic nature of flows in this region the extent of impact, if any, was difficult to predict. As described further in the RTE section of this application, white doll's daisy thrives in the spillway because of occasional flushing flows in combination with periods of low flow. To maintain a healthy white doll's daisy and sticky goldenrod population, PPL Holtwood, LLC developed, in consultation with agencies, a plan to release periodic flushing flows into the spillway to protect habitat for white doll's daisy. PPL Holtwood, LLC also agreed to a long-term monitoring plan developed in conjunction with the PA Department of Conservation and Natural Resources to assess the health of the white doll's daisy population and make adjustments to the flow regime as required.

PPL Holtwood, LLC also conducted a detailed minimum flow study in Piney Channel to determine optimum flows for fishery habitat, water quality, and other purposes. This study showed that the continuous 200 cfs minimum flow that was agreed to for Piney Channel provides a significant amount of the suitable habitat potentially available for a number of resident fish species and life stages. Prior to the redevelopment, during low flow conditions, pools in Piney Channel would become isolated and experience depleted DO concentrations

particularly during the summer months. The continuous 200-cfs minimum flow to Piney Channel is expected to prevent this from occurring in the future.

Exelon's downstream Conowingo Project (FERC No. 405) has minimum flow requirements in their FERC license to maintain adequate flows in the river downstream of Conowingo to the Chesapeake Bay. PPL Holtwood, LLC has entered into a settlement agreement with Exelon to provide a continuous minimum flow of 800 cfs and a daily volumetric flow equivalent to 98.7% of the minimum flow requirements of the Conowingo Project.

DOCUMENTATION OF RELEVANT STANDARD

All of the minimum flow agreements made on the project were supported by resource agencies involved, as evidenced by letters submitted in response to the final license amendment application and by the Minimum Stream Flow Operating Plan developed in conjunction with resource agencies as further explained in Attachment 3.

B. WATER QUALITY

In preparation for applying for a license amendment to construct a second powerhouse, PPL Holtwood, LLC was aware that there may be water quality concerns in the tailrace of the Project as well as in the spillway. To better understand the existing water quality and the processes affecting it, PPL Holtwood, LLC collected dissolved oxygen and temperature data in the Project forebay and tailrace as part of the license amendment process.

Following field studies, PPL Holtwood, LLC determined that the lowest dissolved oxygen (DO) levels generally occur in late August and early September, when water temperatures are highest, although generally, DO concentrations fell well within state water quality standards for the river. During testing in 2005, 99.3% of all samples collected in the tailrace during Project generation periods met or exceeded state water quality standards; 100% of the measurements between July 10 and September 7 in 2006 met or exceeded state water quality standards.

Lake Aldred does not thermally stratify and exhibits only a small gradient in DO due its shape and size relative to flows. Water quality profiles taken at four locations throughout Lake Aldred in the summer of 2006 showed that DO was well above state standards throughout the lake. The

upstream Safe Harbor project uses a turbine venting system to add oxygen to the water passing from their project and this appears to result in good DO levels throughout the lake. When the water passes through the Holtwood Project, air is aspirated into the turbines due to leakage, and as a result the downstream DO is enhanced. For example, in a 2005 study conducted in the tailrace from July 1 to September 15, continuous monitoring showed that tailrace DO was typically elevated by between 0.20 mg/L and 0.40 mg/L during typical generation than the forebay.

Environmental studies conducted prior to submitting the application for a FERC License Amendment also identified areas of the spillway which, when the Project is not spilling, contain several pools that in large part become isolated and stagnant. These pools are then susceptible to algal processes that can reduce DO concentrations. This is particularly characteristic of the upstream portion of what is known as Piney Channel.

To address this concern, and pursuant to Article 52 of the new license, PPL Holtwood, LLC developed a minimum flow protocol that provides for a minimum conservation flow in order to protect water quality in the spillway. A conservation flow of 200 cfs will be released into Piney Channel; in addition, a 10-inch pipe through the dam will also continuously deliver water to the spillway area. A continuous flow through the channel will connect many of these pools, providing a constant source of fresh, oxygenated water. The continuous flow through the spillway would replenish stagnant or near-stagnant pools on a regular basis.

DESCRIPTION OF RELEVANT STANDARD

PPL Holtwood, LLC believes that the new turbines may not aerate the water to the same degree as the older units. To ensure that DO concentrations remain above standards following operation of the new units, PPL Holtwood, LLC has developed a DO monitoring plan in consultation with agencies and pursuant to Article 53 of the new license. This plan calls for water quality monitors to be deployed in the tailrace, Piney Channel and Lake Aldred for the first 5 years of operation of the amended project.

Should DO concentrations fall below standards with the new units, PPL Holtwood, LLC would develop operation protocols or physical modifications to maintain state standards. The FERC order approving this plan is included in Attachment 3 of this certification application.

C. FISH PASSAGE

Improving upstream fish passage of anadromous species at the Holtwood Hydroelectric Project was one of the primary factors behind the redevelopment. PPL Holtwood, LLC has been part of a long-term cooperative effort with resource agencies to resolve fish passage issues and the redevelopment and post-construction monitoring agreements developed represent an industry-leading approach to integrating fish passage with hydroelectric development.

In the early 1980s, PPL Holtwood, LLC entered into a series of agreements with state and federal regulatory agencies to jointly undertake a cooperative program to attempt to restore American Shad and other migratory fish species to the Susquehanna River. This cooperative program led to growth in the numbers of American Shad returning to the Susquehanna River, and ultimately to the construction of fish passage facilities at the Holtwood Project and other hydroelectric projects on the Lower Susquehanna River.

In 1997, PPL Holtwood, LLC began operating a \$21 million fish elevator (fish lift) to pass American shad and River Herring. Since that time, performance of the fish lift at Holtwood, and the passage program generally, has met with mixed success. The program has been much more successful in terms of migratory fish passage numbers during low flow years, while exhibiting steep declines in passage numbers during years when spring flows have been high. For example, the flows were high all spring in 2004 and only 3% of the American shad that were passed at the downstream Conowingo hydroelectric station (FERC No. 405) were counted passing the Holtwood fish lift. As a result of this operating experience PPL Holtwood, LLC examined a number of variables and factors that may be contributing to the poor passage performance, and began to investigate potential solutions to factors within its control. Among these were the potential adverse effect of Project spills (due to the limited hydraulic capacity of the Holtwood plant) on the ability of target migratory species to locate the fish lift entrances; during high river flows shad were not able to detect attraction flows and would follow the river up to the base of the Holtwood Dam and would be separated from the fishlift entrances by a series of narrow

islands. The relationship between high water years and low fish passage was apparent given the longer period of record, see Table 1.

TABLE 1. SUMMARY OF AMERICAN SHAD PASSAGE ON THE SUSQUEHANNA RIVER (SRAFRC, 1997-2006; PFBC 2007)

YEAR	CONOWINGO*	HOLTWOOD	SAFE HARBOR	YORK HAVEN
1997	90,971	28,063	20,828	-
1998	39,904	8,235	6,054	-
1999	69,712	34,702	34,150	-
2000	153,546	29,421	21,079	4,675
2001	193,574	109,976	89,816	16,200
2002	108,001	17,522	11,705	1,555
2003	125,135	25,254	16,646	2,536
2004	109,360	3,428	2,109	219
2005	68,926	34,156	25,425	1,772
2006	56,899	35,968	24,929	1,913
2007	25,464	10,338	7,215	192

* *Conowingo East Lift*

The idea of adding capacity to the existing Project to direct more flow to the side of the river with the fish lifts so more shad would be able to find the entrances was discussed as a possible win-win solution to the fish passage issue. In 2004, PPL Holtwood, LLC retained Kleinschmidt to investigate options and develop a redevelopment plan that could assist in resolving migratory fish passage concerns in a timely fashion while simultaneously providing a new viable renewable energy source. These studies resulted in the identification of a preliminary plan to redevelop the Holtwood project to address multiple resource issues and concerns. This preliminary plan was further refined in a series of meetings with resource agencies in early 2005 and in response to results of environmental studies conducted in the summer and fall of 2005. Formal license amendment proceedings started in 2006 and PPL Holtwood, LLC worked directly with agencies over a three year period to modify the preliminary plan, the conceptual design, and final design to specifically address fish passage issues. This included development of velocity and width criteria for passage, detailed two and three dimensional modeling of the tailrace and fish lift entrance areas, and development of protocols for evaluating and improving fish passage effectiveness post-construction. Modifications to the original design included blasting and excavation in the tailrace to provide passage areas appropriate for upstream migrating shad at full

project generation. PPL Holtwood, LLC also routed the draft tube for the westernmost turbine of the original powerhouse (Unit 1) to release water directly to Piney Channel and excavated approximately 49,000 cubic yards of rock from Piney Channel to create a secondary migratory fish passage route to access Entrance C of the fish lift.

Several modifications to the existing fish lift were also made to enhance lift effectiveness, including changes to the attraction water inlet piping, redesign and reconstruction of fish lift Entrance C, and relocation of the tailrace crowder drive.

Once construction began, several adjustments were made to the construction plan and schedule to avoid unnecessary impacts to American shad passage. When possible, no blasting and excavation activities in the tailrace were scheduled during the upstream fish passage season. In 2012, PPL did blast in the tailrace during the fish passage season, but only in order to address an area that was causing a barrier to fish passage due to high velocities; it was thought that the blasting would alleviate an existing problem and have an immediate positive impact on overall fish passage for the 2012 season. During construction, PPL Holtwood, LLC is providing mitigation for impacts to fish passage performance in the form of \$100,000 annually to the Pennsylvania Fish and Boat Commission, as required by the 401 certification.

American eel are not currently present near the Holtwood project in any significant quantity. However, should they begin to populate the area, either through introduction or passage at Conowingo, the 401 Certification includes provisions for future project operations and modifications to provide upstream and downstream eel passage.

DESCRIPTION OF RELEVANT STANDARD

PPL Holtwood, LLC has developed a Fishway Operating Plan in consultation with agencies for use following completion of construction activities. The plan provides guidance for annual start-up, shut-down, measures to be followed in case of emergency or project outages, routine maintenance, and debris management. In addition, it presents measures pertaining to dam and powerhouse operation that PPL Holtwood, LLC will undertake during fish passage season including the use, monitoring and reporting of flows. It also includes fish passage reporting

requirements which are required in the final 401 certification. This plan was approved by FERC on May 9, 2012. A copy of the FERC order approving this plan is included in Attachment 3.

Under the amended license and 401 certification, PPL Holtwood, LLC agreed to requirements to successfully pass 75% of the American shad that pass through the Conowingo facility, and that 50% of the shad that pass through the Conowingo facility pass through Holtwood within 5 days of passage at Conowingo. Should Holtwood not meet these targets, PPL Holtwood, LLC agreed to first make operational modifications to enhance fish passage; and, if passage is still below targets, to make physical modifications to enhance fish passage. A detailed plan to measure and evaluate performance and conduct follow-up studies as needed was developed as part of the license amendment process.

PPL Holtwood, LLC will also measure survival of American shad moving downstream past the Project and has agreed to meet a target of 95% survival of juvenile American shad and 80% survival of adult American shad. As is the case with upstream passage, should Holtwood not meet the target survival, there would be operational and potentially physical modifications made to meet the target.

In addition to passing anadromous fish, the Holtwood fish lift will begin operating to move resident, or riverine, fish following the completion of construction. The fish lift will operate during the spring for upstream shad passage and from April 1 through June 30 and from September 1 through October 15 each year, for up to 5 days per week and 6 hours per day.

D. WATERSHED PROTECTION

The lands on and immediately surrounding the Holtwood Project are largely wooded but contain recreation areas, scattered residential neighborhoods and farmland. No significant agricultural activities occur on Project lands. PPL Holtwood, LLC owns a majority of the land around Lake Aldred and leases portions of it to individuals and local organizations. Numerous cottages and several businesses have been constructed around the reservoir. Total land area within the Project boundary is approximately 1,853 acres which is largely owned by PPL Holtwood, LLC. In all but approximately 5% of the shoreline, there is at least a 200-foot forested buffer around the river within the Project boundary. Through a lands transfer agreement with local conservation

groups and a recently approved shoreline management plan, PPL Holtwood, LLC has committed to continued land preservation and maintenance of this shoreline buffer zone as well as buffers on a number of tributaries in the immediate project area.

TABLE 2. HOLTWOOD PROJECT LAND USE DESCRIPTIONS

CATEGORY	DESCRIPTION	ACRES (APPROXIMATE)
GENERATION & TRANSMISSION	Lands utilized primarily for the generation and transmission of electrical power including associated facilities such as the Holtwood Village and ash basins.	83
RECREATION	Lands utilized primarily for intensive recreation.	619
NATURAL	Lands managed primarily for scenic enhancement and buffer zones along roadways, recreation areas and other areas easily viewed by the public. These lands provide natural environment for hunting, hiking and similar recreation pursuits. Also, lands of unique scenic and ecologic importance, to be protected to the extent possible from the influence of man. Hiking trails have been constructed to provide opportunity for a wilderness type experience.	2,177
AGRICULTURE	Lands under cultivation for general farming.	21
PRIVATE/SEMI-PRIVATE	Lands leased for homes, cottages, boat clubs, commercial enterprises or other uses of a private or semi-private nature.	213
OPEN WATER		3,114

The Project lands at Holtwood include many areas of high aesthetic value in their topography, geology, and vegetation. The Susquehanna River between Columbia and Fishing Creek, along with numerous riverside and tributary sites, was nominated to be listed as a "National Natural Landmark" in 1981. Although the landmark designation was never completed, PPL Holtwood, LLC continues to maintain and preserve several recreation areas, overlooks and natural features on the property. The Otter Creek tributary gorge and the Muddy Creek area include some of the largest stands of virgin mixed mesophytic forest east of the Appalachian Mountains. The stands include an important Eastern Hemlock component, while in higher elevations, the stands include more oaks. The Kelly's Run and Oakland Run sites also contain mature ravine forest, and are notable for their rock outcrops.

Islands in Lake Aldred offer examples of alluvial riverine communities and are in sharp contrast with the bedrock islands downstream. Lake Aldred islands exhibit multiple stages of riverine community development from sand or mud flats to mature forests. The region below the dam offers an opportunity to see how glacial meltwater dramatically eroded bedrock, creating steep-cliff islands, river potholes and distinct channels. Overlooks in the area include the Pinnacle Overlook, offering a clear view of the upper, narrow part of the Susquehanna River canyon and notable for the scenic cliff exposures and pine-oak forest, and the Urey overlook, also offering striking cliffs and views of the river. Other overlooks at Face Rock, House Rock and other locations provide additional views of the Susquehanna River, and the Holtwood Project. PPL Holtwood, LLC manages the Shenk's Ferry Wildflower Preserve, located upstream of Pequea Creek along Lake Aldred in Lancaster County. The site preserve is rich in wildflowers and fern species due in part to the unique geology that includes limestone and mica-schist rock.

PPL Holtwood, LLC has worked with project stakeholders to divest certain land holdings in order to best preserve important regional natural and cultural resources and to create new and sustainable cooperative opportunities for recreational and interpretive uses of these lands. PPL Holtwood, LLC proposed to grant to others restrictive deed covenants, via conservation easements for lands that it would continue to own, to ensure the continued preservation and use of these lands in support of regional greenspace and heritage initiatives, and to facilitate the public ownership of these lands in the event that PPL Holtwood, LLC should ever terminate hydroelectric operations under its FERC license. Specifically under this plan PPL Holtwood, LLC proposed to:

- transfer to the Lancaster County Conservancy 324 acres of PPL Holtwood-owned non-project lands,
- remove approximately 1,700 acres of Holtwood lands from the FERC delineated Holtwood project boundary and to transfer these lands to the Lancaster County Conservancy, York County, and the Conservation Society of York County,
- grant to the Lancaster County Conservancy, the Pennsylvania Department of Conservation and Natural Resources, and York County conservation easements on approximately 1,400 acres of lands to remain within the FERC delineated Holtwood project boundary,

- coordinate the development of a recreation management plan in consultation with the Pennsylvania Department of Conservation and Natural Resources to facilitate state management of Project-controlled recreation facilities in order to create enhanced public use opportunities, and
- coordinate activities with the various recreation providers and municipal governments in the corridor and to support efforts to create an appropriate management structure or organization to foster communication and coordination among the organizations planning for the future of the river corridor.

Because there were some concerns raised by FERC about removal of Project lands from the project boundary, PPL Holtwood, LLC withdrew the original request for changes to the Project boundary and reapplied in March 2012. FERC issued public notice of the proposed amendment on May 18, 2012. FERC approved the Project Boundary changes on December 21, 2012. FERC subsequently approved the Land and Shoreline Management Plan on January 15, 2013.

E. THREATENED AND ENDANGERED SPECIES PROTECTION

The Holtwood project redevelopment has been conducted in and around a number of endangered plant and bird species. PPL Holtwood, LLC has modified project designs and construction schedules and approaches in order to avoid and minimize potential issues with endangered species at the project as discussed below.

ENDANGERED BIRD SPECIES

Bald Eagle

There is currently a bald eagle nest located along the York County shore near the Holtwood dam. Another nest is located downstream of Holtwood dam at the southern end of Piney Island. Both of these nests have moved within the project area since the start of the redevelopment process. In the case of the eagle nest on Piney Island, it moved to an area that was right in the middle of planned project construction. Because this occurred in 2007 and the eagle was removed from the Endangered Species List in 2007, yet still protected by the Bald and Golden Eagle Act – which did not provide for an incidental take permit, PPL Holtwood, LLC worked with the USFWS to develop an adaptive management based plan and guidelines for construction that allowed for

certain activities to take place at varying distances from the nest during nesting season with ongoing monitoring to ensure the nest was not disturbed.

PPL Holtwood, LLC installed monitoring equipment and a 120' tower to observe the eagles during construction. Work on this was completed in October 2009 in order to avoid interference with eagle courtship and nesting season in December. The tower is located on PPL Holtwood, LLC property on the Lancaster County side of the Project tailrace across from the bald eagle nest on Piney Island. This tower contains two remotely operated cameras and a sound meter. These electronics are powered by solar panels that are mounted on an adjacent storage shed with significant battery backup. The cameras and sound meter are controlled by radio signals from the Holtwood Powerhouse. All video and audio is also transmitted by radio signal to the Powerhouse for storage and transmission to observation locations on remote computers.

Throughout the 2009-2010 and 2010-2011 construction seasons, the management plan worked well and the eagles successfully nested in the midst of considerable construction activity. In the winter of 2011-2012, however, due to considerable construction delays caused by tropical storms and hurricanes, PPL Holtwood, LLC requested permission from the resource agencies to conduct construction activities in closer proximity to the nest. After monitoring indicated that this activity was potentially disturbing the eagles, the USFWS suggested that PPL Holtwood, LLC apply for an incidental take permit, which was now an option under the Bald and Golden Eagle Act. PPL Holtwood, LLC applied for this permit on January 13, 2012 and received it on January 26, 2012. A condition of this permit was that PPL Holtwood, LLC would conduct research on area eagles and in spring 2012, research contractors for PPL Holtwood, LLC successfully outfitted two juvenile eagles from the York County nest with radio transmitters that will track the eagle movements for the next several years. In spring of 2013, PPL Holtwood, LLC was awarded an Outstanding Steward of America's Waters Award from the National Hydropower Association for their work with eagles on this project.

On November 27, 2012, PPL Holtwood, LLC requested amendment of the existing take permit to allow for construction to occur within the 330-foot buffer zone from the York County nest in order to complete the whitewater features in this area in early 2013. This request was first discussed with the USFWS and PGC, who agreed to allow certain activities to occur, with

increased monitoring of the nest as well as new mitigation conditions for PPL Holtwood, LLC to provide funding to area bird rescue groups. The amendment was issued on December 4th, 2012.

Osprey

Osprey is not federally listed, but is listed as threatened in Pennsylvania. Ospreys are large, fish-eating birds of prey most often seen around water. They are one of the world's most widely distributed birds, preying almost exclusively on fish. They usually nest in large trees, but they may be found nesting on channel markers, telephone poles, chimneys and man-made platforms built specifically for their use (DeGraaf and Rudis, 1986). Several nest sites have been identified in the vicinity of the Holtwood Dam. There are nests within the immediate Project area including just below Holtwood dam on transmission towers within the Susquehanna River channel and on the York County shore. PPL Holtwood, LLC has worked with the PA Game Commission to establish construction buffers around active nests and to monitor nests throughout the active nesting season. These measures have been successful in avoiding any impacts to osprey.

Great Blue Heron, a species of special concern in Pennsylvania, is abundant throughout the Holtwood project area. In 2012, two small heron rookeries were established below the Project on Oakes and Piney Islands, in the midst of active construction areas. PPL Holtwood, LLC worked with the PA Game Commission to develop buffer zones around these rookeries to avoid impacting heron during the active nesting season.

ENDANGERED PLANT SPECIES

Several state-listed RTE plants have been identified in the Project area. The primary species of concern with respect to the project redevelopment were American holly, sticky goldenrod, and white doll's daisy.

American holly was found on upland habitats on Piney Island and on a few other islands below Holtwood dam. American Holly grows in poor soils and survives in habitat that is clearly being maintained for a power line right of way. American holly were also found dominating habitat as mature trees in undisturbed areas of prehistoric soils. In other parts of Piney Island, American holly was the dominant understory of a mature deciduous forest. Some holly trees have

established on top of a historic causeway between Piney and Barclay Islands. As part of construction, PPL Holtwood, LLC worked with the DCNR to develop plans that avoided areas where holly trees were growing. In one area, roads had to cross over Piney Island so the area where the least number of mature holly trees was selected and PPL Holtwood, LLC agreed to move the holly trees, store them at an off-site nursery and replant them after construction. A similar approach was taken with some American holly trees around the ash basin disposal area on the Lancaster side of the river, where excavated rock was to be piled.

Sticky goldenrod is very abundant below Holtwood dam scattered among the high elevation rock as part of the riverside outcrop community. White doll's daisy is also found throughout the spillway area. These plants have established in this area at least partly due to the hydrologic regime this area historically experienced. This included high scouring flows during some times of the year with limited to no flow during the summer months. Because the project redevelopment would change the flow regime at the project, there was some concern that this would impact these endangered plant populations. PPL Holtwood, LLC worked with the DCNR to develop a program for controlled spills to provide wetting flows to plants as well as a monitoring program that could be implemented over a multi-year period before and after project redevelopment to determine the impact, if any, on plant populations.

F. CULTURAL RESOURCE PROTECTION

Cultural and historical resources were an important factor in the Holtwood redevelopment project. In 2006, in the early stages of the relicensing process, PPL Holtwood, LLC carried out a preliminary study of the soils and geomorphology of Piney Island and its environs within and adjacent to the Holtwood Hydroelectric Project (Stiteler *et al.* 2007). The purpose of this geoarchaeological study was to evaluate the potential for the presence of intact, in situ cultural material within the alluvial sediments that might be affected by the proposed construction of a new powerhouse and associated modifications to the tailrace channel. The survey of Piney Island involved the excavation of 41 augur probes using a hand-operated bucket augur. Investigation of the east shore of the Susquehanna River along the length of the tailrace channel involved the examination of drilling logs from geotechnical borings and the excavation of three augur probes. The west shore of the Susquehanna River, along the alignments of potential construction access roads, involved a pedestrian survey and one attempted augur probe in the

center of the Susquehanna-Tidewater Canal prism. A limited survey consisting of taped measurements and observational notes was also carried out at the ruins of a probable saw mill located immediately south of Wilson's Creek between McCall's Ferry Road and the canal, identified as the Stokes Mill. In addition, Upper and Lower Bare Islands, downstream of the Project, were investigated by means of a visual survey and augur probes. Finally, a limited pedestrian survey was conducted of a proposed boat launch site at the confluence of Pequea Creek and the Susquehanna River approximately four miles upriver of the Project.

The investigation showed that the east shore of the Susquehanna River across from Piney Island, the area of a proposed new powerhouse adjacent to the existing powerhouse, the proposed Pequea Boat Landing site, and the southern portion of Piney Island, together with much of the eastern bank of the Island, had been previously disturbed and had no potential for artifact-bearing strata. No further investigations were recommended for those areas. However, the investigations found that the east edge of the Upper Piney Island contains moderately stable soils, indicating a high potential for the survival of evidence of prehistoric occupation. Stiteler *et al.* (2007:i) recommended Phase IB testing of this area if the proposed modifications to the Project had the potential to affect it.

The Licensee submitted the draft report to the SHPO on November 29, 2006. Following a meeting between the Licensee and the SHPO on January 12, 2007, the SHPO issued a letter on January 22, 2007 concurring with the recommendations that the proposed new powerhouse site and boat launch site had no archaeological potential, and that no additional archaeological studies would be required if construction associated with the proposed new powerhouse avoided the areas on Piney Island identified as having archaeological potential. PPL Holtwood, LLC was able to redesign the tailrace excavation plan to avoid the areas where there was potential for archeological resources.

On May 22, 2008, the Licensee, through its consultant, Kleinschmidt Associates, submitted a Pennsylvania Historic Resource Survey Form for the Holtwood Hydroelectric Projects to the SHPO. In this Survey Form, the Licensee recommended that the Holtwood Project is eligible for the NRHP. On June 16, 2008, the SHPO concurred with this recommendation. The SHPO determined that the Project, including the powerhouse and the dam, is eligible under Criterion A

for its association with the development of hydroelectric power on the Susquehanna River and under Criterion C for its engineering significance as the location of the first Kingsbury thrust bearings, and as an example of the Classical Revival style of architecture.

To protect all identified historic properties, PPL Holtwood, LLC was initially a party to a Programmatic Agreement (PA) for managing historic properties that was entered into by the Commission and the Pennsylvania State Historic Preservation Officer (SHPO) in August 2009. In December 2009, in compliance with the PA, PPL Holtwood, LLC filed a Historic Properties Management Plan (HPMP) for Commission approval specifying how historic properties will be managed within the Project's Area of Potential Effect (APE) during the term of the amended license.

The HPMP details specific measures associated with those components outlined in the PA and serves as the day-to-day implementation plan for the Licensee for the management and the reasonable protection of historic properties within the Project's APE. The HPMP also serves as a compliance management plan to assist the Commission in ensuring that historic properties within the Project's APE receive a reasonable level of protection and that Section 106 obligations are fulfilled over the term of a new license.

In the development of this HPMP, PPL Holtwood, LLC consulted with the Commission, the Advisory Council, and the SHPO. During the development of the Initial Consultation Document and the Application for a Capacity-Related Amendment for the Holtwood Project, representatives of the Seneca Nation of Indians and the Towanda Band of Senecas were notified of the proposed actions and were invited to consult with FERC. Neither tribe notified either PPL Holtwood, LLC or FERC that they had any potential interest in the proposed action.

The HPMP was approved by FERC on January 11, 2010. PPL Holtwood, LLC is in compliance with the plan and files annual reports of activities under the plan for Commission approval.

G. RECREATION

PPL Holtwood, LLC provides recreational opportunities throughout the Project including flatwater boating access, whitewater boating access, angling access, camping areas, and hiking trails, and others, which will be discussed below. During the license amendment process, PPL Holtwood, LLC identified recreational facilities that would be impacted by the new development and has proposed mitigation for these items. As discussed in detail below, some of the major improvements PPL Holtwood, LLC is making to recreational access to the Project include: improved flatwater boating access at two boat launches on Lake Aldred the launch at Pequea will have a new ADA- accessible fishing pier, a new ADA-accessible fishing pier at the Project tailrace, a new water level gaging system on Lake Aldred that will provide real-time data to the public, and whitewater boating features downstream of the dam. All recreation is open to the public and free of charge, other than some fees associated with use of the campground facilities.

LAND-BASED RECREATION

Land-based recreation activities within the Project boundary include hunting, hiking, sightseeing and wildlife watching, camping, and picnicking, among others. Hunting for waterfowl, pheasant, rabbit, squirrel and deer is permitted on land surrounding the Project. Several long-distance hiking trails cut through the Project area, including the Conestoga Trail, the Mason-Dixon Trail and the Kelly's Run-Pinnacle Trail System. Sightseeing activities are enhanced by various scenic vistas throughout the Project area such as Urey, Pinnacle and Face Rock Overlooks. Birdwatchers congregate to see migrating warblers in early spring, nesting bald eagles and ospreys in late spring and herons on the river in August. The Shenk's Ferry Wildflower Preserve is a popular site for viewing the 73 species of wildflowers which bloom from mid-March through May. Educational exhibits, programming and public outreach are provided at the Environmental Center, Lock 12 Historic Site, and via the Lower Susquehanna River Hotline (1-800-692-6328). Camping is available at Otter Creek and Pequea campgrounds with a total of nearly 200 campsites; picnicking facilities are available at six locations with a total of three pavilions and more than 100 tables.

Most recreational use of the Project occurs at formal access sites. Shoreline anglers and whitewater boaters appear to be the two unique user groups that regularly access the Project using informal trails, generally in the area of the spillway on the western shore downstream of

the dam. People generally park on the side of the gravel-surfaced McCalls Ferry Road, north of Lock 12 Historic Site, and follow informal trails to the spillway. More details regarding whitewater boating use and access are provided below.

Sightseeing and hiking are the most popular recreational activities at the sites within the Preserve, followed by camping. Face Rock Overlook and Lock 12 Historic Area, sites that support sightseeing and hiking, receive the most recreational use. Otter Creek Campground is shown to be a consistently popular site with over 63,000 recreation days annually from 2001 to 2005.

LAKE ALDRED

The 2,400-acre Lake Aldred is popular for boating, angling and, to a lesser extent, water-skiing. Lake Aldred provides opportunities for walleye, bass, catfish, panfish and muskellunge angling. Formal public boat access to the lake is provided at York Furnace and Pequea Creek boat launches and shoreline access is available at these sites, as well as Otter Creek Recreation Area.

Prior to project redevelopment, public boat launches on the Lake were useable during normal Project operations during the recreation season. However, at low water levels that occur during the off season (El. 163.5), boat launches were for the most part unusable.

To enhance boating access to Lake Aldred year-round, PPL Holtwood, LLC is modifying the York Furnace and Pequea boat launches. At the York Furnace boat launch, PPL Holtwood, LLC is extending the existing ramp so that it will be useable at all normal water surface elevations. At Pequea, PPL Holtwood, LLC is installing a new 20 foot wide, 129 foot long boat ramp, and a 25 ft by 20 ft ADA accessible fishing platform and dock in and adjacent to the Susquehanna River. Adjacent to the new ramp, four 8 ft x 16 ft floats are being installed and supported by a concrete abutment on shore and a single 10" diameter pile on the downstream side of the third float section. In addition, within the adjacent Pequea Creek, an existing boat ramp will be extended by 52 ft with precast concrete planks and a new ramp measuring approximately 12 ft in width and 92 ft in length will be constructed upstream of the existing ramp. Two additional 8 ft x 16 ft floats will be installed next to each boat ramp (a total of four) and each set will be supported by a concrete abutment on shore.

Portage services are provided by PPL Holtwood, LLC for through-boaters at the Holtwood development. Licensee personnel transport boaters and their craft around Holtwood Dam to the Muddy Creek Boat Access, about one mile downstream from the dam on the York County side. Approximately a dozen portages are conducted each year; group sizes range from one or two canoes or kayaks to large groups such as the Susquehanna Sojourn where Holtwood has handled 50-75 canoes and water-craft. This service would continue throughout the life of the amended permit.

Islands within the Project boundary are maintained by PPL Holtwood, LLC for informal recreational use. Primarily for reasons of health and safety, swimming is not allowed at PPL Holtwood, LLC's recreation areas.

DOWNSTREAM RECREATION

Tailrace Fishing

The tailrace channel is located between the steep sided ledge of the Lancaster County shore and the eastern shore of Piney Island and remains fully wetted by backwater from Conowingo Pond, regardless of Project operations. Access to the Holtwood Tailrace Fishing Area is prohibited during construction of the new powerhouse; however, on a permanent basis, PPL Holtwood, LLC is improving and relocating the Holtwood Tailrace Fishing Area slightly further downstream of the existing site. The new fishing platform will be ADA-accessible and will be accessible from a new parking area.

Whitewater Boating

Whitewater boating occurs year-round below the Project when flows are available. Most of the whitewater features downstream of the dam are dependent upon spillage from the Project (*i.e.* flows in the spillway). Prior to redevelopment, whitewater features are generally available at total river flows of 50,000 cfs or greater.

Diversion of water to the new powerhouse and excavation of Piney Channel will alter the frequency of flow to the whitewater features in the channel and other areas of the spillway.

However, whitewater features would still be available under certain flow conditions. The effect on whitewater boating would be a reduction in the number of days with suitable flow available.

In 2009, PPL Holtwood, LLC proposed to address concerns raised by whitewater boaters by entering into an agreement (“Settlement Agreement”) with the American Whitewater Association to fund the design, construction and maintenance of alternative whitewater features in Piney Channel. This agreement would also address river access, Unit 1 flows in Piney Channel, and providing real-time flow information. The Settlement Agreement was incorporated into the Section 401 Certificate and thus made a part of the project license. The Settlement Agreement contemplates design and construction, at PPL Holtwood, LLC’s expense, of two new man-made whitewater features that would meet the wave and other characteristics specified in the agreement. These features were meant to compensate for the reduced frequency and quality of existing whitewater boating opportunities that would result from the expansion project. Since executing the Settlement Agreement, PPL Holtwood, LLC has been engaged with stakeholders and other area boaters in a process to finalize the design for and to install these contemplated whitewater features.

When PPL Holtwood, LLC evaluated the performance of the proposed whitewater feature in more detail using hydraulic modeling, modeling showed that the features could not simultaneously meet the whitewater boating criteria as well as the 401 Certificate’s fish passage criteria across all required flow ranges. In addition, the fishery resource agencies were concerned that the features would by their nature serve as an impediment to fish passage. This led to PPL Holtwood, LLC proposing new features in a filing with FERC on December 15, 2011 which, instead of using flows rerouted from the tailrace into Piney Channel, new features would be constructed on the west side of the river, downstream of the dam. PPL Holtwood, LLC would use spills from the dam to provide water for operating these features. FERC approved the plan, with modifications relating largely to reporting requirements, on July 10, 2012. PPL Holtwood, LLC began construction of these features in 2012 and is expected to complete, test, and allow public access to them in 2013. PPL Holtwood, LLC also is enhancing an existing, informal parking area near the proposed features to improve access.

In accordance with the Settlement Agreement, releases will be scheduled for 264 hours per year to activate the new features. Initially releases will not be scheduled during the spring during the American Shad migration period so that PPL Holtwood, LLC can assess whether the spill for whitewater features would provide an undesired fish attraction flow. Discussions with the U.S. Fish and Wildlife Service and Pennsylvania Fish and Boating Commission, and their concurrence with the proposed course of action, would precede any decision to schedule some of the releases during subsequent upstream migration periods of the American Shad. Flows also will not be scheduled when river flows are below 31,000 cfs between June and September for protection of endangered plant species pending further consultation with the PADCNR.

LAND TRANSFER AGREEMENT

As part of a separate non-capacity license amendment, PPL proposed to remove from the Project boundary approximately 1260 acres that are not necessary for Project purposes so that those areas may be transferred to Lancaster County Conservancy (LCC) for long-term preservation and public use. PPL would transfer these lands into public ownership and use the proceeds from that transfer to create a sustainable endowment fund for lands maintenance and for future recreational development to complement regional conservation and developmental initiatives. The lands to be removed from the Project boundary and transferred are outside a 200-ft shoreline buffer and are not otherwise needed for Project purposes.

The long-term vision of this initiative is to conserve and protect the greenway corridor of riverlands in Lancaster and York counties through a public/private partnership that maximizes public/nonprofit ownership, open space conservation, recreation use, and heritage development of PPL lands. As part of the donation, PPL Holtwood also expects to submit for Commission approval a separate request to grant to LCC, DCNR and YC specific conservation easements on certain lands within the Project boundary.

Investment in showcase heritage resources and facilities would be expected to increase use and enjoyment of the river by residents and visitors, help stimulate the local economy and enhance the quality of life. Funding will be used to preserve historic structures and sites, including the conservation of their historic, cultural, and natural contexts and development of new visitor education facilities. Funds would also be used to enhance heritage interpretation based upon the

goals and interpretive frameworks of Lancaster-York Heritage Region, the Susquehanna Greenway Partnership, and the Chesapeake Bay Gateways Network. The initial focus of this program is expected to be on building public awareness, focusing preservation efforts, and identifying priority interpretive opportunities along the river corridor, with an emphasis on unique and scenic locations. Interpretation is expected to include signage, exhibits, literature, guided activities and educational programs.

Table 3 provides a summary of the land to be removed from the Project boundary, including a description of any recreational facilities on the existing Exhibit R drawings filed with FERC that would no longer be within the Project boundary. More information regarding this proposal can be found in PPL Holtwood, LLC's application for amendment of license for change in project boundary, filed with FERC on March 19, 2012. FERC approved this application on December 21, 2012.

TABLE 3. AREAS TO BE REMOVED FROM THE HOLTWOOD HYDROELECTRIC PROJECT BOUNDARY

AREA	AREA TITLE	ACRES (+/-)	TOWNSHIP	COUNTY	TOWNSHIP COUNTY RECREATIONAL RESOURCES IDENTIFIED ON THE CURRENT LICENSE EXHIBIT R	KNOWN FEDERAL THREATENED OR ENDANGERED SPECIES	KNOWN BALD EAGLE NESTS	KNOWN SITES LISTED OR ELIGIBLE FOR LISTING ON THE NATIONAL REGISTER OF HISTORIC PLACES
3A	Pinnacle Overlook/ Kelly's Run	391	Martic	Lancaster	Pinnacle Overlook, Trails, Picnic Area, Playground, Ball Fields, Arboretum	None	None	None
3B	Conowingo Pond	22	Lower Chanceford	York	None	None	None	None
3C	York Shore South	92	Lower Chanceford	York	None	None	None	None
3D	Pequea South	167	Martic and Conestoga	York	None	None	None	None
3E	Otter Creek/York Furnace	294	Lower Chanceford and Chanceford	York	Trails	None	None	None
3F	Pequea North	54	Conestoga	Lancaster	None	None	None	None
3G	Shenk's Ferry	115	Conestoga	Lancaster	None	None	None	Shenk's Ferry Site (36La2)
3H	Pequea Creek	55	Conestoga and Martic	Lancaster	None	None	None	None
3I	York Shore North	49	Chanceford	York	None	None	None	None
3J	Conestoga Creek	16	Conestoga	Lancaster	None	None	None	None
3K	Safe Harbor	5	Conestoga	Lancaster	None	None	None	None

The following groups and agencies filed letters of support for the action: Department of the Interior (National Park Service and U.S. Fish and Wildlife Service), PA Department of Environmental Protection, PA Fish and Boat Commission, PA Department of Conservation and Natural Resources, Commonwealth of Pennsylvania Governor Tom Corbett, Susquehanna River Basin Commission, York County Planning Commission, Lancaster County Conservancy, York County Board of Commissioners, Chesapeake Bay Foundation, Farm and Natural Lands Trust of York County, Mason-Dixon Trail System, Inc., Keystone Trails Association, Pennsylvania Environmental Council, and the Conservation Fund.

H. FACILITIES RECOMMENDED FOR REMOVAL

There have been no Resource Agency recommendations for removal of the Holtwood Project.

ATTACHMENT 1

FERC ISSUED LICENSE AMENDMENT 10-30-09

129 FERC ¶ 62,092
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

PPL Holtwood, LLC

Project No. 1881-054

ORDER AMENDING LICENSE AND REVISING ANNUAL CHARGES

(Issued October 30, 2009)

1. On April 9, 2009, and supplemented on June 1 and August 27, 2009, PPL Holtwood, LLC (PPL), licensee for the Holtwood Hydroelectric Project No. 1881, filed an application to amend its license to redevelop the project to increase the installed capacity and to extend the current license term by a period of 16 years.¹ The Holtwood Project is located on the Susquehanna River in Lancaster and York Counties, Pennsylvania.² As discussed below, this order grants the amendment request.

Background

A. Project Area

2. The Holtwood Project is one of five hydroelectric projects located on the lower Susquehanna River. The most upstream of these projects is the 19.6-megawatt (MW) York Haven Hydroelectric Project No. 1888 at river mile (RM) 55. Proceeding downstream from the York Haven Project are the 417.5-MW Safe Harbor Hydroelectric Project No. 1025 (at RM 33), the 107.2-MW Holtwood Project (at RM 25), and the 512-MW Conowingo Hydroelectric Project No. 405 (at RM 10). The 880-MW Muddy Run Pump Storage Project No. 2355 is located between the Holtwood and Conowingo Projects and uses the Conowingo Pond as its lower reservoir.

¹ On December 20, 2007, and supplemented on January 4, February 20, June 19, July 7, August 27, and October 3, 2008, PPL filed an application to amend its license for the Holtwood Project (sub docket P-1881-050). By letter filed December 8, 2008, PPL withdrew its license amendment application. The withdrawal became effective 15 days later, on December 23, 2008. In its current application, PPL asks that the Commission incorporate by reference the record fully developed in the proceeding for the previously withdrawn license amendment application (sub docket P-1881-050).

² The current license was issued on August 14, 1980. 21 FERC ¶ 61,429 (1980).

B. Current Project Facilities

3. The existing facilities at the Holtwood Project include: a 2,392-foot-long by 55-foot-high concrete gravity dam across the Susquehanna River, with a crest elevation of 165 feet mean sea level (msl) and topped with flashboards that raise its effective height to 169.75 feet msl; an approximately 8-mile-long reservoir (Lake Aldred) with a surface area of 2,400 acres; a skimmer wall for the protection of the powerhouse forebay; a diversion wall between the tailrace and the river channel downstream of the dam; a fish lift, located along the diversion wall between the dam and powerhouse, for upstream fish passage; a powerhouse containing 10 vertical Francis turbine generating units with a total installed capacity of 107.2 MW; transmission facilities consisting of generator leads, three 13.2/66-kilovolt (kV) step-up transformers, and two approximately 3,000-foot-long, 66-kV transmission lines extending from the powerhouse to the Face Rock Substation;³ and appurtenant facilities.

C. Current Project Operation

4. The Holtwood Project operation is coordinated with the other lower Susquehanna River projects. Each project uses its storage capabilities to generate power on a daily and weekly basis, although due to the limited storage ability of Lake Aldred, the Holtwood Project generally operates in a run-of-river mode using flows from the upstream Safe Harbor Project and the approximately 680-square-mile drainage area between the Safe Harbor and Holtwood dams.

D. Fishery Resources

5. The project area currently supports a resident warmwater fishery. Primary warmwater game species in both Lake Aldred and the Susquehanna River downstream of the project include: smallmouth bass; walleye; channel catfish; redbreast sunfish; bluegill; black and white crappie; and pumpkinseed. Other common species that occur in Lake Aldred include gizzard shad, quillback, spotfin shiner, and common carp.

6. In addition, the Susquehanna River has historically supported large runs of anadromous American shad, river herring (blueback herring and alewife), hickory shad, and catadromous American eel. These populations declined in the late 1800s and early

³ Although the 1980 license states that the project works include two 66-kV transmission lines, PPL reports in its December 20, 2007 amendment application that the existing transmission lines are rated at 69 kV.

1900s because of the construction of canal feeder dams, overfishing, water pollution, and eventually the construction of the hydroelectric dams between 1904 and 1928.⁴

7. Since 1972, the effort to restore anadromous fish in the Susquehanna River has included fertilized shad egg stocking in the basin, the construction of a shad hatchery by the Pennsylvania Fish and Boat Commission (Pennsylvania FBC) in the mid-1970s, and the total closure of the shad fishery in the Susquehanna River and upper Chesapeake Bay by the state of Maryland in 1980. The number of returning shad increased through the years. By 1991 a new fish lift was constructed at the Conowingo Project, followed by new fish lifts at the Holtwood and Safe Harbor Projects in 1997. The current fish lift has not been effective in passing shad upstream. Passage success at Holtwood has been variable, ranging from a high of about 63 percent of the shad passed at the Conowingo Project to a low of about 3 percent of the shad passed at the Conowingo Project. While in 1997 and 2001 the Conowingo Project passed about 243,000 and 292,000 herring, Holtwood passed only about 1,000 herring each year.⁵

Proposed Amendment

8. PPL's proposal to redevelop the Holtwood Project includes the modifications to the project as discussed below.

A. Facility Modifications

9. PPL proposes to construct, adjacent to the existing powerhouse, a new powerhouse containing two 40.3-MW vertical Kaplan turbine generating units.⁶ At the existing powerhouse, PPL proposes to remove two retired plant exciter units and to install two 1.18-MW vertical Francis turbine generating units (Units 11 and 13). PPL also proposes to replace the runners and shafts on four of the 10 turbine generating units at the existing powerhouse (Units 1, 2, 4, and 7).⁷ With all of the changes in generating

⁴ When the 55-foot-high Holtwood dam was constructed in 1910, a rock ramp type fishway and a pool-and-weir type fishway were constructed at the project. Neither fishway reportedly ever passed shad successfully, but the rock ramp fishway did pass some American eel. Both of these fishways are currently abandoned.

⁵ Final Environmental Impact Statement at 46-49, issued November 14, 2008, for the Holtwood Project.

⁶ In its December 20, 2007 application for license amendment and supplemental filings, PPL refers to two turbine generating units in the proposed powerhouse as Units 18 and 19.

⁷ PPL is also seeking to amend the license to reflect prior upgrades to Units 3, 5, 6, (continued)

capacity, the total installed capacity of the project would increase from the originally authorized 107.2 MW to 195.5 MW.

10. PPL proposes to replace the existing skimmer wall and to expand the forebay area to ensure that the forebay and pier openings of the existing skimmer wall are adequately sized for the proposed increase in generating capacity. The new skimmer wall would be constructed at the same site as the current wall and would include a roadway deck for improved access to the upper end of the fish passage facilities.

11. PPL proposes to reconfigure the existing fish lift, reroute the discharge of Unit 1 in the existing powerhouse, and excavate a portion of the project tailrace and Piney Channel to improve migratory fish passage.

B. Project Operation and Environmental Measures

12. PPL proposes to continue to operate the Holtwood Project in coordination with the other lower Susquehanna River projects. The generation schedule would continue to be developed on a day-ahead basis. Expecting the new turbine generating units to have higher efficiencies than the existing units, PPL anticipates that the new units will be dispatched first during periods of low flow consistent with the required environmental measures such as the minimum flow and fish passage requirements discussed below.

13. In addition to the proposed facility modifications to enhance fishery resources as discussed above, PPL proposes to provide minimum flows. PPL also proposes to conduct studies of the effectiveness of the modified fish passage facilities and flow releases.

14. PPL proposes to improve existing recreation sites and to enhance recreation by providing, in coordination with the development of land and shoreline management policies and terrestrial management measures, more fishing and boating access points, additional parking, and longer boat launches. Terrestrial management measures proposed by PPL include protecting wetlands and special-status plant and wildlife species. PPL would also finalize a cultural resources management plan to protect archeological sites.

C. Extension of License Term

15. Because of the substantial costs associated with the proposed project modifications, PPL also requests in its license amendment application a 16-year extension of the current license term.

8, 9, and 10 as discussed later in this order.

Procedural Items

16. On February 21, 2008, the Commission issued a public notice noting that the amendment application was accepted for filing, stating that the proposal was ready for environmental analysis, and soliciting comments, motions to intervene, recommendations, terms and conditions, and prescriptions. In response, timely motions to intervene were filed by the U.S. Department of the Interior (Interior), Pennsylvania FBC, Pennsylvania Department of Environmental Protection (Pennsylvania DEP), Pennsylvania Department of Conservation and Natural Resources (Pennsylvania DCNR), Maryland Department of Natural Resources (Maryland DNR), New York State Department of Environmental Conservation (New York DEC), Susquehanna River Basin Commission (SRBC),⁸ Exelon Corporation (Exelon), York Haven Power Company LLC, American Whitewater, Susquehanna Surf Society, Starrk Moon/SWW Park Alliance, Topher Smith, Conewago Canoe Club, The Nature Conservancy, Greater Baltimore Canoe Club, Stewards of the Lower Susquehanna, Inc., and American Rivers. Timely comments were filed by Maryland DNR and Elisabeth L. Lynch. Comments, recommendations, and prescriptions were filed by Interior, U.S. Fish and Wildlife Service (FWS) and Pennsylvania FBC. PPL filed reply comments.

17. On July 18, 2008, Commission staff issued a draft environmental impact statement (EIS) for the project and solicited comments on the draft EIS. Comments were filed by Interior, National Marine Fisheries Service (NMFS), U.S. Army Corps of Engineers (Corps), U.S. Environmental Protection Agency (EPA), New York DEC, Maryland DNR, American Whitewater, Pennsylvania FBC, Exelon, and PPL. Staff considered these comments in preparing the final EIS, which was issued on November 14, 2008.

18. Comments on the draft EIS filed by the EPA on September 8, 2008, were inadvertently excluded from consideration in preparation of the final EIS. The EPA re-filed its comments on January 5, 2009, noting that some of its comments had been addressed through the comments filed by other entities on the draft EIS. The EPA also restated in its January 5, 2009 letter its request for plans regarding sediment and bedrock excavation. As discussed in this order, submission and approval of excavation and erosion and sediment control plans will be required as conditions of the amended license.

19. On May 1, 2009, the Commission issued a public notice that the renewed amendment application was accepted for filing and soliciting comments and motions to

⁸ The Susquehanna River Basin Commission was established by the Susquehanna River Basin Compact (Compact), Pub. L. No. 91-575, 84 Stat. 1509 (1970), with duties and responsibilities for comprehensive planning, programming, and management of the water and related resources of the Susquehanna River Basin.

intervene.⁹ Interior, Pennsylvania DEP, SRBC, Exelon, American Whitewater, Topher Smith, Conewago Canoe Club, Susquehanna Surf Society, Starrk Moon/SWW Park Alliance, and American Rivers filed timely motions to intervene, restating their interests in the proceeding. Comments were filed by Interior and Exelon.

20. The motions to intervene, comments, and recommendations have been fully considered in determining whether, and under what conditions, to issue this amendment of license.

Settlement Agreements

21. On August 3, 2009, PPL filed two settlement agreements relating to the proposed redevelopment of the Holtwood Project: (1) a settlement agreement between Exelon and PPL;¹⁰ and (2) a settlement agreement between recreational stakeholders and PPL.¹¹

22. PPL states that the settlement agreement between Exelon and PPL resolves issues between the two entities associated with the proposed redevelopment of the Holtwood Project. PPL requests that the Commission approve and incorporate into the terms of the amended license the agreement to the extent that it falls within the Commission's jurisdiction regarding the provisions for minimum flows. A discussion of minimum flows is below.

23. The settlement agreement between recreational stakeholders and PPL addresses whitewater boating at the project. PPL states that the agreement is filed with the Commission for informational purposes only because it does not contain any provisions that trigger the Commission's jurisdiction. However, as noted below, certain measures proposed in the agreement include placing features in the downstream reaches of the

⁹ The public notice specified that any entity who intervened in the prior license amendment proceeding (sub docket P-1881-050) did not need to intervene again. Additionally, because the environmental record was considered complete with the recent issuance of the final EIS for the project, the public notice did not seek new recommendations, terms and conditions, or fishway prescriptions for the renewed license amendment application.

¹⁰ Exelon is the licensee for the downstream Conowingo and Muddy Run Projects Nos. 405 and 2355.

¹¹ Recreational stakeholders include the Greater Baltimore Canoe Club, Starrk Moon, SWW Park Alliance, Conewago Canoe Club, Susquehanna Surf Society, Topher Smith, Chris Iverson, and American Whitewater.

project, improving public access, and providing whitewater releases. These measures are related to project operation and recreation and are thus subject to Commission regulation.

Water Quality Certification

24. Under section 401(a)(1) of the Clean Water Act (CWA),¹² the Commission may not authorize construction or operation of a hydroelectric project unless the state water quality certifying agency either has issued water quality certification for the project or has waived certification by failing to act on a request for certification within a reasonable period of time, not to exceed one year. Section 401(d) of the CWA provides that the certification shall become a condition of any federal license that authorizes construction or operation of the project.¹³

25. On April 8, 2009, PPL applied to the Pennsylvania DEP for water quality certification for the Holtwood Project.¹⁴ On June 15, 2009, Pennsylvania DEP issued certification for the proposed redevelopment of the Holtwood Project, as described in PPL's license amendment application. The certification is included as Appendix A of this order, and is made part of the license for the project by ordering paragraph (D).

26. The certification requires the licensee to develop and implement various plans and reports regarding fishway operating procedures, monitoring upstream and downstream American shad passage, construction and monitoring of American eel passage facilities, and minimum flows. These plans and reports should also be filed with the Commission for approval. Article 47 requires the licensee to file the plans and reports required by the certification conditions, for Commission approval.

27. The certification requires the licensee to operate the project in such a manner that it does not cause a violation of the dissolved oxygen criteria under the Pennsylvania DEP water quality standards. The current water quality standards are a minimum daily average dissolved oxygen concentration of 5 milligrams per liter (mg/L), and a minimum of 4 mg/L. The certification also requires the licensee to develop a dissolved oxygen monitoring plan for the forebay, tailrace and Piney Channel during the months of April through September for a five year period. If the monitoring conducted identifies violations of the dissolved oxygen standard resulting from operation of the project, the

¹² 33 U.S.C. § 1341(a)(1) (2006).

¹³ 33 U.S.C. § 1341(d) (2006).

¹⁴ PPL originally applied to the Pennsylvania DEP for water quality certification on January 31, 2008. However, when PPL withdrew its license amendment application in December 2008, it also withdrew its request for water quality certification.

licensee is required to consult with the Pennsylvania DEP to resolve any dissolved oxygen violations. This plan has also been made part of the license under Article 47.

Coastal Zone Management Act

28. Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA),¹⁵ the Commission may not issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification that the project is consistent with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of receipt of the applicant's certification.

29. Pennsylvania DEP manages the approved Coastal Zone Management Program for the state of Pennsylvania. On May 2, 2008, Pennsylvania DEP filed a letter stating that it had reviewed PPL's license amendment proposal for consistency with the CZMA. Pennsylvania DEP determined that the proposed action is located outside Pennsylvania's Coastal Zones, and that it would not cause an impact on the zones.

Threatened and Endangered Species

30. Section 7(a)(2) of the Endangered Species Act of 1973 (ESA)¹⁶ requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat.

31. No federally listed threatened or endangered aquatic, plant, or wildlife species or critical habitat for listed species has been identified in the project area.

National Historic Preservation Act

32. Under section 106 of the National Historic Preservation Act (NHPA),¹⁷ and its implementing regulations,¹⁸ federal agencies must take into account the effect of any proposed undertaking on properties listed or eligible for listing in the National Register of Historic Places (defined as historic properties), and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on any undertaking. This

¹⁵ 16 U.S.C. § 1456(c)(3)(A) (2006).

¹⁶ 16 U.S.C. § 1536(a) (2006).

¹⁷ 16 U.S.C. § 470 (2006) *et seq.*

¹⁸ 36 C.F.R. Part 800 (2009).

generally requires the Commission to consult with the State Historic Preservation Officer (SHPO) to determine whether and how a proposed action may affect historic properties, and to seek ways to avoid or minimize any adverse effects.

33. To satisfy these responsibilities, the Commission executed a Programmatic Agreement (PA) on October 7, 2009, with PPL and the Pennsylvania SHPO. The PA requires PPL to file for Commission approval a final Historic Properties Management Plan (HPMP) prior to starting construction. Execution and implementation of the PA demonstrates the Commission's compliance with section 106 of the NHPA. Article 61 requires PPL to implement the PA, and to file an HPMP with the Commission prior to starting construction on the redevelopment of the project.

Section 18 Fishway Prescriptions

34. Section 18 of the Federal Power Act (FPA)¹⁹ provides that the Commission shall require the construction, maintenance, and operation by a licensee of such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce, as appropriate.

35. On April 16, 2008, Interior filed a preliminary fishway prescription for American shad, alewife, blueback herring, American eel, and other designated resident riverine fish species. On September 3, 2009, Interior filed a modified fishway prescription for these same species. Interior's prescription is set forth in Appendix B of this order and incorporated into the license by ordering paragraph (E).

36. The fishway prescription requires the licensee to operate the upstream anadromous fishway during the designated migration period at river flows up to 100,000 cfs, as measured at the U. S. Geological Survey Gage No. 01576000 (Susquehanna River at Marietta). The prescription requires PPL to operate the downstream fishway during the designated migration period whenever units are operated at the Holtwood Project. The fishway prescription details the upstream and downstream migration periods for American shad, alewife and blueback herring and American eel.

37. Interior's fishway prescription also requires the licensee to develop and implement various plans and reports regarding fishway operating procedures, monitoring of upstream and downstream American shad passage, and construction and monitoring of American eel passage facilities, which are virtually identical to the requirements under the water quality certification.

Recommendations Pursuant to Section 10(j) of the FPA

¹⁹ 16 U.S.C. § 811 (2006).

38. Section 10(j) of the FPA²⁰ requires the Commission to include license conditions based on recommendations by federal and state fish and wildlife agencies submitted pursuant to the Fish and Wildlife Coordination Act,²¹ to "adequately and equitably protect, mitigate damages to, and enhance, fish and wildlife (including related spawning grounds and habitat)" affected by the project.

39. In response to the February 21, 2008 public notice, FWS filed seven recommendations under section 10(j) of the FPA, and Pennsylvania FBC filed three recommendations.²² Two of FWS' recommendations require the licensee to develop and implement an Eagle Management and Monitoring Plan and a Shoreline Management Plan. These recommendations are made part of the license under Articles 59 and 63, respectively. One recommendation was determined to be outside the scope of section 10(j) and is discussed in the next section.

40. The other four recommendations filed by FWS refer to the development of a plan to minimize unavoidable impacts to the river and wetlands from project construction and operation, and a compensatory mitigation plan to offset any unavoidable impacts on fish and wildlife habitat due to project construction and operation. Commission staff believes these plans to be duplicative of other plans recommended for construction and operation of the amended project. As a result of consultation with FWS during the section 10(j) process, FWS clarified that these recommendations were related primarily to assuring that the upstream passage of American shad during the construction of the project expansion would be no less significant than during the previous 11 years of operation of the Holtwood fish lift. Commission staff agreed and subsequently recommended that the licensee prepare a plan to mitigate for any adverse construction effects that would reduce the efficiency of the Holtwood fish lift during the 3-year construction period. This recommendation has been made part of the license under Article 50.

41. The first of Pennsylvania FBC's section 10(j) recommendations requires the licensee to provide for resident fish passage. For a period of five years beginning when the new units become operational, the licensee is to operate the fish passage system from April 1 through June 30 and from September 1 to October 15. This recommendation is made part of the license under Article 48.

²⁰ 16 U.S.C. § 803(j)(1) (2006).

²¹ 16 U.S.C. §§ 661 (2006) *et seq.*

²² FWS filed its recommendations on April 16, 2008, and Pennsylvania FBC filed its recommendations on May 2, 2008.

42. The Pennsylvania FBC's second and third recommendations were found not to be in the scope of section 10(j) and are discussed in the next section.

Recommendations Pursuant to Section 10(a)(1) of the FPA

43. Section 10(a)(1) of the FPA²³ requires that any project for which the Commission issues a license shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce; for the improvement and utilization of waterpower development; for the adequate protection, mitigation, and enhancement of fish and wildlife; and for other beneficial public uses, including irrigation, flood control, water supply, recreation, and other purposes.

A. Agency Recommendations Not Considered Under Section 10(j) of the FPA

44. The FWS recommends that the licensee continue its participation in the Holtwood Fish Passage Technical Advisory Committee, including participation in the drafting of a fish passage report. This recommendation, considered under section 10(a), has been made part of the license under Article 55.

45. The Pennsylvania FBC recommends that the licensee count and identify resident fish and provide a daily monitoring report and an annual monitoring report to the resource agencies during the five year period the fish passage system is operated for resident fish, as discussed in the preceding section. At the end of the five year period, the licensee and the resource agencies would discuss whether modifications to the fish passage system operation are necessary. Absent modification, the licensee is to continue to operate the fish passage system as it was operated during the initial five year period. This recommendation has been incorporated into the project license under Article 48.

Other Issues

A. Minimum Flows

46. The licensee proposes to release during operation of the proposed project a minimum stream flow (including leakage) equal to, on a daily volumetric basis, 98.7 percent of the minimum flow required by the Commission to be released at the downstream Conowingo Project, with a minimum continuous flow of 800 cfs from the project. If inflow to Lake Aldred is less than the required minimum streamflow, the licensee proposes to release a minimum flow equal to the inflow.

²³ 16 U.S.C. § 803(a)(1) (2006).

47. On August 4, 2009, the licensee and Exelon filed a proposed license article reflecting the minimum flow provisions of both the water quality certification issued by Pennsylvania DEP and Section VI of the settlement agreement between PPL and Exelon. The proposed minimum flow license article represents a compromise between operational need and environmental requirements, including fish passage. In order to better clarify the required minimum flows under the water quality certification, the licensee's proposed minimum flow article is incorporated into the project license by Article 51.

B. Maintenance of Continuous Flows in Bypassed Reach

48. As part of its proposed operational modifications, the licensee would continue to use the existing configuration of flashboards to pass water through the existing 10-inch-diameter pipe on the dam to maintain the current rate of flow into the bypassed reach. This should be made part of the license for the project. Article 52 requires the licensee to maintain this minimum flow.

C. Tailrace Dissolved Oxygen Monitoring Plan

49. Redevelopment of the project as proposed would result in a major re-distribution of flows from the bypassed reach into the tailrace. The licensee provided data showing that the existing turbine generating units provide some aeration during water passage ranging from 0.2 to 0.8 mg/L. The new units, which would be a modern, more efficient design, would not likely provide any aeration through the units. Assuming these units would be preferentially operated during the low-flow summer months, their operation could result in reduced dissolved oxygen levels in the tailrace compared to existing conditions. Current dissolved oxygen levels in the tailrace generally meet state standards; however, in response to Pennsylvania DEP concerns about potential dissolved oxygen reductions when the new units become operational, the licensee proposes to conduct water quality monitoring in the tailrace. To ensure that dissolved oxygen levels continue to meet state standards, a dissolved oxygen monitoring program should be conducted in the tailrace once the proposed project begins operation. If state standards are not maintained, the licensee shall be required to implement measures to improve dissolved oxygen in the project tailrace releases. Article 53 requires the licensee to file a tailrace dissolved oxygen monitoring plan.

D. Final Excavation and Blasting Plans and Schedule

50. Although PPL filed plans for excavation in the Susquehanna River in the vicinity of the Holtwood Project as part of the information provided to Pennsylvania DEP on June 13, 2008, in support of the water quality certification application process, specific plans for in-water or in-the-dry excavation and blasting must be submitted for Commission approval prior to the initiation of construction activities that involve blasting so that staff has the opportunity to make adjustments to this planned excavation, if required, in order to protect water quality and aquatic habitat. The plan should be prepared in consultation

with Pennsylvania DEP, Pennsylvania FBC, and FWS. Article 54 requires the licensee to file an excavation and blasting plan.

E. Final Fishway Design Drawings

51. The section 18 fishway prescription filed by FWS and the water quality certification issued by Pennsylvania DEP require improvements to the upstream fish passage facilities. The licensee proposes to file final design drawings for any structural improvements to the project fish passage facilities at the Holtwood Project. Article 49 requires the licensee to file final design plans, study plans for evaluation studies, and plans for any future modifications to project fish passage facilities and associated monitoring studies.

F. Protection of Special-status Plants

52. Construction of the new facilities may affect American holly, white doll's daisy and sticky golden rod special-status plants. Pennsylvania DCNR requested and PPL has agreed to provide irrigation flows of approximately 1,000 cfs in the bypassed reach for one hour on days when river flows are between 31,000 and 61,500 cfs. PPL proposes and Pennsylvania DNR recommends a long-term monitoring program of wetlands and state threatened and endangered plants in the river bed downstream of the dam to examine the effects of reductions in spill frequency on in-river resources and determine if any adjustments to planned flow release rates are warranted to ensure the continued protection of the river area and special-status plants. Pursuant to Article 56, PPL must file the final monitoring plan with the Commission for approval.

G. Wetlands Mitigation Plan

53. Construction of the proposed project would permanently eliminate 1.24 acres (54,000 square feet) of wetlands. PPL proposes to replace the lost wetlands at a suitable location to be determined in consultation with the Corps and Pennsylvania DEP. PPL indicated that it has agreed to construct a wetland mitigation project along Landis Run in Manheim Township and that details would be provided to the Commission after they are finalized in consultation with Pennsylvania DEP. Article 57 requires PPL to file a wetlands mitigation plan.

H. Bald Eagle Plan

54. A pair of bald eagles currently nests on Piney Island, which is located just below the Holtwood dam, and will be subjected to construction noise such as blasting and trucks hauling bedrock. While it is not known how susceptible this nesting pair is to noise and other human disturbance, in order to minimize potential effects on bald eagles, PPL proposes and the FWS recommends implementation of a bald eagle protection plan, to include seasonal restrictions on activities, nest buffers, noise reduction measures,

monitoring of eagle behavior, and streambank stabilization measures to protect nest trees. Article 58 requires PPL to file a bald eagle protection plan prior to starting construction, in consultation with the Pennsylvania DEP and FWS.

I. Recreational Use Monitoring

55. The proposed amendment would result in restricted access to certain recreational facilities during the construction period, and could reduce boating access to Lake Aldred when the reservoir level drops during drought operations. In addition, under the proposed action, PPL is proposing modifications to existing recreational facilities as well as new facilities that could alter current recreational usage. In order to monitor the effects of the proposed action on recreational use and access at the project, Article 59 requires PPL to file a recreational use monitoring plan, in consultation with the agencies.

J. Whitewater Boating

56. In the final EIS, Commission staff found that whitewater boating experiences are valuable to the local boating organizations, and that these opportunities would decrease as a result of the proposed action. Commission staff concluded that continuing to provide comparable whitewater experiences is warranted. As discussed above, the measures proposed in the whitewater boating agreement include placing features in the downstream reaches of the project, improving public access, and providing whitewater releases. Since these pertain to project operation and recreation and are inside the project boundary, these measures will require Commission approval. Therefore, Article 60 requires PPL to prepare and file, for Commission approval, a whitewater boating plan that should include, but may not necessarily be limited to, the provisions in the whitewater boating agreement filed on August 3, 2009. Implementation of the measures proposed by PPL in the agreement would mitigate for the reduction in existing boating opportunities by providing additional physical features and whitewater flow releases from Unit 1, and provide enhanced public access downstream of the project. Provided that the provisions in the boating plan are consistent with the settlement agreement, PPL may submit the agreement as evidence of consultation on whitewater boating at the project. If the plan differs from the settlement agreement, PPL should consult with the recreational stakeholders and the Pennsylvania DEP prior to filing the plan with the Commission.

K. Land and Shoreline Management

57. PPL's proposed construction activities and other project changes would result in both short- and long-term effects on land resources within the project boundary. Short-term effects include construction on temporary access roads, closure of certain recreational access points, and physical changes to the tailrace channel. Long-term effects would result from the construction of the new powerhouse, new tailrace area, and the proposed new and modified recreational facilities at the project. A land and shoreline management plan would provide a means to ensure that project lands are managed for the

protection of project resources and purposes. The plan should be developed in consultation with the FWS, Pennsylvania FBC, Pennsylvania Game Commission, Pennsylvania DEP, and Pennsylvania DCNR. Article 62 requires PPL to file a land and shoreline management plan to assess and protect project land resources.

L. Installed Capacity

58. Over time, PPL replaced the runners and shafts on six of the 10 existing turbine generating units (Units 3, 5, 6, 8, 9, and 10) and rewound the generators on Units 3, 8, and 9. The project capacity is modified by this order to properly reflect these upgrades. The completed upgrades, along with PPL's proposed modifications in generating capacity, would increase the total installed capacity of the project from 107.2 MW to 195.5 MW. The following table shows the proposed installed capacities as compared to the capacities authorized in the license issued in 1980.

Unit No.	Authorized Capacity before Upgrade (kW)	Refurbished Turbine Capacity (kW)	Refurbished Generator Capacity (kW)	Authorized Capacity after Upgrade (kW) ^a	Date of Start of Construction of Revised Capacity
Unit 1	10,400	11,510	10,400	10,400	Future
Unit 2	10,400	12,140	10,400	10,400	Future
Unit 3	10,400	13,700	13,500	13,500	June 25, 1990
Unit 4	10,400	12,140	10,400	10,400	Future
Unit 5	10,400	12,225	10,400	10,400	July 9, 2001
Unit 6	10,400	13,700	10,400	10,400	July 6, 1992
Unit 7	10,400	10,580	10,400	10,400	Future
Unit 8	10,400	12,200	11,440	11,440	August 31, 1987
Unit 9	12,000	14,800	13,200	13,200	July 7, 1986
Unit 10	12,000	14,250	12,000	12,000	July 10, 2006
Unit 11	N/A	1,180	1,250	1,180	Future
Unit 13	N/A	1,180	1,250	1,180	Future
Unit 18	N/A	40,300	57,950	40,300	Future
Unit 19	N/A	40,300	57,950	40,300	Future
Total	107,200			195,500	

^a Section 11.1(i) of the Commission's regulations states that the authorized installed capacity means the lesser of the ratings of the generator or turbine units.

Comprehensive Plans

59. Section 10(a)(2)(A) of the FPA²⁴ requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project.²⁵ Under

²⁴ 16 U.S.C. § 803(a)(2)(A) (2006).

²⁵ Comprehensive plans for this purpose are defined at 18 C.F.R. §2.19 (2009).

section 10(a)(2)(A), federal and state agencies filed 24 comprehensive plans that address various resources in Pennsylvania. For this proceeding, the staff identified and reviewed 13 of these comprehensive plans that are relevant to the Holtwood Project.²⁶ No conflicts were found.

Susquehanna River Basin Commission

60. Under the November 5, 1975 memorandum of understanding between the Commission and the SRBC, the Commission committed to give due regard to any recommendations made by the SRBC. On June 18, 2009, the SRBC issued an order approving PPL's redevelopment proposal subject to the Commission's approval of the license amendment. Commission staff finds that this amendment order is not inconsistent with the recommendations contained in the SRBC's June 18 order.

Applicant's Plans and Capabilities

A. Conservation Efforts

61. Section 10(a)(2)(C) of the FPA requires the Commission to consider the electricity consumption improvement program of the applicant, including its plans, performance, and capabilities for encouraging or assisting its customers to conserve electricity cost-effectively, taking into account the published policies, restrictions, and requirements of state regulatory authorities.

62. PPL sells the power generated by the project on a wholesale basis to utilities within the PJM Interconnection system, and does not serve any retail customers. Commission staff concludes that, given the limits of its ability to influence users of the electricity generated by the project, PPL complies with Section 10(a)(2)(C) of the FPA.

B. Safe Management, Operation, and Maintenance of the Project

63. Commission staff has reviewed PPL's operation, maintenance, and management of the Holtwood Project pursuant to the requirements of 18 C.F.R. Part 12 of the Commission's regulations and the Commission's Engineering Guidelines. The Holtwood Project dam has a low hazard potential classification. By letter dated May 15, 1996, the Director of the Division of Dam Safety and Inspections granted PPL's request for an exemption from the requirements of Part 12, Subparts C and D of the Commission's regulations. Staff concludes that the dam and other project works are safe, and that there is no reason to believe that PPL cannot continue to safely manage, operate, and maintain these facilities under an amended license.

²⁶ The list of applicable plans can be found in section 5.3 of the final EIS.

Comprehensive Development

64. Sections 4(e) and 10(a)(1) of the FPA²⁷ require the Commission to give equal consideration to power development purposes and to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of fish and wildlife, the protection of recreational opportunities, and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. The decision to issue this license amendment, and the terms and conditions included herein, reflect such consideration.

65. The final EIS for the licensee's proposal contains background information, analysis of impacts, and support for related license articles. The project will be safe if operated and maintained in accordance with the requirements of this license.

66. Based on staff's independent review and evaluation of the project, recommendations from the resource agencies and other stakeholders, and the no-action alternative, as documented in the final EIS, staff has determined the licensee's proposal, with the staff-recommended measures along with mandatory conditions, is best adapted to a comprehensive plan for improving or developing the Susquehanna River.

67. This alternative is selected because: (1) issuance of the amendment will serve to maintain a beneficial, dependable, and inexpensive source of electric energy; (2) the required environmental measures will protect fish and wildlife resources, water quality, recreational resources, and historic properties; and (3) the 195.5 MW of electric energy generated from this renewable resource may offset the use of fossil-fueled generating plants, thereby conserving nonrenewable resources and reducing atmospheric pollution.

License Term

68. The current license expires on September 1, 2014. As part of its application, PPL requests that the current license term be extended by a period of 16 years. The Commission's general policy is to establish 30-year terms for projects with little or no redevelopment, new construction, new capacity, or environmental mitigation and enhancement measures; 40-year terms for projects with a moderate amount of such activities; and 50-year terms for projects with extensive measures.²⁸

69. This order requires an extensive amount of redevelopment, new capacity, and mitigation and enhancement measures including: construction of a new powerhouse

²⁷ 16 U.S.C. §§ 797(e) and 803(a)(1) (2006).

²⁸ See *Consumers Power Company*, 68 FERC ¶ 61,077 at 61,383-84 (1994).

containing two turbine generating units that would add 80.6 MW of capacity; installation of two turbine generating units at the existing powerhouse that would add 2.36 MW of capacity; implementation of fishway operating procedures, implementation of a plan to monitor upstream and downstream American shad passage; construction and monitoring of American eel passage facilities; implementation and monitoring of minimum stream flow requirements; implementation of a dissolved oxygen monitoring plan; implementation of an excavation and blasting plan; and implementation of various plans to protect and enhance wildlife and associated habitat, enhance recreation opportunities, and protect historic resources.

70. It is also the Commission's policy to coordinate to the maximum extent possible the license expiration dates of projects in a river basin, in order that subsequent relicensing proceedings can also be coordinated.²⁹ As noted above, there are four nearby licensed projects in the lower Susquehanna River Basin: York Haven Project No. 1888; Safe Harbor Project No. 1025; Muddy Run Project No. 2355; and Conowingo Project No. 405.

71. The license for the Holtwood Project is currently set to expire concurrently with three of the licensed projects in the lower river basin: York Haven Project, Muddy Run Project, and Conowingo Project.³⁰ The 16-year extension of license term would result in the Holtwood Project license expiring concurrently with the Safe Harbor Project No. 1025, the project located on the Susquehanna River immediately upstream of the Holtwood Project.

72. In consideration of the amount of redevelopment, new capacity, and environmental measures authorized by this order, and to ensure continued coordination with other projects in the basin to the extent possible, this order grants a 16-year extension of the license term to August 31, 2030.

Administrative Conditions

A. Annual Charges

²⁹ See 18 C.F.R. § 2.23 (2009) ("In issuing both new and original licenses, the Commission will coordinate the expiration dates of the licenses to the maximum extent possible, to maximize future consideration of cumulative impacts at the same time in contemporaneous proceedings at relicensing.")

³⁰ The licensees for the York Haven, Muddy Run, and Conowingo Projects are in the process of preparing their relicensing applications, which are due to be filed by August 2012.

73. PPL's proposed redevelopment of the Holtwood Project would result in an increase in the project's installed capacity. The total installed capacity of the project would increase from 107.2 MW to 195.5 MW.

74. The Commission collects annual charges from licensees for administration of the FPA. Article 31 of the license provides for the collection of funds for administration of the FPA. Ordering paragraph (I) of this order revises the annual charges under Article 31 of the license to reflect the change in generating capacity due to the previous rehabilitation work of the turbine generating units at the existing powerhouse (Units 3, 5, 6, 8, 9, and 10), as shown in the following table. In accordance with the Commission's rules and regulations, the effective date of the revised annual charges will be the date of the start of construction of the new capacity.³¹

Unit No.	Authorized Capacity before Upgrade (kW)	Refurbished Turbine Capacity (kW)	Refurbished Generator Capacity (kW)	Authorized Capacity after Upgrade (kW) ^a	Date of Start of Construction of Revised Capacity	Authorized Capacity for Annual Charges (Based on 107,200 kW + incremental increase of each upgraded unit)
Unit 9	12,000	14,800	13,200	13,200	July 7, 1986	108,400
Unit 8	10,400	12,200	11,440	11,440	August 31, 1987	109,440
Unit 3	10,400	13,700	13,500	13,500	June 25, 1990	112,540
Unit 6	10,400	13,700	10,400	10,400	July 6, 1992	112,540
Unit 5	10,400	12,225	10,400	10,400	July 9, 2001	112,540
Unit 10	12,000	14,250	12,000	12,000	July 10, 2006	112,540

^a Section 11.1(i) of the Commission's regulations states that the authorized installed capacity means the lesser of the ratings of the generator or turbine units.

75. In addition, Article 42 requires the licensee to file with the Commission the construction start date for the new capacity authorized by this order, which will be used to revise the annual charges under Article 31 of the license.

B. Exhibit Drawings

76. Included in the December 20, 2007 filing of the amendment application is a set of 15 design drawings, five showing the existing site and 10 showing the site with the proposed redevelopment.³² Because drawings that reflect the existing project conditions

³¹ Section 11.1(c)(5) of the Commission's regulations states that the assessments for new authorized capacity start on the date of commencement of construction of such new capacity.

³² PPL refers to the filed design drawings as Exhibit F drawings. However, because the current design drawings approved by the August 14, 1980 license are Exhibit (continued)

are already approved for the Holtwood Project (Exhibits L-1 through L-10), there is no need to approve the filed existing conditions drawings. The Exhibit L drawings that reflect the proposed redevelopment, however, are approved in ordering paragraph (F). Ordering paragraph (G) requires the licensee to file the approved drawings in aperture card and electronic file formats.

77. PPL also submitted with its amendment application two updated exhibit drawings depicting the entire project including the boundary.³³ However, the two updated drawings do not match the boundary shown on the 19 Exhibit K drawings under the license. Therefore, the two filed Exhibit K drawings are not approved by this order. Rather, PPL is directed to update its existing Exhibit K drawings to show the additional project features approved by this amendment. For example, the Exhibit K-4 drawing should be revised to include the new powerhouse. The drawings should also be revised to include the locations of all recreation facilities approved by the Commission. The licensee should review all of the 19 existing Exhibit K drawings to make sure they meet the Commission's current standards for maps and drawings.

78. The settlement agreement between PPL and Exelon, filed August 3, 2009, references under section 3.1, project boundary changes to eliminate the existing overlap in project boundaries associated with the Holtwood and Conowingo Projects. Section 3.1 states the parties will file at a later time applications to amend the existing project boundaries of both projects to resolve the subject overlap. Such an application for the Holtwood Project was filed on October 28, 2009, and is under review in a separate proceeding.

79. Ordering paragraph (H) requires PPL to file updated Exhibit K drawings to show: the new powerhouse and additional project features approved by this amendment; and all recreation facilities for the project that have been approved by the Commission.

C. Construction-Related Articles

80. Article 44 requires the licensee to provide the Commission's Division of Dam Safety and Inspection New York Regional Office (D2SI-NYRO) with final contract drawings and specifications - together with a supporting design report consistent with the Commission's engineering guidelines. A quality control and inspection program,

L drawings, the design drawings will continue to be referred to as Exhibit L drawings.

³³ PPL refers to the filed project boundary drawings as Exhibit G drawings. However, because the current project boundary drawings approved for the project consists of 19 Exhibit K drawings, the project boundary drawings will continue to be referred to as Exhibit K drawings.

temporary construction emergency action plan, and soil erosion and sediment control plan shall be included with the licensee's submittal.

81. Article 45 requires the licensee to provide the Commission's D2SI-NYRO with cofferdam construction drawings.

82. Where new construction or modifications to the project are involved, the Commission requires licensees to file revised drawings of project features as built. Article 46 provides for the filing of these drawings.

The Director orders:

(A) PPL's April 9, 2009 request to amend the license for the Holtwood Hydroelectric Project No. 1881, is approved as provided by this order, effective the day this order is issued.

(B) The term of the license for the Holtwood Hydroelectric Project No. 1881 is extended to August 31, 2030.

(C) Ordering paragraph (B)(2) of the license is revised, in part, to read as follows:

Project works consisting of: (1) a 2,392-foot-long by 55-foot-high concrete gravity dam located on the Susquehanna River, with a crest elevation of 165 feet mean sea level (msl) and topped with flashboards that raise its effective height to 169.75 feet msl; (2) an approximately 8-mile-long reservoir (Lake Aldred) with a surface area of 2,400 acres at elevation 169.75 feet msl; (3) a skimmer wall for the protection of the powerhouse forebay; (4) a diversion wall between the tailrace and the river channel downstream of the dam; (5) a tailrace and a spillway fish lift, located along the diversion wall between the dam and powerhouse, for upstream fish passage; (6) a powerhouse containing twelve vertical Francis turbine generating units (Units 1-11 and 13) with a total installed capacity of 114.9 megawatts (MW); (7) a new powerhouse, adjacent to the existing powerhouse, containing two vertical Kaplan turbine generating units (Units 18 and 19) with a total installed capacity of 80.6 MW; (8) transmission facilities consisting of generator leads, three 13.2/69-kilovolt (kV) step-up transformers at the existing powerhouse, a 13.2/69-kV step-up transformer at the new powerhouse, and two approximately 3,000-foot-long, 69-kV transmission lines extending from the powerhouses to the Face Rock Substation; and (9) appurtenant facilities.

(D) The license is subject to the conditions of the Water Quality Certification issued by the Pennsylvania Department of Environmental Protection on June 15, 2009, under section 401 of the Clean Water Act, as those conditions are set forth in Appendix A to this order.

(E) The license is subject to the conditions filed September 3, 2009, by the Secretary of the U.S. Department of the Interior under section 18 of the FPA, as those conditions are set forth in Appendix B to this order.

(F) The following filed Exhibit L drawings filed on December 20, 2007, are approved and made part of the license.

Exhibit No.	FERC Drawing No.	Drawing Title
L-11	1881-136	Existing and New Site Plan
L-12	1881-137	Proposed Final Power Station – Site Layout Plan
L-13	1881-138	Proposed New Powerhouse – Plan at El. 185'
L-14	1881-139	Proposed New Powerhouse – Longitudinal Section
L-15	1881-140	Proposed New Powerhouse – Transverse Section Looking Downstream
L-16	1881-141	Proposed Excavation Areas and Construction Access Roads
L-17	1881-142	Proposed Unit 1 New Draft Tube Extension Section
L-18	1881-143	Proposed New Plan and Section of Skimmer Wall
L-19	1881-144	Proposed Exciter Bay Replacement Turbines Locations
L-20	1881-145	Proposed Fish Lift Tailrace Crowder Modifications

(G) Within 45 days of the date of issuance of this order, the licensee shall file the approved exhibit drawings in aperture card and electronic file formats.

a) Three sets of the approved exhibit drawings shall be reproduced on silver or gelatin 35mm microfilm. All microfilm shall be mounted on type D (3-1/4" X 7-3/8") aperture cards. Prior to microfilming, the FERC Project-Drawing Number (i.e., P- 1881-136) shall be shown in the margin below the title block of the approved drawing. After mounting, the FERC Drawing Number shall be typed on the upper right corner of each aperture card. Additionally, the Project Number, FERC Exhibit (i.e., L-11), Drawing Title, and date of this order shall be typed on the upper left corner of each aperture card. See Figure 1.

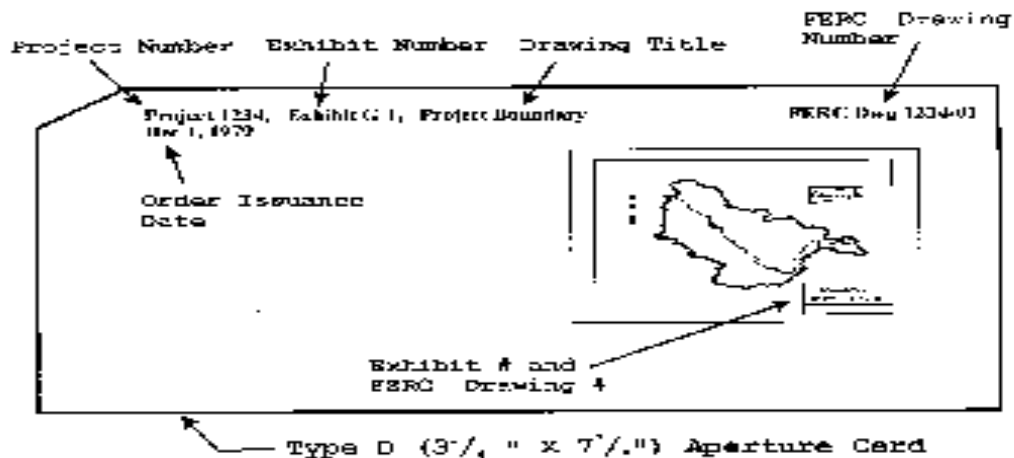


Figure 1.

Two of the sets of aperture cards shall be filed with the Secretary of the Commission, ATTN: OEP/DHAC. The third set shall be filed with the Commission's Division of Dam Safety and Inspections New York Regional Office.

b) The licensee shall file two separate sets of exhibit drawings in electronic raster format with the Secretary of the Commission, ATTN: OEP/DHAC. A third set shall be filed with the Commission's Division of Dam Safety and Inspections New York Regional Office. Exhibit L drawings must be identified as **(CEII) material under 18 CFR § 388.113(c)**. Each drawing must be a separate electronic file, and the file name shall include: FERC Project-Drawing Number, FERC Exhibit, Drawing Title, date of this order, and file extension in the following format [P-1881-136, L-11, Existing and New Site Plan, MM-DD-YYYY.TIF]. Electronic drawings shall meet the following format specification:

IMAGERY - black & white raster file
 FILE TYPE – Tagged Image File Format, (TIFF) CCITT Group 4
 RESOLUTION – 300 dpi desired (200 dpi min.)
 DRAWING SIZE FORMAT – 24" X 36" (min), 28" X 40" (max)
 FILE SIZE – less than 1 MB desired

(H) Within 90 days of the date of issuance of this order, the licensee shall file revised Exhibit K drawings showing: the new powerhouse and additional project features, and all recreation facilities approved by the Commission. The revised Exhibit K drawings shall conform to the current requirements under 18 CFR §§ 4.39 and 4.41(h).

(I) Article 31 of the license is revised to read as follows:

The licensee shall pay the United States an annual charge for the purpose of reimbursing the United States for the cost of administering Part I of the Federal Power Act, as determined by the Commission. The authorized installed capacity for that purpose is 108,400 kilowatts (kW) effective July 7, 1986, 109,440 kW effective August 31, 1987, and 112,540 kW effective June 25, 1990.

In addition, upon commencement of construction of the additional authorized capacity, the total authorized installed capacity for that purpose will be 195,500 kW.

(J) The license is subject to the following additional articles:

Article 42. Administrative Annual Charges Notification. Within 30 days of the start of construction of the new generating capacity, the licensee shall file with the Commission notification of the construction commencement date. The Commission will use the commencement of construction date to revise the project's annual charges under Article 31.

Article 43. Start of Construction. The licensee shall commence construction of the project works within two years from the issuance date of this order and shall complete construction of the project works within 5 years from the issuance date of this order.

Article 44. Contract Plans and Specifications. At least 60 days prior to the start of construction, the licensee shall submit one copy of its final plans and specifications and supporting design document to the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer, and two copies to the Commission (one of these shall be a courtesy copy to the Director, D2SI). The submittal must also include as part of preconstruction requirements: a Quality Control and Inspection Program, Temporary Construction Emergency Action Plan, and Soil Erosion and Sediment Control Plan. The licensee may not begin construction until the D2SI – New York Regional Engineer has reviewed and commented on the plans and specifications, determined that all preconstruction requirements have been satisfied, and authorized start of construction.

Article 45. Cofferdam Construction Drawings. Before starting construction, the licensee shall review and approve the design of contractor-designed cofferdams and deep excavations and shall make sure construction of cofferdams and deep excavations is consistent with the approved design. At least 30 days before construction of the cofferdam, the licensee shall submit one copy to the Commission's D2SI – New York Regional Engineer and two copies to the Commission (one of these shall be a courtesy copy to the Director, D2SI), of the approved cofferdam construction drawings and specifications and the letters of approval.

Article 46. As-built Drawings. Within 90 days of completion of all construction activities, the licensee shall file for Commission approval, revised Exhibits A, K, L, and R, as appropriate, describing the project facilities as built. A courtesy copy shall be filed with the Commission's D2SI – New York Regional Engineer, the Director, D2SI, and the Director, Division of Hydropower Administration and Compliance.

Article 47. Commission Approval, Reporting, and Filing of Amendments.

(a) Mandatory Conditions for Commission Approval

The licensee shall implement the mandatory conditions of this license found in the Pennsylvania Department of Environmental Protection's (Pennsylvania DEP) final section 401 Water Quality Certification (WQC) (Appendix A to this order) and the Department of the Interior's (Interior) final section 18 fishway prescription (Appendix B to this order). These conditions require, in part, that the licensee prepare certain plans and reports, in consultation with other entities, for approval by FWS or Pennsylvania DEP. These plans shall also be filed with the Federal Energy Regulatory Commission (Commission) for approval, and implemented following Commission approval. Each such plan shall also include an implementation schedule. The required plans and required filing date are listed below.

WQC Condition No.	Interior Prescription No.	Description	Filing Date From Order Amending License
NA	3	Plan for sequencing construction activities	6 months
III.A.1	6.1	Fishway Operating Plan	2 years
III.B.1	7.1	Plan for monitoring the effectiveness of upstream American shad passage	2 years
III.B.2	7.2	Plan to measure the survival of American shad moving downstream past the amended project	2 years
III.C.1b	8.1.b	Upstream American eel passage siting study plan	5 years or within 4 months of trigger date for initiation of upstream eel passage, as determined by III.C.1.a

WQC Condition No.	Interior Prescription No.	Description	Filing Date From Order Amending License
III.C.1d	8.1.d	Plan for construction of upstream American eel passage facilities	8 years or within 9 months of the time adequate information is available to make a siting decision
III.C.1e	8.1.e	Plan for monitoring effectiveness of upstream American eel passage facilities	9 years or within 3 months of the approval of the design plans
III.C.2b	8.2.b	Plan for monitoring effectiveness of downstream passage of American eels, including discrete survival study	10 years; or within 1 year of operation upstream eel passage at Holtwood; or within 1 year of eel stocking in Lake Aldred; or one year after the Pennsylvania Department of Environmental Protection determines that available data indicate that sufficient numbers of American eels are available upstream of Holtwood to require downstream passage
III.C.2.d	N/A	Plan for proposed structural modifications to be implemented if downstream passage of American eel is less than 85 percent, to include a plan for measuring effectiveness of modified structures	Within 60 days prior to initial operation of modified structures
IV.A	N/A	Minimum Stream Flow Operation Procedure Manual for operations and maintenance related to minimum stream flows	2 years

WQC Condition No.	Interior Prescription No.	Description	Filing Date From Order Amending License
IV.C.1	N/A	Plan and schedule for achieving and monitoring minimum stream flows in the spillway area	2 years
IV.C.3	N/A	Plan and schedule for modifications to minimum stream flows in the spillway area	After 4 years of operation of the amended project, if designated uses and water quality standards are not being maintained in the first three years
IV.C.4	N/A	Plan and schedule for additional modifications to minimum stream flows in the spillway area	After 4 years and 6 months of operation with the amended minimum flows (per IV.C.3), if designated uses and water quality standards are not being maintained
IV.D.1	N/A	Plan and schedule for achieving and monitoring minimum stream flows in the Piney Channel, in the tailrace, and from Lake Aldred	2 years
IV.D.5	N/A	Plan and schedule for modifications to minimum stream flows in the Piney Channel, in the tailrace, and from Lake Aldred	After 4 years of operation of the amended project, if designated uses and water quality standards are not being maintained in the first three years

WQC Condition No.	Interior Prescription No.	Description	Filing Date From Order Amending License
IV.D.6	N/A	Plan and schedule for additional modifications to minimum stream flows in the Piney Channel, in the tailrace, and from Lake Aldred	After 3 years and 6 months of operation with the amended minimum flows (per IV.D.5), if designated uses and water quality standards are not being maintained
VI.A.2	N/A	Plan and schedule for continuous monitoring of dissolved oxygen in the forebay, tailrace and Piney Channel	1 year
VI.A.4.	N/A	Plan to resolve DO violations	6 months after violations of the daily average or instantaneous standard resulting from operation of the project

The plans shall be developed in consultation with the Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, Pennsylvania Department of Conservation and Natural Resources, Susquehanna River Basin Commission, Maryland Department of Natural Resources, U.S. Fish and Wildlife Service, and U.S. Army Corps of Engineers. The licensee shall file documentation of consultation and copies of comments and recommendations received on the draft plans, and a description of how the final plans accommodate the comments and recommendations. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information. The Commission reserves the right to make changes to any plan submitted. Upon Commission approval, the licensee shall implement the plan and any associated changes in project operations or facilities, including any changes to the plans required by the Commission.

(b) Requirement to Notify Commission of Planned and Unplanned Deviations from License Requirements

The WQC conditions (Appendix A) and section 18 fishway prescription (Appendix B) may require the licensee to temporarily modify operations and license requirements under certain conditions. The Commission shall be notified prior to

implementing such modifications, if possible, or in the event of an emergency beyond the control of the licensee, as soon as possible, but no later than 10 days after each such incident.

(c) *Requirement to File Additional License Amendments*

Some parts of the WQC conditions (Appendix A) and some section 18 fishway prescriptions (Appendix B) contemplate unspecified long-term changes to project structures or operations for the purpose of mitigating environmental impacts or enhancement of environmental resources. These changes may not be implemented without prior Commission authorization after the filing of an application to amend the license. These conditions are listed below.

WQC Condition No.	Interior Prescription No.	Potential Modification
III.C.1b and d	10.b and d	Upstream American eel passage facilities
III.C.2d		Downstream American eel passage facilities
IV.C	N/A	Plan and schedule for providing initial and modified minimum flows in spillway area
IV.D	N/A	Plan and schedule for providing initial and modified minimum flows in Piney Channel, in the tailrace, and from Lake Aldred

Article 48. *Operation of Fish Lift for Resident Fish Species.* The licensee shall operate the project fish lift from April 1 through June 30 and from September 1 to October 15 for passage of resident fish species for five years following commencement of amended project operations. During this five year period, the licensee shall count and identify resident fish and provide a daily monitoring report submitted on a daily basis and an annual monitoring report submitted by December 31 of each year to the Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, and U.S. Fish and Wildlife Service.

At the end of the five year period, the licensee shall consult with the Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, and U.S. Fish and Wildlife Service to determine whether modifications to the fish passage system for resident fish are necessary. The licensee shall prepare an evaluation of the results of the fish lift operation to determine if additional fall operations are warranted, and file a report of this evaluation, along with its recommendations for any future fall operations with the Commission for approval. Absent modification, the licensee shall

continue to operate the fish passage system as it was operated during the initial five year period.

The licensee shall conduct this evaluation in consultation with the Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, and U.S. Fish and Wildlife Service. The licensee shall include with the final report documentation of consultation, copies of agency comments and recommendations, and a description of how the agency comments are accommodated in the analysis. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the report with the Commission for approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to any plan for future fall fish lift operations. The plan shall not be implemented until the licensee is notified that the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 49. Fish Passage Improvements and Monitoring. The U.S. Fish and Wildlife Service's section 18 fishway prescription and the Pennsylvania Department of Environmental Protection's water quality certification require major improvements to the upstream fish passage facilities at the project, including monitoring, that would rectify several of the deficiencies in the facilities seen since first operated in 1997. The licensee shall file with the Commission for approval, all final design plans, study plans for evaluation studies, and plans for any future modifications to project fish passage facilities and associated monitoring studies.

The licensee shall develop the plans in consultation with the Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, and U.S. Fish and Wildlife Service. The licensee shall include with the final plans documentation of consultation, copies of agency comments and recommendations, and a description of how the agency comments are accommodated by the plans. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plans with the Commission for approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plans. The plans shall not be implemented until the licensee is notified that the plans are approved by the Commission. Upon Commission approval, the licensee shall implement the plans, including any changes required by the Commission.

Article 50. Mitigation for Construction Effects on Upstream Passage of American Shad. The licensee shall file, for Commission approval, a plan to mitigate for any

adverse construction effects that would reduce the efficiency of the Holtwood fish lift during the 3-year construction period, if such effects are identified.

The licensee shall develop the plan in consultation with the Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, and U.S. Fish and Wildlife Service, as well as the licensee for the Conowingo Project No. 405, immediately after the conclusion of spring fish passage operations during each year of construction at the Holtwood Project, if the consulting parties determine that construction effects have occurred. The licensee shall determine, in consultation with the agencies, the shortfall of adult shad that would need to be mitigated, and develop the best method for mitigation. The licensee shall file the final mitigation plan with the Commission by September 1 in order to allow sufficient time for Commission approval and for the licensee to prepare for and implement the plan the following spring.

The licensee shall include with the final plan documentation of consultation, particularly for the determination of construction effects on fish passage, copies of agency comments and recommendations, and a description of how the agency comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 51. Minimum Stream Flows.

(a) *Continuous Minimum Flows and Daily Minimum Flows.* In consultation with the licensee for the Conowingo Project No. 405, and subject to the approval of the Pennsylvania Department of Environmental Protection and the Commission, the licensee shall develop a Minimum Stream Flow Operations Procedures Manual (MSFOP Manual).³⁴ The MSFOP Manual will require the licensee to release the following flows into the Susquehanna River below Holtwood Dam: (1) a 24-hour continuous minimum flow of 800 cfs (Continuous Minimum Flows); and (2) a daily volumetric flow equivalent to 98.7% of the minimum continuous flow requirements of the downstream Conowingo Project No. 405, aggregated over a 24-hour period (Daily Minimum Flows). In the event that the net inflow to Lake Aldred is less than the Continuous Minimum Flows and the Daily Minimum Flows, the MSFOP Manual shall require the licensee to maintain flows

³⁴ Required under the licensee's WQC, Condition No. IV.A.

in the Susquehanna River below Holtwood Dam equal to the net inflow to Lake Aldred. Modifications of the MSFOP Manual must be initiated by the licensee, with consultation with the licensee for the Conowingo Project No. 405, and may not become effective unless approved by the Pennsylvania Department of Environmental Protection and the Commission.

(b) Commencement Date of Minimum Flows. The licensee shall commence the Daily Minimum Flows required under this article on the date that the Commission's order approving the Holtwood Project license amendment becomes final. The licensee shall commence the Continuous Minimum Flows required under this article upon the earlier of: (1) the date the licensee has both commenced operation of Unit 1 to Piney Channel and placed its refurbished exciter units into service; (2) the date three years after the date of the Commission's final order approving the Holtwood Project license amendment; or (3) the date established by the MSFOP Manual.

(c) Effect of Modification of Minimum Flow Requirements at Project No. 405. In the event that the minimum continuous flow requirements at the Conowingo Project No. 405 are ever modified, the MSFOP Manual will be modified as follows: (1) the Continuous Minimum Flows required under this article shall be similarly adjusted by an equivalent percentage; and (2) the Daily Minimum Flows required under this article shall be recalculated based on the modified flows established by the license for the Conowingo Project No. 405.

(d) Temporary Variance. For temporary flow variances of the Continuous Minimum Flows and Daily Minimum Flows resulting from short-term construction activities associated with the Holtwood Project redevelopment and expansion, the licensee shall seek the consent of the licensee for the Conowingo Project No. 405. The Continuous Minimum Flows and Daily Minimum Flows required under this article also may be temporarily modified if required by operating emergencies beyond the control of the licensee, where necessary to prevent unavoidable loss of life, personal injury or severe property damage and where there is no feasible alternative. If the Continuous Minimum Flows or Daily Minimum Flows are so modified, the licensee shall notify the Commission as soon as possible, but no later than 10 days after each such incident. For all other non-construction temporary variances of the Continuous Minimum Flows and Daily Minimum Flows required under this article, the licensee shall provide notice to the licensee for the Conowingo Project No. 405 and obtain prior authorization from the Commission.

(e) Scheduling, Monitoring, Verification and Reporting. Scheduling, monitoring, verification, and reporting of minimum flows shall be in accordance in the licensee's MSFOP Manual.

Article 52. Maintenance of Continuous Flow into Project Bypassed Reach.

Article 47 includes a requirement for preparation of a plan and schedule for providing and monitoring minimum stream flows in the spillway area (Minimum Stream Flow Operation Procedure Manual). In addition to flows provided through Article 47, the licensee shall continue to use the existing configuration of flashboards and to pass water through the existing 10-inch-diameter pipe on the dam to maintain the current rate of flow into the bypassed reach.

Article 53. Tailrace Dissolved Oxygen Monitoring Plan. The licensee shall conduct a dissolved oxygen (DO) monitoring program in the project tailrace, once the amended project begins operation. Within 2 years of the date of issuance of this order, the license shall file its tailrace DO monitoring plan with the Commission for approval. This plan shall include a monitoring schedule, a schedule for filing results with the Commission that will describe whether state standards are being maintained, and a description of measures that would be implemented if state standards are not maintained.

The licensee shall develop the plan in consultation with the Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, and U.S. Fish and Wildlife Service. The licensee shall include with the final plan documentation of consultation, copies of agency comments and recommendations, and a description of how the agency comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 54. Excavation and Blasting Plan. Within 90 days of the date of issuance of this order, the licensee shall file, for Commission approval, final excavation plans and schedule detailing the in-water and in-the-dry excavations and blasting activities. The plan shall include sufficient detail such that a final assessment of potential effects on water quality, fisheries, and wildlife can be made and appropriate mitigation measures required as part of the compliance activities.

The licensee shall develop the plan in consultation with the Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, and U.S. Fish and Wildlife Service. The licensee shall include with the final plan documentation of consultation, copies of agency comments and recommendations, and a description of how the agency comments are accommodated by the plan. The licensee

shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 55. Fish Passage Technical Advisory Committee and Report. The licensee shall continue its participation in the Holtwood Fish Passage Technical Advisory Committee (FPTAC) as required under the 1993 Settlement Agreement for the Development of Fish Passage Facilities at the Holtwood, Safe Harbor, and York Haven Projects on the Susquehanna River. This participation shall include drafting of a fish passage report for the prior year that will document: (1) fish passage number and timing; (2) fishway operational problems and action taken to correct those problems; and (3) recommendations to improve or enhance fish passage at the project. A draft of the fish passage report shall be provided to the resource agencies by January 1 of each year and the final report shall be filed with the Commission, following review and approval by the agencies, by April 1 of each year.

Article 56. Special-status Plants Monitoring Program and Irrigation Flows. The licensee shall provide irrigation flows into the bypassed reach of approximately 1,000 cfs for one hour on days when river flows are between 31,000 and 61,500 cfs. The licensee shall file, for Commission approval, a long-term monitoring program of state threatened and endangered plants in the river bed downstream of the dam. The plan shall include measures to examine the effects of reductions in spill frequency and determine if any adjustments to planned flow release rates are warranted to ensure the continued protection of special-status plants.

The licensee shall develop the plan in consultation with the Pennsylvania Department of Environmental Protection and Pennsylvania Department of Conservation and Natural Resources. The licensee shall include with the final plan documentation of consultation, copies of agency comments and recommendations, and a description of how the agency comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that the plan is approved by the

Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 57. Wetlands Restoration Plan. Within two years of the date of issuance of this order, the licensee shall file, for Commission approval, a plan for construction of a wetland replacement project along Landis Run in Manheim Township, Lancaster County, to mitigate for wetlands affected by project construction. The plan shall include detailed descriptions of mitigation measures to be implemented at Landis Run, and a detailed methodology for a minimum of five years of monitoring of all wetland, stream and riparian plantings related to the project.

The licensee shall develop the plan in consultation with the Pennsylvania Department of Environmental Protection, U.S. Army Corp of Engineers, and U.S. Fish and Wildlife Service. The licensee shall include with the final plan documentation of consultation, copies of agency comments and recommendations, and a description of how the agency comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 58. Bald Eagle Protection Plan. Prior to the commencement of construction, the licensee shall file, for Commission approval, a bald eagle protection plan to ensure that eagles foraging or nesting in the immediate project area are protected. The licensee shall develop the plan in consultation with the Pennsylvania Department of Environmental Protection and U.S. Fish and Wildlife Service, and shall include with the final plan documentation of consultation, copies of agency comments and recommendations, and a description of how the agency comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 59. Recreational Use Monitoring Plan. Within 6 months of the issuance date of this order, the licensee shall file, for Commission approval, a plan to monitor recreational use at the project. The plan shall include: (1) estimates of annual project-related recreation use visitation; (2) assessments of (a) the effects of proposed project construction on recreation opportunities and access at the project during the construction period, (b) the effects of project operations (e.g., reservoir elevations and provision of flows downstream of the project dam) on recreation access and opportunities at the project, (c) the adequacy of the existing project's recreation facilities, and (d) the need for additional recreation facilities at the project site; and (3) a description of any recreation plans proposed by the licensee to accommodate or control visitation in the project area.

The licensee shall develop the plan in consultation with the U.S. Fish and Wildlife Service, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Pennsylvania Department of Environmental Protection, and Pennsylvania Department of Conservation and Natural Resources. The licensee shall include with the final plan documentation of consultation, copies of agency comments and recommendations, and a description of how the agency comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

The licensee shall file an annual recreation and monitoring report, beginning April 30, 2011, during the construction period, and every year after the completion of construction (in conjunction with the Form 80 report filing). The annual report shall be developed in consultation with the agencies listed above, allowing a minimum of 30 days for the agencies to comment and to make recommendations before filing the report with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information. If changes are made to the plan via the annual report, those changes must be approved by the Commission.

Article 60. Whitewater Boating. Within 3 months of the issuance date of this order, the licensee shall file, for Commission approval, a whitewater boating plan to provide whitewater experiences comparable to those existing prior to beginning construction on the proposed redevelopment and capacity increase. The plan shall include, but not necessarily be limited to, measures to: (1) construct and maintain whitewater kayaking features in the river; (2) minimize impacts to existing whitewater

features; (3) provide recreational releases from Unit 1; (4) provide flow information; and (5) provide public access to the river.

The licensee shall include with the final plan documentation of consultation with the recreational stakeholders that signed the settlement agreement and the Pennsylvania Department of Environmental Protection, copies of comments and recommendations, and a description of how the comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 61. Historic Properties Management Plan. Prior to the commencement of construction, the licensee shall implement the Programmatic Agreement and file, for Commission approval, a Historic Properties Management Plan to ensure that construction activities avoid archaeologically sensitive areas and that the designs for the new powerhouse and dam features avoid altering the characteristics that qualify these facilities for listing on the National Register of Historic Places.

The licensee shall develop the plan in consultation with Pennsylvania State Historic Preservation Officer. The licensee shall include with the final plan documentation of consultation, copies of agency comments and recommendations, and a description of how the agency comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 62. Land and Shoreline Management Plan. Within 6 months of the issuance date of this order, the licensee shall file, for Commission approval, a land and shoreline management plan. The plan shall include: (1) an assessment of the lands to be included within a shoreline buffer (including rationale for extending the shoreline buffer beyond that which currently exists at the project) and lands to be included within the

project boundary for the protection of project resources, such as protection of fish and wildlife habitat, providing public access for recreation, and protecting sensitive, unique, or scenic areas; (2) a description of those lands covered by the plan, including any proposed revisions to the project boundary and revisions to Exhibit G, if necessary; (3) a description of measures to be implemented for the management and use of project lands; (4) measures for the coordination of the plan with other resource management plans and programs for the project, such as the Historic Properties Management Plan, long-term monitoring program of wetlands and state threatened and endangered plants, and the bald eagle protection plan; (5) measures to revise and update the plan; and (6) a schedule for implementation of the plan and associated management measures.

The licensee shall develop the plan in consultation with the U.S. Fish and Wildlife Service, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Pennsylvania Department of Environmental Protection, and Pennsylvania Department of Conservation and Natural Resources. The licensee shall include with the final plan documentation of consultation, copies of agency comments and recommendations, and a description of how the agency comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

(K) This order constitutes final agency action. Requests for rehearing may be filed within 30 days of the date of issuance of this order, pursuant to 18 C.F.R. § 385.713.

William Guey-Lee
Chief, Engineering and Jurisdiction Branch
Division of Hydropower Administration
and Compliance

APPENDIX A

Pennsylvania Department of Environmental Protection Section 401 Water Quality Certification, issued June 15, 2009

WATER QUALITY CERTIFICATION FOR HOLTWOOD HYDROELECTRIC STATION AND RELATED MITIGATION FERC PROJECT NO. 1881

I. PROJECT DESCRIPTION

A. EA36-018: PPL Holtwood LLC, Dennis J. Murphy, VP/COO, 2 North 9th Street, Allentown, PA 18101, Martic Township, **Lancaster County**, ACOE Baltimore District.

PPL Hydroelectric Plant is located on the Susquehanna River (WWF) in Martic Township, Lancaster County. PPL proposes to construct a new powerhouse, install new turbines, construct a new skimmer wall, increase the forebay capacity, and reconfigure the project facilities to enhance upstream fish passage through modification of existing facilities and excavations in the tailrace channel (Holtwood, PA Quadrangle N: 14 inches; W: 11.5 inches; Latitude: 39° 49' 37.7"N Longitude: 76° 19' 50.4" W). The licensed installed capacity at the project would increase from 107.2 MW to a proposed 195.5 MW. To improve migratory fish passage at the project, PPL proposes to (1) modify the existing fish lift; (2) reroute the discharge of Unit 1 in the existing powerhouse; and (3) excavate the project tailrace (33.49 acres), the forebay (4.63 acres) and Piney Channel (6.68 acres). PPL also proposes to provide minimum flows, perform studies and evaluations of the effectiveness of the fish passage improvements and flow releases, improve existing and construct new recreational facilities, and protect special status plants, wildlife and cultural resources during construction. The project will cumulatively impact 1.24 acres of palustrine emergent and forested wetlands, approximately 7.69 acres of shallow water habitat and approximately 14.60 acres of deep water habitat and includes 20.84 acres of impacts to the lake fluctuation zone. To mitigate for impacts associated with the project, PPL proposes to (1) construct 0.25 acre emergent wetland, 1.96 acre forested wetland and establish 1.57 acre forested riparian buffer, and 1.8 acre upland forest at the RLPS Architect's property located west-southwest of the intersection of Oregon Pike (PA-272) and Valleybrook Drive in Manheim Township, Lancaster County (Lancaster, PA Quadrangle N: 15.96 inches; W: 5.37 inches; Latitude: 40° 05' 16.332" N Longitude: 76° 17' 18.2004" W) in the

floodway of Landis Run (WWF) or, if this project cannot be timely constructed, provide and construct such replacement project as is acceptable to the Department; (2) construct and maintain a 3,200.0-foot stream restoration project in and along Pequea Creek (WWF) located (New Holland and Gap, PA Quadrangles Latitude: 40° 00' 01.1" N; Longitude: 76° 06' 11.1" W) in Paradise and Leacock Townships, Lancaster County. The project shall include riparian plantings along 5000.0-feet (4-acres) of Pequea Creek, 3,300-feet of streambank fencing providing for a minimum of a 25-foot buffer on each side of the Pequea Creek, two cattle crossings, one cattle access, four areas of habitat boulder placement, five rock cross vanes, nine J-hooks, three stream bank rock deflectors, five root wads, four mudsill fish enhancement structures; (3) plant 7.6 acres of an existing agricultural field adjacent to the Susquehanna River with native tree species at a point just north of the intersection of Prescott Road and River Road (S.R. 441) (York Haven, PA Quadrangle; Latitude: 40° 06' 35.70" N, Longitude: 76° 41' 18.36" W) in Conoy Township, Lancaster County; (4) remove three dams, or if these projects are funded through other sources, provide and construct such replacement projects as are acceptable to the Department (a) D36-306, Levi Fisher Dam located on Pequea Creek (HQ-CWF) at a point just west of the intersection of Mount Vernon Road and Buena Vista Road (Honey Brook, PA Quadrangle; Latitude: 40° 1' 9.12" N, Longitude: 75° 59' 4.56" W) in Salisbury Township, Lancaster County; (b) Smucker Dam located on Groff Run (WWF) at a point just west of the intersection of Tabor Road and Custer Avenue (New Holland PA Quadrangle; Latitude: 40° 4' 9.84" N, Longitude: 76° 5' 8.52" W) in Earl Township, Lancaster County; (c) Zimmerman Dam located on Conestoga River (WWF) at a point just southwest of the intersection of Cabin Road and Twenty-Eighth Division Highway (S.R. 322) (Ephrata PA Quadrangle; Latitude: 40° 9' 1.44" N, Longitude: 75° 8' 11.49" W) in Earl Township, Lancaster County; (5) construct and maintain a new boat ramp measuring 100.0-feet long by 20.0-feet wide into the Susquehanna River, a 25.0-foot by 20.0-foot ADA accessible fishing platform and dock, 18 additional trailer spaces, 3 additional car parking spaces and 2 ADA accessible car spaces and place 1,633.0 cubic yards of material in and along the Susquehanna River (WWF) (Conestoga, PA Quadrangle N: 2.5 inches; W: 16.5 inches; Latitude: 39° 53' 17.4" N; Longitude: 76° 22' 0.5" W) to improve the Pequea Boat Launch; (6) construct and maintain a 52-foot long extension to an existing boat ramp to provide total boat ramp dimension of 80.0-feet long by 12.0-feet wide. This modification shall be in Pequea Creek (WWF) located approximately 75-feet upstream of the railroad bridge near the confluence with the Susquehanna River (Conestoga, PA Quadrangle N: 2.35 inches; W: 16.39 inches; Latitude: 39° 53' 16.2" N; Longitude: 76° 22' 0.7" W) as part of the improvements to the Pequea Boat Launch; (7) construct and maintain an extension measuring 30.0-feet long by 12.0-feet wide to provide total boat launch dimension of 95-feet long by 12-feet wide each on two existing boat ramps in the Susquehanna River (WWF) located at the York Furnace Recreation Area (Safe Harbor, PA Quadrangle N: 0.75 inches;

W: 1.0 inches; Latitude: 39° 52' 20.8" N; Longitude: 76° 22' 48.3" W); (8) construct and maintain additional parking along the existing McCall's Ferry Road by placing 250 cubic yards of fill in the floodway of the Susquehanna River (WWF) in Lower Chanceford Township, York County (Holtwood, PA Quadrangle N: 13.0 inches; W: 12.5 inches; Latitude: 39° 49' 15.6" N; Longitude: 76° 20' 16.5" W), to provide parking for the white water boating community use. The additional parking includes widening McCall's Ferry Road by 27.5-feet for a distance of 137.0-feet, and (9) construct and maintain a bridge over the railroad tracks along the east bank of the Susquehanna River (WWF) for the purpose of allowing recreational access to a new parking area, measuring 200.0-feet long by 50.0-feet wide, located between the railroad right-of-way and the Holtwood Tailrace (Holtwood, PA Quadrangle N: 13.25 inches; W: 11.0 inches; Latitude: 39° 49' 22.6" N; Longitude: 76° 19' 35.3" W).

II. PROVISIONS APPLICABLE TO ALL WATER QUALITY CERTIFICATION CONDITONS

A. Final Agency Action. Notwithstanding any other provision of the Certification to the contrary, any action taken by DEP in response to any submission required or authorized under this certification or any action taken by DEP to require PPL to undertake any action that affects PPL's personal or property rights, privileges, immunities, duties, liabilities or obligations including, but not limited to, any action to approve, approve with conditions, disapprove, modify or establish operational or structural changes, plans, schedules, studies or monitoring programs shall constitute a "final agency action" and may be challenged in accordance with applicable law.

B. Operational modifications are a component of the adaptive management system to implement the approved plans, including the performance requirements of this certification. Operational modifications include modifications of seasonal and daily periods of operation of the fishway, dam and powerhouse detailing how the plant shall be operated during fish passage season and throughout the year including sequencing of turbine start-up and operation, flow split between the old and new powerhouses and between the tailrace and Piney Channel, procedures for monitoring and reporting flows in the tailrace, Piney Channel and the spillway channel as well as any other necessary provisions for plant operation to ensure attraction to and operation of the fishways or to meet other provisions of this certification, procedures for monitoring and reporting on the operation of each existing fish passage facility or other provisions of this certification or measure, procedures for annual start-up and shut-down, and procedures for use in case of emergencies and project outages significantly affecting fishway operations or other provisions of this certification. No substantial alteration or addition not in conformity with the plans approved by the

Federal Energy Regulatory Commission shall be made to any dam or other project works constructed under the Federal Power Act without the prior approval or authorization of the Federal Energy Regulatory Commission.

C. Structural modifications are changes to project infrastructure, tailrace, Piney Channel or other areas of the Susquehanna River pursuant to the provisions of this certification. No substantial alteration or addition not in conformity with the plans approved by the Federal Energy Regulatory Commission shall be made to any dam or other project works constructed under the Federal Power Act without the prior approval or authorization of the Federal Energy Regulatory Commission.

D. Resources Agencies – Department of Environmental Protection (“DEP” or “Department”), Pennsylvania Fish and Boat Commission (“PFBC”), Department of Conservation and Natural Resources (“DCNR”), Susquehanna River Basin Commission (“SRBC”), Maryland Department of Natural Resources (“MDDNR”), United States Fish and Wildlife Service (“USFWS”) and the United States Army Corps of Engineers (“CORPS”).

E. General Requirements

1. The work shall at all times be subject to supervision and inspection by representatives of DEP, and no changes in the maps, plans, profiles, and specifications as approved shall be made except with the written consent of DEP. DEP, however, reserves the right to require such changes or modifications in the maps, plans, profiles, and specifications as may be considered necessary to assure compliance with the Pennsylvania Clean Streams Law, Dam Safety and Encroachments Act and other appropriate requirements of state law. DEP further reserves the right to suspend or revoke this certification and permit for failure to comply with appropriate requirements of state law, an administrative order of DEP or a term or condition of this certification and permit.

2. PPL shall notify DEP, in writing, of the proposed time for commencement of work at least 15 days prior to the commencement of construction.

3. PPL shall implement and monitor the Erosion and Sedimentation Control Plan prepared in accordance with Chapter 102 so as to minimize erosion and prevent excessive sedimentation into the receiving watercourse or body of water.

4. All wetlands within the project area shall be accurately field-definable prior to the start of construction activities and up to the time that earth

disturbance activities are completed and the site has been stabilized. An acceptable means of field-identification is the use of an orange construction safety fence.

5. PPL shall obtain an Individual NPDES Permit for Stormwater Discharges Associated with Construction Activity for the project.

6. PPL shall obtain an NPDES Permit for Stormwater Discharges Associated with Construction Activity as appropriate for project mitigation prior to the commencement of construction. Where an NPDES Permit for Stormwater Discharges Associated with Construction Activity is not required, PPL shall obtain approval from the local county conservation district for the erosion and sediment control plan for each mitigation project prior to the commencement of construction.

F. Temporary stream crossings

1. The causeway and/or cofferdams must be constructed of rock, free of fines and silts, or other erodible material.

2. The temporary cofferdams shall be completely removed and the area restored and stabilized upon completion of the project in accordance with 25 Pa. Code Chapter 102 and the approved Erosion and Sedimentation Control Plan.

3. Roads must cross all watercourses at a right angle to the stream, unless it is physically impossible to cross at a right angle to the stream, or otherwise approved in writing by DEP.

4. A culvert, having as large a diameter as possible, must be provided to minimize placement of excessive fill and excavation of the streambanks. If the bank height prohibits a large diameter pipe culvert, the crossing could consist of a bridge. The minimum size diameter culvert to be used is 12 inches.

5. Road and causeway embankments shall consist of rock, free of fines and silt or other erodible material, to minimize stream channel sedimentation during placement, removal, and periods of overtopping.

6. Unless otherwise approved by DEP, approach roads to temporary road crossings shall utilize original grades. However, clean rock material or gravel to a depth of six inches above original grade shall be utilized for approaches as necessary.

7. Temporary road crossings shall be kept open and functioning at all times by maintaining the crossings free of debris and other obstructions.

8. Construction of the temporary roads and cofferdams at any boat launching ramp along a waterway shall take place between September 15 and May 15.

III. FISH PASSAGE

A. General Requirements

1. Fishway Operating Procedures (“FOP”)

- a. The FOP will include, for each fishway, schedules for routine maintenance, procedures for routine operation (including: seasonal and daily periods of operation, dam and powerhouse operational measures) detailing how the plant shall be operated during fish passage season including sequencing of turbine start-up and operation, flow split between the old and new powerhouses and between the tailrace and Piney Channel, procedures for monitoring and reporting flows in the tailrace, Piney Channel and the spillway channel, debris management as well as any other necessary provisions for plant operation related to attraction flow as a component of the fish passage system for operation of the fishways, procedures for monitoring and reporting on the operation of each existing fish passage facility or measure, procedures for annual start-up and shut-down, and procedures for use in case of emergencies and project outages significantly affecting fishway operations. PPL shall count all fish passing through the upstream fish passage, including anadromous, catadromous and resident fishes, during the upstream shad passage season as described in the FOP.
- b. PPL shall implement the FOP consistent with the approval of the DEP. PPL shall provide written documentation to the Resource Agencies that all fishway operational personnel have reviewed and

understand the FOP signed by the operations manager of the Amended Project.

- c. Copies of the approved FOP and all modifications will be provided to the Resource Agencies.
- d. By December 31 of each year, following commencement of the Amended Project, PPL shall provide an annual report detailing: the implementation of the FOP, including any deviations from the FOP and a process to prevent those deviations in the future, to the Resource Agencies; any proposed modifications to the FOP, or in the case of emergencies or project outages, the steps taken by PPL to minimize adverse effects on fishway operation or fish passage measures and any proposed modifications to those steps to further enhance their effectiveness in the future. PPL shall meet with the Resource Agencies by January 31 of each year unless a different date is mutually agreed upon by PPL and the Resource Agencies. Any required modifications to the FOP shall be submitted to the Resource Agencies within 30 days of receipt of a request for the modification unless a longer period is approved by the DEP. The modifications to the FOP shall be implemented consistent with the approval of the DEP. Nothing herein shall require PPL to make operational or structural changes related to the fish passage facilities and measures beyond those changes provided for in Sections III B., C. and D. hereof.
- e. For fish passage system enhancements and facilities not constructed contemporaneously with the Amended Project, and for fish passage measures that do not begin operation contemporaneously with the entry into operation of the Amended Project, 60 days prior to operation of the enhancements and/or facilities, PPL shall submit FOP provisions for any such new fish passage enhancements, facilities and measures to the Resource Agencies for review and approval and shall implement the FOP as approved by the DEP.

- f. The FOP shall also include procedures for resident fish passage provided for in Paragraphs III.D.1-5.

2. Fish Passage Facilities

- a. Contemporaneously with the construction of the new hydroelectric generation facilities, PPL shall implement the final design plans approved by the DEP for the fish passage system enhancements to increase the percentage of anadromous and catadromous fish passing upstream and downstream through the Amended Project and to provide safe, timely and effective passage. At a minimum, these fish passage system enhancements shall include:
 - i. modifications to the existing fish lift including changes to the attraction water inlet piping, rebuilding the skimmer wall, reconstruction of the fish lift entrance C and relocation of the tailrace crowder drive;
 - ii. redirection of discharge flows from Unit 1 through the diversion wall and into Piney Channel in a manner consistent with minimum stream flow conditions described in Section III and consistent with the range of operation of Unit 1;
 - iii. excavation within the project boundary to significantly “minimize” velocity barriers to fish passage in the tail race, downstream of the tailrace, and in Piney Channel in a manner consistent with minimum stream flow conditions described in Section IV;
 - iv. Passive Integrated Transponder (PIT) tagging monitors at locations approved by DEP in consultation with the resource agencies within the fishway at Holtwood to facilitate monitoring efforts; and
 - v a spill control system approved by DEP.

- b. Enhancements to the fish passage system described in Paragraph III. A. 2. a. i-v above shall be included in the final design plans and shall be operational no later than the beginning of operation of the Amended Project.

B. American Shad Passage

1. Upstream Shad Passage

- a. PPL shall implement a monitoring plan approved by DEP to monitor the effectiveness of upstream shad passage. The plan shall include annual fish counts and passive integrated transponder (PIT) tagging monitoring, or other monitoring techniques approved by the DEP in consultation with the other Resource Agencies, of upstream shad passage to meet the annual monitoring requirements of Paragraph III. B. 1. c. (referred to as “Tier I”). The PIT tagging component of the plan shall include PIT tag readers installed at the Conowingo Dam. In the event that PPL is legally precluded from installing PIT tag readers at the Conowingo Dam to implement the monitoring plan and PIT tag readers are not otherwise installed at the Conowingo Dam, then, unless another monitoring technique is approved by the DEP in consultation with the other Resource Agencies, PPL shall implement the Tier II monitoring plan described in Paragraphs III. B. 1. c. through III. B. 1. g. below (referred to as “Tier II”). The Resource Agencies will use reasonably diligent measures to have PIT tag readers installed at the Conowingo Dam in the event that PPL is legally precluded from installing the PIT tag readers. Beginning in the first year of operation of the Amended Project, PPL shall implement the plan according to the schedule consistent with the approval of the DEP. In the event PPL fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and PPL shall implement that plan and schedule consistent with the approval of the DEP.

- b. Following completion of the project amendments and following commencement of operation of the Amended Project, PPL shall annually monitor the effectiveness of upstream American shad passage using the approved monitoring plan. This annual monitoring shall be continued for the term of the FERC license granted to PPL. PPL shall provide daily updates of monitoring results to the Resource Agencies. PPL shall provide an annual report of the monitoring results by December 31st of each year. After 3 years of monitoring, or such longer period approved in writing by the DEP, the results of the monitoring shall be examined to assess the performance of the fish passage system.
- c. At the end of the first three years of the monitoring period established by Paragraph III. B.1.b. above and for each year thereafter, unless the results indicate that at least 75% of the American shad that pass the Conowingo Hydroelectric Facility pass through the Amended Project and 50% of the shad pass the Amended Project within 5 days of passage at Conowingo, PPL shall meet with the Resource Agencies to discuss a plan and schedule for a radio telemetry study or equivalent of American shad passage at the Amended Project and shad migration behavior below the facility. This meeting shall occur within one month of the DEP's determination of failure to meet the Tier 1 target for upstream American shad passage or such longer time as established by the DEP. The annual percentages shall be added together and divided by the total number of years in the monitoring period to determine whether the 75 % and 50 % fish passage percentages are achieved. Days during which river flows at the Marietta gage exceed 100,000 cfs shall not be counted as part of the 5-day passage period.
- d. The Tier II study shall continue the annual fish counts and passive integrated transponder (PIT) tagging monitoring, or other Tier 1 monitoring techniques

approved by the DEP in consultation with the other Resource Agencies, of upstream American shad passage. PIT tag monitoring, or other approved Tier I monitoring, shall not be required during any period that it is not possible for reasons beyond PPL's control. A radio telemetry study plan and schedule shall be developed to determine the percentage of American shad that enter Holtwood project waters and subsequently pass through the Holtwood fish passage system. The radio telemetry study shall be designed to insert the transmitter at the Conowingo facility or at such other location(s) approved by the DEP and American shad that pass river mile 23.2 (located between the Muddy Run Pump Storage Facility and Cully's Falls) or such other location(s) as determined by the DEP shall be considered to have entered the "project waters".

- e. Within two months of the meeting described in Paragraph III. B. 1. c., PPL shall submit the Tier II study plan and schedule to the Resource Agencies for review and approval by DEP. PPL shall implement the plan according to the schedule therein and consistent with the approval of the DEP. PPL shall continue implementation of the Tier II study for a minimum of four years or such longer time period as required by the DEP in consultation with the other Resource Agencies. PIT tagging or other Tier I monitoring techniques, as described in Paragraph III. B. 1. a. shall be continued during the Tier II study. PPL shall provide daily updates of monitoring results to the Resource Agencies. PPL shall provide an annual report of the monitoring results of the Tier II study by December 31st of each year.
- f. At the end of each year of the Tier II study period, or such longer time as established by the DEP, if the results indicate that less than 85% of the American shad that enter the Holtwood project waters pass through the Amended Project, PPL shall propose a plan and schedule for operational modifications to enhance fish passage at the Amended Project if

operational changes would enhance fish passage and the failure to achieve at least 85% passage is attributable, in whole or in part, to PPL operations at the Amended Project. This plan and schedule shall be submitted to the Resource Agencies as an amendment to the FOP for the following year. PPL shall implement the plan and schedule consistent with the approval of the DEP. In the event PPL fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and PPL shall implement that plan and schedule consistent with the approval of the DEP. The annual percentages shall be added together and divided by the total number of years in the monitoring period to determine whether the 85 % fish passage percentage is achieved. If PPL implements operational modifications, only those years following the operational modifications shall be considered to determine whether the 85% passage percentage is achieved.

- g. If at the end of the Tier II monitoring period, or such longer time as established by the DEP, the results indicate that less than 85% of the American shad that enter the Holtwood project waters pass through the Amended Project, PPL shall propose a plan and schedule for structural modifications to enhance fish passage at the Amended Project if structural changes will enhance fish passage at the Amended Project and the failure to achieve the 85% fish passage is attributable, in whole or in part, to PPL. This plan and schedule shall be submitted to the Resource Agencies within 6 months from the end of the monitoring period. PPL shall implement the plan and schedule consistent with the approval of the DEP. In the event PPL fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and PPL shall implement that plan and schedule consistent with the approval of the DEP.

2. Downstream Shad Passage

- a. PPL shall implement a plan to measure the survival of American shad moving downstream past the Amended Project according to the schedule and consistent with the approval of the DEP (“Discrete Survival Study”). In the event PPL fails to submit the plan and schedule required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and PPL shall implement that plan and schedule consistent with the approval of the DEP.
- b. Following completion of the project amendments and upon commencement of operation of the Amended Project, PPL shall, in accordance with the plan established in Paragraph III. B. 2. a., conduct the Discrete Survival Study. PPL shall provide a report of the Discrete Survival Study within 90 days of its completion to the Resource Agencies.
- c. If the results of the Discrete Survival Study indicate that PPL can operate the Amended Project so that PPL achieves at least 95% survival of the juvenile American shad and 80 % survival of the adult American shad that pass through the Amended Project, then PPL shall incorporate into the annual FOP any required operational measures or protocols to meet the established percentages. These procedures will be subject to review at the annual meeting per paragraph III.A.1.d.
- d. If the results of the Discrete Survival Study do not indicate that the project can be operated to achieve at least 95% passage survival of juvenile American shad and 80% survival of adult American shad, PPL shall, at the annual FOP meeting propose a plan of operation and/or structural modifications of the Amended Project for the following year or such later date approved by the DEP to maximize the downstream American shad passage survival rate. For structural modifications, the plan shall include a plan for measuring and/or quantifying the effectiveness of the structural modification.

- e. This plan and schedule shall be submitted to the Resource Agencies within the time frame for submission of amendments to the FOP in accordance with Paragraph III.A.1.d.. PPL shall implement the plan and schedule consistent with the approval of the DEP. In the event PPL fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and PPL shall implement that plan and schedule.

3. Passage During Construction

- a. PPL shall mitigate impacts on American shad upstream fish passage during construction by providing \$100,000/year to the PFBC or other entity designated by the DEP in writing, beginning in the year that initial in-river construction commences (if construction commences below the Holtwood Dam prior to or during the upstream American shad migration period) or beginning in the following year (if construction commences after the upstream American shad migration period) until such time that construction activity in the river below the Holtwood Dam ceases. The payment shall be made by April 15 of each year that payment is due unless a different date is approved by the Department in writing. The funds shall be used to supplement currently available funds, to support American Shad restoration in the Susquehanna River.
- b. Fish passage during construction shall be reported in the annual FOP report and discussed as part of the annual FOP meeting.

C. Eel Passage

1. Upstream Eel Passage

- a. The trigger date for initiation of upstream eel passage measures shall be the earliest of the following dates:

- i. The date on which upstream eel passage becomes operational at Conowingo Dam; or
 - ii. The date on which eels begin being stocked into the Conowingo reservoir as part of an agency-approved stocking plan; or
 - iii. The date on which the DEP, in consultation with the other Resource Agencies, determines that newly available data indicates that eels are otherwise present below the Amended Project in numbers appropriate to require upstream eel passage.
- b. Within one month after the trigger date, PPL shall meet with the Resource Agencies to discuss a plan and schedule for a study to determine where to site permanent eel passage fishway(s). Based on this discussion, within three months after the meeting, PPL shall submit a plan and schedule for a study to determine where to site permanent eel passage fishway(s) to the Resource Agencies for review and approval. PPL shall implement the plan according to the schedule consistent with the approval of the DEP. In the event PPL fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and PPL shall implement that plan and schedule consistent with the approval of the DEP. If implementation takes longer than one year, PPL shall provide an annual report of the implementation of the plan by December 31 of each year.
- c. If a plan is fully implemented and the DEP, in consultation with the other Resource Agencies, determines the results do not yield adequate information to permit a siting decision for permanent passage, the study shall be repeated annually until adequate information is available and a satisfactory siting decision can be made. PPL may request

approval from DEP to delay or terminate any repeat studies.

- d. When DEP, in consultation with the other Resource Agencies determines that based on the results of the studies provided for in Paragraph III. C. 1. b. or c. there is adequate information available to permit a siting decision, PPL shall meet with the Resource Agencies to discuss a plan and schedule for siting and construction of permanent eel fishways. Within 6 months from the date of the meeting, PPL shall provide design plans and a schedule for installation of upstream eel passage fishway(s) to the Resource Agencies for review and approval. PPL shall implement the plan and schedule consistent with the approval of the DEP. In the event PPL fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and PPL shall implement that plan and schedule consistent with the approval of the DEP.
- e. Within one month from approval of the plan for installation of the upstream eel passage fishway(s), PPL shall meet with the Resource Agencies to discuss a plan and schedule to monitor the effectiveness of upstream eel passage and to annually count and report the number of eels passing the Amended Project. Based on this discussion, within three months of the meeting, PPL shall submit a plan and schedule for monitoring the effectiveness of upstream eel passage to the Resource Agencies for review and approval. PPL shall implement the plan according to the schedule consistent with the approval of the DEP. In the event PPL fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the PFBC and the USFWS, may establish a plan and schedule and PPL shall implement that plan and schedule consistent with the approval of the DEP.

- f. PPL will provide an annual report of monitoring results to Resource Agencies by December 31 of each year.
- g. Once the upstream passage system for eels is operational and annual monitoring has been implemented, PPL shall evaluate the effectiveness of upstream passage through PIT tagging in a manner approved by DEP unless a different monitoring method is agreed upon by the parties.

2. Downstream Eel Passage

- a. The trigger date for initiation of downstream eel passage measures shall be the earliest of the following dates:
 - i. Three years following the date on which upstream eel passage becomes operational at Amended Project; or
 - ii. Three years following the date on which eels begin being stocked into Lake Aldred as part of an agency-approved stocking plan; or
 - iii. The date on which the DEP, in consultation with the other resource agencies, determines that newly available data indicates that eels are otherwise present upstream of the Amended Project or other upstream areas in numbers appropriate to require downstream eel passage.
- b. Within one month after the trigger date or such longer period established by DEP, PPL shall meet with the Resource Agencies to discuss a plan and schedule for a discrete survival study to measure the effectiveness of downstream passage of eels at the Amended Project. Based on this discussion, within six months, PPL shall submit a plan and schedule for a discrete survival study to measure the effectiveness of downstream eel passage to the Resource Agencies for review and

approval. The plan shall include balloon tag studies or such other studies approved by the DEP in consultation with the other Resource Agencies. PPL shall implement the plan according to the schedule consistent with the approval of the DEP. In the event PPL fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and PPL shall implement that plan and schedule consistent with the approval of the DEP. PPL shall provide a report of the study results within 90 days of the date of completion of the study.

- c. If the results of the discrete survival study indicate that PPL can operate the project so that PPL achieves at least 85% survival of the American eel that pass through the Amended Project, then PPL shall incorporate in the annual FOP any operational measures needed to meet this percentage. These procedures will be subject to review at the annual meeting per Paragraph III.A.1.d.
- d. If the results of the studies do not indicate that the Amended Project can be operated to achieve at least 85% passage survival of American eel, PPL shall, at the annual FOP meeting, propose a plan of operation or structural modifications of the Amended Project for the following year or such later date approved by the DEP to maximize the downstream American eel passage survival rate. For structural modifications, the plan shall include a plan for measuring and/or quantifying the effectiveness of the structural modification.
- e. This plan and schedule under Paragraph III. C. 2. d. shall be submitted to the Resource Agencies within the time frame for submission of amendments to the FOP under Paragraph III.A.1.d. above. PPL shall implement the plan and schedule consistent with the approval of the DEP. In the event PPL fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource

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

D. Resident Fish Passage

1. Resident fish species include all fish species that occur in the Susquehanna River excluding anadromous and catadromous fish.

2. For a period of five years beginning when the Amended Project commences operation, excluding days when river flow at the Marietta gage exceeds 100,000 cfs, PPL shall, consistent with the provisions of the FOP:

- a. operate the fish passage system from April 1 through June 30 to allow passage of resident fish species;
- b. subject to Paragraph III.D.4 below, operate the fish passage system from September 1 through October 15 in order to facilitate fall passage of resident fish.
- c. Operation of the fish passage system for resident fish species, from September 1 through October 15, shall occur up to 5 days per week and 6 hours per day as described in the FOP.

3. During this five year period of operation of the fish passage system to allow passage of resident fish species, PPL shall count and identify resident fish and provide a daily monitoring report for the periods April 1 through June 30 and September 1 through October 15 submitted on a daily basis and an annual monitoring report submitted by December 31 of each year to the Resource Agencies.

4. At the FOP meeting each year, PPL and the Resource Agencies shall discuss the September/October resident fish passage condition. If there is evidence of any necessary and documented repairs to the fish passage facilities that could not be mitigated or repaired in time for spring operation, PPL may propose modifications to the five year September/October fish passage operation to the DEP. If PPL demonstrates to the DEP's satisfaction, in consultation with the other Resource Agencies, that the fall passage of resident fish presents a significant and unacceptable risk that the fish passage facilities will not be available for spring operation, then PPL may discontinue fall operation of the fish passage facilities upon receipt of written approval from the DEP.

5. At the FOP meeting preceding the end of this five year period, PPL and the Resource Agencies shall discuss whether modifications to the fish passage system operation for resident fish species are necessary. Absent modification, PPL shall continue to operate the fish passage system from April 1 through June 30 of each year as it was operated during the initial five year period. A decision concerning operation of the fish passage system in September/October shall be based on the monitoring results and PPL's experience with making repairs to any damage to the fish passage facilities in time for spring operation. The decision shall be made in writing by the DEP based on the consensus recommendation of the PFBC and MDDNR with input from PPL.

IV. MINIMUM STREAM FLOW ("MSF")

A. MSF Operating Procedures and General Requirements.

1. PPL shall implement a Minimum Stream Flow Operation Procedure Manual (MSFOP) for the Amended Project approved by the DEP. The MSFOP shall include, as necessary, schedules for routine maintenance, procedures for routine operation including: seasonal and daily periods of operation, dam and powerhouse operational measures detailing how the plant shall be operated to meet MSF conditions and requirements including sequencing of turbine start-up and operation, flow split between the old and new powerhouses and between the tailrace and Piney Channel, procedures for measuring and reporting minimum stream flows, procedures for determining net inflows to Lake Aldred, flows in the tailrace and Piney Channel and the spillway channel, as well as any other necessary provisions for plant operation, procedures for monitoring and reporting on the operation, procedures for annual start-up and shut-down, and procedures for use in case of emergencies and project outages significantly affecting MSF requirements. In the event PPL fails to submit the MSFOP as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a MSFOP and PPL shall implement the MSFOP consistent with the approval of DEP.

2. PPL shall implement the MSFOP according to the schedule upon review and consistent with the approval of the DEP. PPL shall provided written documentation to the Resource Agencies that all operational personnel have reviewed and understand the MSFOP signed by the operations manager of the Amended Project.

3. Copies of the approved MSFOP and all modifications will be provided to the Resource Agencies.

4. By December 31 of each year, PPL shall provide an annual report (the "MSFOP annual report") detailing the implementation of the MSFOP including any deviations from the MSFOP and a process to prevent those deviations in the future to the Resource Agencies. PPL shall meet with the Resource Agencies by January 31 of each year unless a different date is mutually agreed upon by PPL and the Resource Agencies. Any required modifications to the MSFOP shall be submitted to the Resource Agencies within 30 days of receipt of a request for the modification unless a longer period is approved by the DEP. The modification to the MSFOP shall be implemented consistent with the approval of the DEP.

5. PPL may request a waiver of any of the MSF established herein for a specified period of time if necessary for construction of the new hydroelectric facilities or fish passage system at the Amended Project.

6. In the event of an emergency, where necessary to prevent unavoidable loss of life, personal injury or severe property damage and where there is no feasible alternative, PPL shall not be required to meet the MSF provisions of this certification. PPL shall notify the DEP within 24 hours and provide a report to DEP within 15 days from the date of any emergency.

7. Except for the MSF established under Section IV. B. 1 and 2 hereof, DEP may require amendments to the MSFOP as necessary to maintain and protect existing and designated uses and to implement water quality standards and other appropriate requirements of state law. PPL shall submit all amendments to the Resource Agencies for review and approval on the schedule established by the DEP for submission of the amendment. PPL shall implement any amendments to the MSFOP according to the schedule and consistent with the approval of the DEP.

B. Minimum Stream Flow

1. Upon issuance by FERC of the amended license authorizing installation of the new hydroelectric turbines and except where a higher flow is otherwise required to meet fish passage or recreational boating requirements and except as provided in Paragraph IV. B. 2. below, PPL shall operate the Amended Project to release (including leakage) on a daily volumetric basis 98.7 percent of the minimum flows required by FERC to be released at the Conowingo Hydroelectric Facility.

2. If net inflow to Lake Aldred is less than the MSF requirement established in Paragraph IV.B.1. above, the Amended Project shall achieve a MSF release on a daily volumetric basis equal to the net inflow to Lake Aldred.

3. Except where a higher flow is necessary to meet fish passage or recreational boating requirements, PPL shall achieve an hourly release equal to the lesser of: (a) 800 cfs, or (b) the hourly net inflow to Lake Aldred, with allowances for lake evaporation and other estimated quantities as authorized by the SRBC in accordance with the approved MSFOP. PPL may request a modification to this requirement at any time and shall implement the modification upon approval by the Department.

4. PPL is authorized to vary the total daily minimum releases, with the approval of SRBC, in such a way as to eliminate drawdown caused by the continuous releases during times of drought provided the other MSF requirements of this 401 certification are achieved. This variance is limited to that necessary to mitigate the drawdown caused by the continuous releases to Piney Channel and the spillway.

5. PPL may request a waiver of the MSF established by Paragraphs IV.B.1 and 2 above for a specified period of time if necessary for construction of the new hydroelectric facilities or fish passage system at Holtwood.

6. Within one year from the issuance of the FERC license, as part of the MSFOP, PPL shall submit a plan for measurement, recordkeeping and reporting on minimum stream flows to the Resource Agencies for review. That measurement shall include, where appropriate, continued evaluation capable of providing information, including real time data on multiple parameters, to demonstrate compliance with MSF conditions.

C. Minimum Stream Flows in the “Spillway Area”

1. PPL shall implement a plan and schedule approved by the DEP for achieving minimum stream flows in the Spillway Area as may be necessary to maintain and protect existing and designated uses and to implement water quality standards and other appropriate requirements of state law. In the event PPL fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and PPL shall implement that plan and schedule consistent with the

approval of the DEP. The plan shall include a minimum stream flow in the spillway area at least equal to the present rate of leakage through the dam flashboards plus the level of flow through the ten inch pipe in the dam. In order to protect endangered plants (sticky goldenrod and white doll's daisy), the spillway area shall remain essentially dry during the summer months, except when river flow is sufficient to cause spills over the dam. To provide periodic inundation of the plants in a manner similar to what has occurred historically, irrigation spills of 1000 cfs for a period of one hour per day shall, subject to modification under paragraph IV. A. 7., be provided in summer months (June through September) at times when river flows are above 31,000 cfs and less than 61,500 cfs. As currently configured, flows will enter the spillway area during the summer months from Piney Channel when Unit 1 is operation or when recreational boating flows occur. During construction, PPL shall develop a plan, in consultation with the Resource Agencies, to prevent the spillway area (where endangered species are located) from being inundated with water during the summer months, provide for irrigation flows and ensure that migratory fish will be able to traverse between the spillway and Piney Channel during seasonal migratory periods. PPL shall submit this draft plan to the Resource Agencies within six months following the issuance of the FERC license and shall implement the plan as approved by the DEP. If a closure structure is needed, minor filling will be required that would permanently impact a maximum of 210 square feet of the Susquehanna River. The plan shall include a process for ongoing monitoring of the spillway area.

2. PPL shall implement a MSF monitoring plan for the spillway area according to the schedule consistent with the approval of the DEP. In the event PPL fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and PPL shall implement that plan and schedule consistent with the approval of the DEP. PPL shall annually report the monitoring results by December 31st of each year, which shall be included in the MSFOP annual report.

3. After three years of operation of the Amended Project or such different time established by the DEP, in consultation with the other Resource Agencies, if the results indicate that existing and designated uses and water quality standards are not being maintained and protected and other appropriate requirements of state law are not achieved, DEP may require that PPL propose a plan and schedule for modifications to minimum stream flows in the spillway area if operational modifications would help to maintain and protect existing and designated uses and to implement water quality standards and other appropriate requirements of state law. This plan and schedule shall be submitted to the Resource Agencies within 6 months from the date that the DEP notifies PPL of the need for the plan and schedule. PPL shall implement the plan and schedule

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

4. After three years from beginning of implementation of the operational modifications described in Paragraph IV.C.3, or different time established by the DEP in consultation with the other Resource Agencies, if the results indicate that the existing and designated uses and water quality standards are not being maintained and protected and other appropriate requirements of state law are not achieved PPL shall consult with the Resource Agencies to determine if additional operational or structural modifications are necessary to maintain and protect existing and designated uses and to implement water quality standards and other appropriate requirements of state law. If DEP, in consultation with the Resource Agencies, determines that such operational or structural modifications are necessary and would help to maintain and protect existing and designated uses and to implement water quality standards and other appropriate requirements of state law, DEP may require that PPL propose a plan and schedule for additional modifications to minimum stream flows in the Spillway Area. This plan and schedule shall be submitted to the Resource Agencies within 6 months or such longer time established by DEP in consultation with the Resource Agencies. PPL shall implement the plan and schedule consistent with the approval of the DEP. For structural modifications, the plan shall include a plan for measuring and/or quantifying the effectiveness of the structural modification.

D. Minimum Stream Flows in Piney Channel, and the Tailrace and from Lake Aldred

1. PPL shall implement a plan and schedule approved by the DEP for achieving and monitoring minimum stream flows in the Piney Channel, and the Tailrace and from Lake Aldred as may be necessary to maintain and protect existing and designated uses and to implement water quality standards and other appropriate requirements of state law. As part of the monitoring portion of the plan, PPL shall provide a plan and schedule for design and installation of telemetry at the stream gage on Pequea Creek at Martic Forge (USGS Station Gage #01576787). In the event PPL fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resources Agencies, may establish a plan and schedule and PPL shall implement that plan and schedule consistent with the approval of the DEP.

2. PPL shall implement the monitoring portion of the plan according to the schedule consistent with the approval of the DEP. In the event PPL fails to submit the plan and schedule as required by this paragraph, the DEP, in consultation with the other Resource Agencies, may establish a plan and schedule and PPL shall implement that plan and schedule consistent with the approval of the DEP. PPL shall report the monitoring results by December 31st of each year, which shall be included in the MSFOP annual report.

3. Commencing upon operation of Unit 1 being re-routed to Piney Channel or upon operation of the Amended Project, whichever occurs first, PPL shall achieve a continuous minimum release of 200 cfs into the Piney channel.

4. During times of upstream anadromous fish passage, PPL shall maintain MSF in the tailrace and Piney Channel to attract American Shad to the fish passage system entrance at such times and for such durations as detailed in the FOP and MSFOP. MSF must result in velocities that provide necessary attraction flows as well as a zone of passage. Within one year from the issuance of the FERC license amendment, PPL shall provide, as part of the MSFOP, a plan, schedule and approach to conduct measurement of flows in the tailrace and Piney Channel through the range of operating scenarios sufficient to demonstrate that there is a minimum velocity greater than or equal to 2 feet/sec. and less than or equal to 6 feet/sec. within a zone of passage at least 12 feet wide and 3 feet deep (collectively the "passage criteria") to provide safe, timely and effective passage. The plan shall include the use of devices, placement, operation and timing for implementation of this plan. If measurement demonstrates that velocities and/or zone of passage do not meet the passage criteria, PPL shall propose and implement operational changes or other appropriate measures approved by DEP in consultation with the Resource Agencies during fish passage season so that velocities and zones of passage meet the passage criteria.

5. After three years of operation of the Amended Project or such different time established by the DEP in consultation with the other Resource Agencies, if the results indicate that existing and designated uses and water quality standards are not being maintained and protected and other appropriate requirements of state law are not achieved, DEP may require that PPL propose a plan and schedule for modifications to minimum stream flows in the Piney Channel, and/ or the Tailrace and/or from Lake Aldred if operational modifications would help to maintain and protect existing and designated uses and to implement water quality standards and other appropriate requirements of state law. This plan and schedule shall be submitted to the Resource Agencies within 6 months from the date that the Resource Agencies notify PPL of the need for the

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

6. After three years from beginning of implementation of the modifications described in Paragraph IV.D.5., or such different time established by the DEP in consultation with the other Resource Agencies, if the results indicate that the existing and designated uses and water quality standards are not being maintained and protected and other appropriate requirements of state law are not achieved PPL shall consult with the Resource Agencies to determine if additional modifications are necessary to maintain and protect existing and designated uses and to implement water quality standards and other appropriate requirements of state law. If DEP, in consultation with the Resource Agencies, determines that such operational or structural modifications are necessary and would help to maintain and protect existing and designated uses and to implement water quality standards and other appropriate requirements of state law, DEP may require that PPL propose a plan and schedule for additional modifications to minimum stream flows in the Piney Channel, and/or the Tailrace and/or from Lake Aldred. This plan and schedule shall be submitted to the Resource Agencies within 6 months or such longer time established by DEP in consultation with the Resource Agencies. PPL shall implement the plan and schedule consistent with the approval of the DEP. For structural modifications, the plan shall include a plan for measuring and/or quantifying the effectiveness of the structural modification.

V. BOATING AND FISHING

A. Recreational Boating in Piney Channel

1. PPL shall implement the terms of the Settlement Agreement dated June 12, 2009 between PPL and the Greater Baltimore Canoe Club, Stark Moon, SWW Park Alliance, Conewago Canoe Club, Susquehanna Surf Society, Topher Smith, Chris Iverson and American Whitewater in a manner consistent with the other requirements of this 401 Certification. PPL is responsible for construction of the whitewater kayaking features described in the Settlement Agreement. The whitewater features shall be operational by the time the amended project becomes operational.

B. Pequea Boating Access

1. The Pequea Creek Boat Launch shall be modified to construct and maintain a new boat ramp measuring 100.0-feet long by 20.0-feet wide into the Susquehanna River, a 25.0-foot by 20.0-foot ADA accessible fishing platform and dock, 18 additional trailer spaces, 3 additional car parking spaces and 2 ADA accessible parking spaces and place 1,633.0 cubic yards of material in and along the Susquehanna River (WWF) (Conestoga, PA Quadrangle N: 2.35 inches; W: 16.39 inches; Latitude: 39° 53' 16.2" N; Longitude: 76° 22' 0.7" W). The Pequea Boat Launch shall also be modified to construct and maintain a 52-foot long extension to an existing boat ramp to provide total boat ramp dimensions of 80.0-feet long by 12.0-feet wide. This modification shall be in Pequea Creek (WWF) located approximately 75.0-feet upstream of the railroad bridge near the confluence with the Susquehanna River (Conestoga, PA Quadrangle N: 2.5 inches; W: 16.5 inches; Latitude 39° 53' 17.4" N; Longitude: 76° 22' 0.5" W).

2. The Pequea Creek Boat Launch shall be constructed in accordance with Pequea Boat Launch Drawing No. D323450, Sheet No. 2, Rev. D, dated October 27, 2008 and shall be completed no later than the beginning of operation of the Amended Project.

3. The docking facilities along the Susquehanna River shall be equipped with proper lighting which meets the visibility requirements of the Pennsylvania Fish and Boat Commission.

4. Construction of these ramps shall take place between September 15 and May 15.

5. PPL shall notify DEP, in writing, of the proposed time for commencement of work at least 15 days prior to beginning construction;

C. Tailrace Fishing. PPL shall construct and maintain a bridge over the railroad tracks along the east bank of the Susquehanna River for the purpose of allowing recreational access to a new parking area, measuring 200.0-feet long by 50.0-feet wide, located between the railroad right-of-way and the Holtwood Tailrace (Holtwood, PA Quadrangle N: 13.25 inches; W: 11.0 inches; Latitude: 39° 49' 22.6" N; Longitude: 76° 19' 35.3" W). This parking area shall include parking for 18 cars, with 3 spaces reserved for ADA access. From the parking area an ADA accessible trail shall provide access to a 40.0-foot by 10.0-foot fishing platform along the Holtwood Tailrace. The fishing platform shall be retrofitted from the abutment to the lower tailrace bridge and shall require 150 cubic yards of concrete over 400.0 square feet of forested floodplain. The project shall be completed no later than the beginning of operation of the Amended Project.

D. York County Parking PPL shall construct additional parking along the existing McCall's Ferry Road, which is located in the floodway of the Susquehanna River (Holtwood, PA Quadrangle N: 13.0 inches; W: 12.5 inches; Latitude: 39° 49' 15.6" N; Longitude: 76° 20' 16.5" W), to provide parking for the white water boating community use. The additional parking includes widening McCall's Ferry Road by 27.5-feet for a distance of 137-feet. The project shall be completed no later than the beginning of operation of the Amended Project.

E. York Furnace Recreation Area

1. PPL shall extend the two existing boat ramps at the York Furnace Boating Access into the Susquehanna River (Safe Harbor, PA Quadrangle N: 0.75 inches; W: 1.0 inches; Latitude: 39° 52' 20.8" N; Longitude: 76° 22' 48.3" W). The extensions each measure 30.0-feet long by 12.0-feet wide to provide total boat launch dimensions of 95-feet long by 12-foot wide each. The project shall be completed no later than the beginning of operation of the Amended Project.

2. Construction of the York Furnace boat ramps in/along Susquehanna River shall take place between September 15 and May 15.

VI. DISSOLVED OXYGEN ("DO")

A. Dissolved Oxygen Limitation.

1. PPL shall operate the Holtwood facility in such manner that it does not cause a violation of the dissolved oxygen criteria in the DEP water quality standards (currently a minimum daily average dissolved oxygen concentration of 5 mg./l. and a minimum of 4 mg./l.).

2. Within 6 months from issuance of the FERC license, PPL shall submit a DO monitoring plan to the DEP. The plan shall propose a plan and schedule for continuous monitoring of dissolved oxygen levels in the forebay, the tailrace and Piney Channel during the months of April through September for a five year period beginning upon implementation of the plan. The plan shall include data collection, analysis and reporting. At the end of the five year monitoring period, PPL may propose to discontinue or modify monitoring based on the results of the monitoring and the need for continued monitoring.

3. PPL shall implement the plan and schedule as approved by the Department.

4. If the monitoring conducted under the plan identifies violations of the daily average or instantaneous standard resulting from operation of the project, PPL shall, within 30 days, consult with the DEP and within 90 days submit a plan to resolve any DO violations resulting from operation of the Holtwood Facility.

VII. ENDANGERED SPECIES AND SPECIES OF SPECIAL CONCERN

A. Bald Eagle

1. Work shall be performed in accordance with the Bald Eagle Management and Monitoring Plan for Holtwood Redevelopment dated August 8, 2008.

2. PGC shall be notified within 24 hours of any new bald eagle nests located within the Project Area.

B. Osprey

1. Construction activities will be limited to outside a 500.0-foot buffer around osprey nest(s) during the nesting season, March 25 through July 31. The Pennsylvania Game Commission (PGC) will be contacted when any construction activity is to occur within 800.0-feet of an osprey nest during the nesting season.

2. Weekly monitoring of all osprey nests is required when construction activity is occurring within 800.0-feet of active nest(s) in order to document behavior of osprey. This information shall be included in an annual report submitted to PGC.

3. PGC shall be notified within 24 hours of any new osprey nests located in the Project Area.

C. Plant Species

1. See Section IV.C.

2. American Holly plants located on the roadways of Piney Island shall be removed and stored in a nursery setting during construction and replanted after construction in a manner consistent with a plan approved by the Department of Conservation and Natural Resources. All machinery entering Piney Island shall be cleaned prior to entering the island in a manner consistent with a plan approved by the Department of Conservation and Natural resources.

VIII. WETLAND AND STREAM COMPENSATORY MITIGATION

A. Wetland Mitigation

1. All existing wetlands within the project area shall be accurately field-definable prior to the start of construction activities and up to the time that earth disturbance activities are completed and the site has been stabilized. An acceptable means of field-identification is the use of an orange construction safety fence.
2. Wetland mitigation shall be constructed at the RLPS Architect's property ("RPLS Mitigation") located west-southwest of the intersection of Oregon Pike (PA-272) and Valleybrook Drive in Manheim Township, Lancaster County (Lancaster, PA Quadrangle N: 15.96 inches; W: 5.37 inches; Latitude: 40° 05' 16.332"N Longitude: 76° 17' 18.2004" W) in the floodway of Landis Run (WWF).
3. The wetland mitigation shall be constructed in accordance with the RLPS Property: Emergent and Forested Wetland Mitigation narrative and plans titled Wetland Mitigation Project-RLPS Architects Site, prepared by Kleinschmidt Energy & Water Resource Consultants, sheets 1-6, received by the Department on August 22, 2008.
4. PPL shall notify DEP, in writing, of the proposed time for commencement of work at least 15 days prior to beginning construction;
5. The construction of the wetland mitigation, done in accordance with the aforementioned plans, shall be completed by September 30, 2010.
6. If the DEP determines that the RPLS Mitigation cannot be constructed, then PPL shall propose an alternative wetland mitigation project to the DEP within 60 days of receipt of written notice that the RPLS Mitigation cannot be constructed. If PPL fails to provide an alternative project within this time period, or if PPL proposes a project that is not acceptable to the DEP, the DEP can identify a wetland mitigation project. Within 60 days after approval or identification of a wetland mitigation project, in writing, PPL shall submit a complete narrative, plans, specifications, drawings and schedule for construction and monitoring of the wetland mitigation project. Any additional information or revisions requested by the DEP in writing shall be submitted within 30 days of the request or within a longer time frame approved by the DEP, in writing. PPL shall implement the wetland mitigation project consistent with the approval of the DEP

7. PPL shall monitor the wetland replacement site for at least five years. Reports shall be submitted to DEP twice a year for the first two years reporting on the spring and fall monitoring periods then once a year for the following three years being submitted no later than October 31. Annual reports shall follow guidance provided for wetlands by DEP's wetland replacement manual and/or publications, including, but not limited to information describing the success of the site at the time of inspection, an inventory of the surviving plant species and percent coverage, photographs of the mitigation site with plans showing the location and orientation of each of the photographs, and a written plan to correct any resource replacement deficiencies identified during the monitoring phase and implement corrective measures in order that design objectives are achieved.

8. If wetlands constructed on the approved sites have not achieved design objectives within the monitoring period, remedial work will be required to assure establishment of 2.1 acre(s) of functional wetlands. Replacement wetlands shall be considered successful when they meet the design objectives as stated in the approved wetland replacement plan.

B. Stream Restoration

1. PPL shall construct and maintain a 3200.0-foot stream restoration project in and along Pequea Creek (WWF) located (New Holland and Gap, PA Quadrangles Latitude: 40° 00' 01.1" N; Longitude: 76° 06' 11.1" W) in Paradise and Leacock Townships, Lancaster County. The project shall include riparian plantings along 5000.0-feet (4-acres) of Pequea Creek, 3,300-feet of streambank fencing, two cattle crossing, one cattle access, four areas of habitat boulder placement, five rock cross vanes, nine J-hooks, four stream bank rock deflectors, five root wads, four muddsill fish enhancement structures.

2. The stream restoration project shall be constructed in accordance with the Pequea Creek Phase IV Stream Restoration proposal received by the Department on October 14, 2008 consisting of Plan Sheets 1 - 15.

3. Prior to implementing the aforementioned plan, PPL shall obtain an approved E&S Plan from the Lancaster County Conservation District.

4. PPL shall notify DEP, in writing, of the proposed time for commencement of work at least 15 days prior to beginning construction.

5. The construction of the stream restoration project, done in accordance with the aforementioned plans, shall be completed by September 30, 2010.

6. PPL shall provide copies of annual monitoring reports to the Department for a period of three years following construction of the stream restoration project. Monitoring reports shall include a minimum of comments on channel conditions, bank/structure conditions, an inventory of the surviving plant species and percent coverage, photographs of the stream reach with plans showing the location and orientation of each of the photographs, and a written plan and schedule to correct any deficiencies identified during the monitoring phase.

C. Brunner Island Plantings

1. PPL shall implement the planting scheme titled Prescott Road Property: Forest Mitigation Planting Plan, PPL Drawing No. D323455, Sheet No. 2, Rev. B, 10/13/08.

2. PPL shall notify DEP, in writing, of the proposed time for commencement of work at least 15 days prior to beginning construction.

3. The construction of the Brunner Island Planting Project shall be done in accordance with the aforementioned plans, shall be completed by September 30, 2010.

4. PPL shall provide copies of annual monitoring reports to the Department for a period of three years following construction of the Brunner Island Planting Project. Monitoring reports shall include an inventory of the surviving plant species and percent coverage and a written plan and schedule to correct any deficiencies identified during the monitoring phase.

D. Dam Removals

1. PPL shall remove three (3) dams

- a. D36-306, Levi Fisher Dam located on Pequea Creek (HQ-CWF) at a point just west of the intersection of Mount Vernon Road and Buena Vista Road (Honey Brook, PA Quadrangle; Latitude: 40° 1' 9.12" N, Longitude: 75° 59' 4.56" W) in Salisbury Township, Lancaster County;
- b. D36-220, Smucker Dam located on Groff Run (WWF) at a point just west of the intersection of Tabor Road and Custer Avenue (New Holland PA Quadrangle;

Latitude: 40° 4' 9.84" N, Longitude: 76° 5' 8.52" W)
in Earl Township, Lancaster County; and

- c. D36-270, Zimmerman Dam located on Conestoga River (WWF) at a point just southwest of the intersection of Cabin Road and Twenty-Eighth Division Highway (S.R. 322) (Ephrata PA Quadrangle; Latitude: 40° 9' 1.44" N, Longitude: 75° 8' 11.49" W) in Earl Township, Lancaster County;

2. The dam removal projects shall be constructed in accordance with the plans submitted to the Department on October 9, 2008. The plan for the Fisher Dam is dated August 4, 2007 and consists of Sheets 1 – 15. The plan for the Smucker Dam is dated September 18, 2008 and consists of Sheet 1. The plan for the Zimmerman Dam is dated September 18, 2008 and consists of Sheets 1 – 4.

3. Prior to implementing the plans, PPL shall obtain an approved E&S Plan from the Lancaster County Conservation District.

4. PPL shall notify DEP, in writing, of the proposed time for commencement of work at least 15 days prior to beginning construction.

5. The dam removals shall be completed by September 30, 2010. PPL shall provide a copy of the Dam Breach Certification to the Department upon completion of the projects.

6. If any dam project is funded by a grant from the National Oceanographic and Atmospheric Administration ("NOAA"), then PPL shall propose an alternative mitigation project to the DEP within 60 days of receipt of written notice of NOAA funding. If PPL fails to provide an alternative project within this time period, or if PPL proposes a project that is not acceptable to the DEP, DEP can identify a mitigation project. Within 60 days after approval or identification of a mitigation project, in writing, PPL shall submit a complete narrative, plans, specifications, drawings and schedule for construction and monitoring of the mitigation project. Any additional information or revisions requested by the DEP in writing shall be submitted within 30 days of the request or within a longer time frame approved by the DEP, in writing. PPL shall implement the mitigation project consistent with the approval of the DEP

7. PPL shall provide copies of annual monitoring reports to the DEP for a period of three years following construction of the dam removals. Monitoring reports shall include a minimum of comments on the status of the projects, channel conditions, bank/structure conditions, photographs of the stream

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reach with plans showing the location and orientation of each of the photographs, and a written plan and schedule to correct any deficiencies identified during the monitoring phase.

James S. Spontak	Date
Program Manager	
Watershed Management Program	

APPENDIX B

U.S. Department of the Interior, U.S. Fish and Wildlife Service Modified Fishway Prescription Pursuant to Section 18 of the FPA filed September 3, 2009

Modified Prescription for Fishways

Pursuant to section 18 of the Federal Power Act, as amended, the Secretary of the Department of the Interior, as delegated to the Service, is exercising his authority to prescribe the construction, operation and maintenance of such fishways as deemed necessary, subject to the procedural provisions described above.

The Department's Modified Prescription for Fishways reflects a number of issues and concerns related to fish restoration and passage that have been raised by the applicant, Commission staff, State resource agencies, and other parties involved in these proceedings.

Fishways shall be constructed, operated, and maintained to provide safe, timely, and effective passage for American shad, alewife, blueback herring, and American eels and other designated riverine fish species at the licensee's expense.

To ensure the immediate and timely contribution of the fishways to the ongoing and planned anadromous and catadromous fish restoration and enhancement program in the Susquehanna River, the following are included and shall be incorporated by the licensee to ensure the effectiveness of the fishways pursuant to section 1701(b) of the 1992 National Energy Policy Act (P.L. 102-486, Title XVII, 106 Stat. 3008).

Design Populations

American shad:

The design population at the Project for American shad is derived from the *1993 Settlement Agreement for the Development of Fish Passage Facilities at the Holtwood, Safe Harbor, and York Haven Projects on the Susquehanna River*,³⁵

³⁵ Settlement Agreement. 1993. Pennsylvania Power and Light Company, Safe Harbor Water Power Corporation, and York Haven Power Company, and United States Department of the Interior Fish and Wildlife Service, Pennsylvania Fish and
(continued)

and the existing fishway was designed to pass 2,700,000 American shad.

River herring (alewife and blueback herring):

The design population at the Project for river herring is derived from the *1993 Settlement Agreement for the Development of Fish Passage Facilities at the Holtwood, Safe Harbor, and York Haven Projects on the Susquehanna River*, and the existing fishway was designed to pass 10,00,000 river herring.

American eel:

American eel do not currently have access to Project waters due to a lack of upstream passage at the Conowingo Hydroelectric Project located downstream, but the Service anticipates that eels will soon have access to the Project tailwater when passage facilities or trap and truck operations for eels are made available at the downstream Conowingo Hydroelectric Project. While the Department does not have a precise estimate of the numbers of eels that would be expected to use eel passage at the Project, a properly designed and sited upstream eel passageway at the Project would enhance the eel stocks and help to achieve overall management goals of Federal and State resource agencies when eels arrive at the Project.

Upstream passage needs for eels differ from those of American shad and river herring. Separate upstream eel fishways typically are installed at barriers in addition to those that are provided for anadromous migratory fish. The licensee has agreed to install eel ramps and monitoring equipment at the Project, report annual passage numbers, and consult with the Service and State resource agencies regarding future eel passage needs. Based on the information made available through the licensee's proposed study and consultation process, the Service will be able to determine the effectiveness of the proposed eel passage to accommodate adequate numbers of migrating eels needed to meet the resource agencies' restoration objectives.

Boat Commission, Pennsylvania Department of Environmental Resources,
Maryland Department of Natural Resources, Susquehanna River Basin
Commission, Upper Chesapeake Watershed Association, and Pennsylvania
Federation of Sportsmen's Clubs. June 1, 1993

1. Operational Flows

Upstream anadromous fishways shall be operational during the designated migration period at river flows up to 100,000 cfs, as measured at the USGS gage at the Susquehanna River at Marietta, No. 01576000. Downstream fishways shall be operated during the designated migration period whenever units are operated at the Holtwood Project.

2. Fishway Operating Periods

Regarding the timing of seasonal fishway operations, fishways shall be maintained and operated, at the licensee's expense, to maximize fish passage effectiveness throughout the upstream and downstream migration periods for American shad, alewife, blueback herring, American eel, and designated riverine fish.

Table 1: Upstream and downstream migration periods for the target fish species.*

Species	Upstream Migration Period	Downstream Migration Period
American shad	April 1 through June 15	July 1 through November 15 (juv.) April 15 through July 1 (adult)
Alewife & Blueback herring	April 1 through June 15	June 15 through October 14 (juv.) April 15 through July 1 (adult)
American eel	March 1 through December 1, or whenever river temperature is above 50 degrees F **	September 15–February 15, or whenever river temperature is above 50 degrees F ***

* Any of these migration periods may be changed during the term of the license by the Service, based on new information, in consultation with the other fishery agencies and the licensee.

** The Service is calling for the licensee to study the duration and timing of upstream eel migration through the projects so that the effectiveness of this period can be evaluated. This initial operational period is based on preliminary data on American eel migration timing from other tributaries to the Chesapeake Bay.³⁶

³⁶ Walsh, S., Smith, D., Eyler, S., Zimmerman, J., Mandt, T. 2007. Migration of
(continued)

*** The Service is calling for the licensee to study the magnitude and timing of downstream eel migration through the projects so that the effectiveness of the reduced period can be evaluated. This initial operational period is based on preliminary data on American eel migration timing from other tributaries to the Chesapeake Bay.³⁷

3. Fishway Operational Procedures during Powerhouse Construction

The timely and proper operation of the existing fishway structures, facilities, or devices is a measure directly related to those structures, facilities, or devices and is necessary to ensure the effectiveness of such structures, facilities, or devices. The construction of the new powerhouse has the potential to adversely affect the operation of the existing fishways over the extended construction period proposed for the Project. Therefore, the Department's Prescription includes the express requirement that the licensee develop a plan for construction sequencing during the migratory fish passage season. This plan should describe how the licensee expects to undertake construction activities at the Project so as to avoid impacts to the migration of anadromous and catadromous fish. The plan should provide for the continued operation of all fish passage facilities as well as construction restrictions to prevent interference with fish migration.

The licensee shall prepare the plan after consultation with the Service, the Pennsylvania Fish and Boat Commission, the Pennsylvania Department of Environmental Protection, and the Pennsylvania Department of Conservation and Natural Resources. The licensee shall include with the plan documentation of consultation, copies of comments, and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies and other interested organizations to comment and to make recommendations.

silver-phase and yellow-phase American eels in relation to hydroelectric dams on the Shenandoah River: Progress Report. Submitted to Allegheny Energy Supply, December 3. 32 pp.

³⁷ Walsh, S., Smith, D., Eyler, S., Zimmerman, J., Mandt, T. 2008. Migration of silver-phase and yellow-phase American eels in relation to hydroelectric dams on the Shenandoah River: Progress Report. Submitted to Allegheny Energy Supply, March 12. 39 pp.

4. Inspection

The licensee shall provide personnel of the Service, and other Service-designated representatives, timely, access to the Project site and to pertinent Project records for the purpose of inspecting the fishways to determine compliance with the fishway Prescriptions.

5. Consultation

The licensee shall develop, in consultation with and submit for approval by the Service, all functional and final design plans, construction schedules, and any hydraulic model studies for the fishways or modifications to existing fishways described herein.

6. General Requirements

6.1 Fishway Operating Plan (FOP)

- a. A draft FOP has been developed by the applicant and addresses, for each fishway schedules for routine maintenance procedures for routine operation including: seasonal and daily periods of operation; dam and powerhouse operational measures detailing how the plant shall be operated during fish passage season, including sequencing of turbine start-up and operation; flow split between the old and new powerhouses and between the tailrace and Piney Channel procedures for monitoring and reporting flows in the tailrace, Piney Channel, and the spillway channel procedures for debris management, as well as any other necessary provisions for plant operation related to attraction flow as a component of the fish passage system and operation of the fishways procedures for monitoring and reporting on the operation of each existing fish passage facility or measure procedures for annual start-up and shut-down and procedures for use in case of emergencies and Project outages significantly affecting fishway operations. The licensee shall count all fish passing through the upstream fish passage, including anadromous, catadromous, and riverine fishes, during the upstream shad passage season as described in the FOP.
- b. PPL shall implement the FOP consistent with the approval of the Service. The licensee shall provide written documentation to the Resource Agencies that all fishway operational personnel have reviewed and understand the FOP signed by the operations manager of the Amended Project.
- c. Copies of the approved FOP and any modifications will be provided to the Resource Agencies.

- d. By December 31 of each year, following commencement of operation of the new powerhouse, the licensee shall provide an annual report to the Resource Agencies detailing the implementation of the FOP, including any deviations from the FOP and a process to prevent those deviations in the future to the Resource Agencies; any proposed modifications to the FOP or, in the case of emergencies or Project outages, the steps taken by the licensee to minimize adverse effects on fishway operation or fish passage measures; and any proposed modifications to those steps to further enhance their effectiveness in the future. The licensee shall meet with the Resource Agencies by January 31 of each year, unless a different date is mutually agreed upon by the licensee and the Resource Agencies. Any required modifications to the FOP shall be submitted to the Resource Agencies within 30 days of receipt of a request for the modification unless a longer period is approved by the Service. The modifications to the FOP shall be implemented consistent with the approval of the Service.
- e. For fish passage system enhancements and facilities not constructed contemporaneously with the Amended Project, and for fish passage measures that do not begin operation contemporaneously with the entry into operation of the Amended Project, 60 days prior to operation of the enhancements and/or facilities, the licensee shall submit FOP provisions for any such new fish passage enhancements, facilities, and measures to the Resource Agencies for review and approval and shall implement the FOP as approved by the Service.

6.2 Fish Passage Facilities

Contemporaneously with the construction of the new hydroelectric generation facilities, the licensee shall implement the final design plans approved by the Service for the fish passage system enhancements to increase the percentage of anadromous and catadromous fishes passing upstream and downstream through the Amended Project and to provide safe, timely, and effective passage.³⁸

At a minimum, these fish passage system enhancements shall include:

- a. modifications to the existing fish lift including changes to the attraction

³⁸ Application for Capacity-Related License Amendment, Holtwood Hydroelectric Project, FERC No. 1881, Exhibit E – Environmental Report, pages 5-54 through 5-59. 2007.

- water inlet piping, rebuilding the skimmer wall, reconstruction of the fish lift entrance C, and relocation of the tailrace crowder drive;
- b. redirection of discharge flows from Unit 1 through the diversion wall and into Piney Channel consistent with the range of operation of Unit 1;
 - c. excavation within the Project boundary to significantly “minimize” velocity barriers to fish passage in the tail race, downstream of the tailrace, and in Piney Channel;
 - d. American eel monitoring ramps and traps in the tailrace and spillway; and
 - e. a spill control system approved by Service.

7. American Shad Passage

7.1 Upstream American Shad Passage Monitoring

- a. PPL shall implement a monitoring plan approved by Service to monitor the effectiveness of upstream shad passage. The plan shall include annual fish counts and passive integrated transponder (PIT) tagging monitoring, or other monitoring techniques approved by the Service in consultation with the other Resource Agencies, of upstream shad passage to meet the annual monitoring requirements.
- b. Following completion of the Project amendments and following commencement of operation of the Amended Project, the licensee shall annually monitor the effectiveness of upstream American shad passage using the approved monitoring plan. This annual monitoring shall be continued for the term of the license issued to the licensee. The licensee shall provide daily updates of monitoring results to the Resource Agencies. The licensee shall provide an annual report of the monitoring results by December 31 of each year. After 3 years of monitoring, or such longer period approved in writing by the Service, the results of the monitoring shall be examined to assess the performance of the fish passage system.
- c. PPL shall meet with the Resource Agencies to discuss the results of the above study and the need to develop a plan and schedule for a telemetry study or equivalent study of American shad passage at the Amended Project and shad migration behavior below the facility. The results of this study will be used to determine the need for, and form of, any additional fish passage measures or facilities. The telemetry study plan and schedule

shall be developed to determine the percentage of American shad that enter Holtwood Project waters and subsequently pass through the Holtwood fish passage system. The telemetry study shall be designed to insert the transmitter at the Conowingo facility or at such other location(s) approved by the Service, and tagged American shad that pass river mile 23.2 (located between the Muddy Run Pump Storage Facility and Cully's Falls) or such other location(s) as determined by the Service shall be considered to have entered the "Project waters". The licensee shall continue the radio telemetry study for a minimum of 4 years or such longer time period as required by the Service in consultation with the other Resource Agencies. PIT tagging, or other monitoring techniques as described above, shall be continued during the telemetry study. The licensee shall provide daily updates of monitoring results to the Resource Agencies. The licensee shall provide an annual report of the monitoring results of the telemetry study by December 31 of each year.

7.2 Downstream American Shad Passage Monitoring

- a. PPL shall implement a plan to measure the survival of American shad moving downstream past the Project according to the schedule and consistent with the approval of the Service (Discrete Survival Study).
- b. Following commencement of operation of the new powerhouse, the licensee shall conduct the Discrete Survival Study in accordance with the plan above. The licensee shall provide a report of the Discrete Survival Study within 90 days of its completion to the Service and Resource Agencies.

8. American Eel Passage

8.1 Upstream Eel Passage

- a. The trigger date for initiation of upstream eel passage measures shall be the earliest of the following dates:
 - 1) The date on which upstream eel passage becomes operational at Conowingo Dam, or;
 - 2) The date on which eels begin being stocked into the Conowingo reservoir as part of an agency-approved stocking plan, or;
 - 3) The date on which the Service, in consultation with the other Resource

Agencies, determines that newly available data indicates that eels are otherwise present below the Amended Project in numbers appropriate to require upstream eel passage.

- b. Within 1 month after the trigger date, the licensee shall meet with the Service and Resource Agencies to discuss a plan and schedule for a study to determine where to site permanent eel passage fishway(s). Based on this discussion, within 3 months after the meeting, the licensee shall submit a plan and schedule for a study to determine where to site permanent eel passage fishway(s) to the Service and Resource Agencies for review and approval. The licensee shall implement the plan according to the schedule consistent with the approval of the Service.
- c. If a plan is fully implemented and the Service, in consultation with the other Resource Agencies, determines the results do not yield adequate information to permit a siting decision for permanent passage, the study shall be repeated annually until adequate information is available and a satisfactory siting decision can be made. The licensee may request approval from the Service to delay or terminate any repeat studies.
- d. When the Service, in consultation with the other Resource Agencies, determines that, based on the results of the studies, there is adequate information available to permit a siting decision, the licensee shall meet with the Service and Resource Agencies to develop a plan and schedule for siting and construction of permanent eel fishways. Within 6 months from the date of the meeting, the licensee shall provide design plans and a schedule for installation of upstream eel passage fishway(s) to the Service and Resource Agencies for review and approval. The licensee shall implement the plan and schedule consistent with the approval of the Service.
- e. Within 3 months from approval of the plan for installation of the upstream eel passage fishway(s), the licensee shall submit a plan and schedule for monitoring the effectiveness of upstream eel passage to the Service and Resource Agencies for review and approval. The licensee shall implement the plan according to the schedule consistent with the approval of the Service.
- f. PPL will provide an annual report of monitoring results to Resource Agencies by December 31 of each year.
- g. Once the upstream passage system for eels is operational and annual monitoring has been implemented, the licensee shall evaluate the

effectiveness of upstream passage through PIT tagging in a manner approved by Service unless a different monitoring method is deemed to be adequate.

8.2 Downstream Eel Passage

- a. The trigger date for initiation of downstream eel passage measures shall be the earliest of the following dates:
 - 1) Three years following the date on which upstream eel passage becomes operational at Amended Project, or;
 - 2) Three years following the date on which eels begin being stocked into the Lake Aldred as part of an agency-approved stocking plan, or;
 - 3) The date on which the Service, in consultation with the other resource agencies, determines that newly available data indicates that eels are otherwise present upstream of the Amended Project or other upstream areas in numbers appropriate to require downstream eel passage.
- b. The licensee shall submit a study plan, to measure the effectiveness of downstream eel passage past the Project, to the Service and the State resource agencies for review and approval. The licensee shall implement the plan according to the schedule consistent with the approval of the Service. The licensee shall provide a report of the study results within 90 days of the date of completion of the study.

Correspondence Regarding the Modified Prescription for Fishways

Any written inquiries, comments, request for documents, or other correspondence related to this Modified Fishway Prescription for the Holtwood Hydroelectric Project should be sent to:

Project Leader
U.S. Fish and Wildlife Service
Mid-Atlantic Fishery Resources Office
1601 Elmerton Avenue
P.O. Box 67000
Harrisburg, Pennsylvania 17106-7000

Document Content(s)

P-1881-054.DOC.....1-82

ATTACHMENT 2

AGENCY CONTACTS

ATTACHMENT 2

AGENCY CONTACTS

NAME	TITLE	AGENCY	PHONE NO.	E-MAIL
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Shawn Seaman	Administrator	Maryland Department of Natural Resources Power Plant Assessment Division B-3	(410) 260-8662	SSeaman@dnr.state.md.us
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ATTACHMENT 3

FERC ORDERS WITH RESPECT TO LICENSE COMPLIANCE

139 FERC ¶ 62,052
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

PPL Holtwood, LLC

Project No. 1881-075

ORDER MODIFYING AND APPROVING MINIMUM STREAM FLOW
OPERATIONS PROCEDURES MANUAL PURSUANT TO ARTICLE 51

(Issued April 19, 2012)

1. On December 15, 2011, PPL Holtwood, LLC, licensee for the Holtwood Hydroelectric Project, filed with the Federal Energy Regulatory Commission (Commission), a minimum stream flow operations procedures manual (Plan). The Plan was filed pursuant to article 51 of the Commission's Order Amending License and Revising Annual Costs.¹ The project is located on the Susquehanna River in Lancaster and York Counties, Pennsylvania.

LICENSE REQUIREMENTS

2. Article 51 of the amended project license, as well as Condition number IV.A of the Water Quality Certification² requires the licensee to develop a Minimum Stream Flow Operations Procedures Manual in consultation with the licensee for the Conowingo Project (FERC Project no. 405).³ The Plan must be approved by the Pennsylvania Department of Environmental Protection (DEP) and the Commission.

¹ 129 FERC ¶ 62,092 (issued October 30, 2009). The Commission amended PPL Holtwood, LLC's (licensee) original license (issued on August 14, 1980) in response to the licensee's application to construct additional facilities and increase generation at the project.

² The Water Quality Certification (WQC) for the project was issued by the Pennsylvania Department of Environmental Protection pursuant to Section 401 of the Clean Water Act. Conditions of the WQC were accepted as part of the amended license under Article 47.

³ The Conowingo Project (FERC No. 405) is owned by Exelon Corporation. PPL Holtwood, LLC and Exelon signed into an agreement that, in part, specifies operating procedures and protocols since these two projects are dependant upon each others operation.

3. Article 51 states that the licensee's Plan is to include the following provisions regarding project minimum flows:

(a) Continuous Minimum Flows and Daily Minimum Flows. In consultation with the licensee for the Conowingo Project No. 405, and subject to the approval of the Pennsylvania Department of Environmental Protection and the Commission, the licensee shall develop a Minimum Stream Flow Operations Procedures Manual (MSFOP Manual).⁴ The MSFOP Manual will require the licensee to release the following flows into the Susquehanna River below Holtwood Dam: (1) a 24-hour continuous minimum flow of 800 cfs (Continuous Minimum Flows); and (2) a daily volumetric flow equivalent to 98.7% of the minimum continuous flow requirements of the downstream Conowingo Project No. 405, aggregated over a 24-hour period (Daily Minimum Flows). In the event that the net inflow to Lake Aldred is less than the Continuous Minimum Flows and the Daily Minimum Flows, the MSFOP Manual shall require the licensee to maintain flows in the Susquehanna River below Holtwood Dam equal to the net inflow to Lake Aldred. Modifications of the MSFOP Manual must be initiated by the licensee, with consultation with the licensee for the Conowingo Project No. 405, and may not become effective unless approved by the Pennsylvania Department of Environmental Protection and the Commission.

(b) Commencement Date of Minimum Flows. The licensee shall commence the Daily Minimum Flows required under this article on the date that the Commission's order approving the Holtwood Project license amendment becomes final. The licensee shall commence the Continuous Minimum Flows required under this article upon the earlier of: (1) the date the licensee has both commenced operation of Unit 1 to Piney Channel and placed its refurbished exciter units into service; (2) the date three years after the date of the Commission's final order approving the Holtwood Project license amendment; or (3) the date established by the MSFOP Manual.

(c) Effect of Modification of Minimum Flow Requirements at Project No. 405. In the event that the minimum continuous flow requirements at the Conowingo Project No. 405 are ever modified, the MSFOP Manual will be modified as follows: (1) the Continuous Minimum Flows required under this article shall be similarly adjusted by an equivalent percentage; and (2) the Daily Minimum Flows required under this article shall be recalculated based on the modified flows established by the license for the Conowingo Project No. 405.

(d) Temporary Variance. For temporary flow variances of the Continuous Minimum Flows and Daily Minimum Flows resulting from short-term construction activities associated with the Holtwood Project redevelopment and expansion, the licensee shall seek the consent of the licensee for the Conowingo Project No. 405. The

⁴ Required under the licensee's WQC, Condition No. IV.A.

Continuous Minimum Flows and Daily Minimum Flows required under this article also may be temporarily modified if required by operating emergencies beyond the control of the licensee, where necessary to prevent unavoidable loss of life, personal injury or severe property damage and where there is no feasible alternative. If the Continuous Minimum Flows or Daily Minimum Flows are so modified, the licensee shall notify the Commission as soon as possible, but no later than 10 days after each such incident. For all other non-construction temporary variances of the Continuous Minimum Flows and Daily Minimum Flows required under this article, the licensee shall provide notice to the licensee for the Conowingo Project No. 405 and obtain prior authorization from the Commission.

(e) Scheduling, Monitoring, Verification and Reporting. Scheduling, monitoring, verification, and reporting of minimum flows shall be in accordance in the licensee's MSFOP Manual.

LICENSEE'S PLAN

4. The licensee proposes in its Plan the methods by which it will calculate individual flow components of the project. The components of these flow calculations are the net inflow to Lake Aldred, Holtwood project outflow, tailrace flow, Piney Channel flow, and spillway area flow.

5. The licensee proposed to determine, record, and report the total of the flows from the tailrace, Piney Channel, and spillway area on an hourly basis. In addition, the licensee proposes to calculate daily inflow and outflow from the project to determine whether the total outflow from the project satisfies the daily project minimum flow requirements as stated in license article 51.

6. The licensee states that the daily minimum flow from the project as required by Article 51(a) require the licensee to release the lesser of 98.7 percent of the daily minimum flow requirement at the Conowingo Project, or the daily net inflow to Lake Aldred. Therefore, the licensee proposes procedures for calculating and managing daily minimum flow operations. In addition to calculating the various daily flow components identified above, the proposed Plan also include provisions for making corrective releases if necessary to meet the daily minimum flow requirements.

7. The licensee's Plan proposes continuous minimum flow operating procedures that will provide for the required 800 cubic feet per second continuous flow or hourly net inflow to Lake Aldred, whichever is less. The licensee proposes to calculate and determine inflow on an hourly volumetric average based on the best available estimate of net inflow to the project. The licensee proposes to schedule its hourly operation on one day ahead basis so that the hourly operations scheduled for the upstream Safe Harbor Dam can be used to predict operations at Holtwood to maintain the licensee's continuous minimum flow requirement.

8. The licensee's Plan also provides for data recording, maintenance and inspection of facilities associated with minimum flow release, communication procedures and a personnel contact list.

9. The Plan proposes that daily data entry records will be available to the resource agencies upon request. The Plan proposes to provide a daily minimum flow report to Exelon, no earlier than 3:00 PM of the day following the operating day covered by the report. In addition, the licensee proposes to submit an annual report on minimum stream flow operations in accordance with the stipulations in the WQC, which state that the licensee will submit this report to the DEP by December 31, which describes the implementation of the minimum flow procedures and any deviations from the procedures and corrective actions to prevent them from reoccurring. Also, by January 31 of each year, the licensee is required to meet with the DEP, Pennsylvania Fish and Boat Commission, Pennsylvania Department of Conservation and Natural Resources, Susquehanna River Basin Commission, Maryland Department of Natural Resources, U.S. Fish and Wildlife Service, and the U.S. Army Corp of Engineers (resource agencies) to discuss minimum flow operating procedures and any modifications to the minimum flow procedures that were identified through project operation.

AGENCY CONSULTATION

10. On September 21, 2011, the licensee's consultant distributed the draft Minimum Stream Flow Operation Procedures Manual to stakeholders and resource agencies for comment and approval. Comments on the draft Plan were received from Exelon Corporation, Susquehanna River Basin Commission (SRBC), and DEP. On December 5, 2011, the DEP stated that they adopt the comments regarding the Plan as stated by the SRBC. The licensee included in its filing, answers to all the comments received from Exelon and the SRBC and incorporated the changes into the final Plan.

DISCUSSION AND CONCLUSIONS

11. The licensee's minimum stream flow operations procedures manual is consistent with the requirements set forth in Article 51 of the Commission's October 30, 2009 Order Amending License and Revising Annual Costs and Condition IV.A of the Water Quality Certification. The licensee's proposed Plan provides methods and terms for calculating and monitoring project inflow and outflow in cooperation with upstream and downstream projects operating within the same hydrologic system.

12. The Plan also proposes and defines calculations and procedures to determine daily average minimum flow from the project, as well as continuous minimum flow, and provides for corrective measures to ensure minimum flow releases are accomplished on a daily and hourly basis as required by the project license. However, if project operations deviate from the required continuous minimum flows or the daily average minimum flow as determined by the approved monitoring and operation procedures plan, the licensee should file a report with the Commission within 10 days of the incident. The report

should, to the extent possible, identify the cause, severity, and duration of the incident, and any observed or reported adverse environmental or recreational impacts resulting from the incident. The report should also include: (1) operational data necessary to determine compliance with article 51 and water quality certification condition IV.A; (2) a description of any corrective measures implemented at the time of the occurrence and the measures implemented or proposed to ensure that similar incidents do not recur; and (3) comments or correspondence, if any, received from resource agencies regarding the incident. Based on the report and the Commission's evaluation of the incident, the Commission should reserve its right to require modifications to project facilities and operations to ensure future compliance.

13. The licensee's Plan states that it will abide by the reporting requirements established in the WQC, with respect to the DEP. The licensee's Plan mentions reporting to the Commission, but does not specify a reporting date. The WQC requires the licensee to submit an annual report to the DEP by December 31 of each year and meet with the resource agencies by January 31 of each year to discuss any changes to the minimum flow operating procedures. In order to keep the Commission apprised of project operations, the licensee should file the DEP approved annual report and any proposed changes to minimum flow operations with the Commission for review by March 1 of each year.

14. The licensee's proposed Plan should provide for operating protocols that ensure the minimum flow required by Article 51 of the amended project license and the WQC are met and, as modified herein, should be approved.

The Director orders:

(A) PPL Holtwood, LLC (licensee) proposed Minimum Stream Flow Operations Procedures Manual, filed on December 15, 2011 pursuant to Article 51 of the Federal Energy Regulatory Commission's Order Amending License and Revising Annual Costs, as modified in paragraph (B), is approved.

(B) The licensee shall file with the Federal Energy Regulatory Commission (Commission) an annual report by March 1st of the following year in which the data was collected that describe the implementation of the minimum flow procedures and a summary of any deviations from the procedures and corrective actions that were taken to prevent them from reoccurring. The licensee's report shall include any comments from the Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, Pennsylvania Department of Conservation and Natural Resources, Susquehanna River Basin Commission, Maryland Department of Natural Resources, U.S. Fish and Wildlife Service, and the U.S. Army Corp of Engineers (resource agencies) and the licensee's response to any comments.

If project operations deviate from the required continuous minimum flows or the daily average minimum flow as determined by the approved monitoring and operation

procedures plan, the licensee shall file a report with the Commission within 10 days of the incident. The report shall, to the extent possible, identify the cause, severity, and duration of the incident, and any observed or reported adverse environmental or recreational impacts resulting from the incident. The report shall also include: (1) operational data necessary to determine compliance with article 51 and water quality certification condition IV.A; (2) a description of any corrective measures implemented at the time of the occurrence and the measures implemented or proposed to ensure that similar incidents do not recur; and (3) comments or correspondence, if any, received from resource agencies regarding the incident. Based on the licensee's reports and the Commission's evaluation of the incidents, the Commission reserves the right to require modifications to project facilities and operations to ensure future compliance.

(C) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the Federal Power Act, 16 U.S.C. § 8251 (2006), and the Commission's regulations at 18 C.F.R. § 385.713 (2011). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The exemptee's failure to file a request for rehearing shall constitute acceptance of this order.

Thomas J. LoVullo
Chief, Aquatic Resources Branch
Division of Hydropower Administration
and Compliance

Document Content(s)

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UNITED STATES OF AMERICA 134 FERC ¶ 62,051
FEDERAL ENERGY REGULATORY COMMISSION

PPL Holtwood, LLC

Project No. 1881-067

ORDER APPROVING DISSOLVED OXYGEN MONITORING PLAN PURSUANT TO
ARTICLES 47A AND 53

(Issued January 19, 2011)

1. On October 29, 2010, PPL Holtwood, LLC, licensee for the Holtwood Hydroelectric Project FERC No. 1881, filed its Holtwood Redevelopment Dissolved Oxygen Monitoring Plan pursuant to license articles 47A and 53.¹ The Holtwood Project is located on the Susquehanna River in Lancaster and York counties, Pennsylvania.

LICENSE REQUIREMENTS

2. License article 47A requires the licensee to implement the mandatory conditions of the license found in the Pennsylvania Department of Environmental Protection's (PADEP) final section 401 Water Quality Certification (WQC) as found in Appendix A to the license amendment order. These conditions require, in part, that the licensee prepare certain plans and reports, in consultation with other entities, for approval by the PADEP. These plans are required to also be filed with the Federal Energy Regulatory Commission (Commission) for approval, and implemented following Commission approval. Condition VI.A.2 of the WQC requires the licensee to file a plan and schedule for continuous monitoring of dissolved oxygen (DO) in the forebay, tailrace and Piney Channel.

3. License article 53 requires the licensee to conduct a DO monitoring program in the project tailrace once the amended project begins operation. Article 53 also requires the licensee to file its plan for the DO monitoring program with the Commission for approval. The plan is required to include a monitoring schedule, a schedule for filing results with the Commission that will describe whether state standards are being maintained, and a description of measures that would be implemented if state standards are not maintained. The licensee must develop the plan in consultation with the PADEP, Pennsylvania Fish and Boat Commission (PAFBC), and the U.S. Fish and Wildlife Service (USFWS). The plan must include documentation of consultation, copies of

¹ See Order Amending License and Revising Annual Charges, issued October 30, 2009. 129 FERC ¶ 62,092 (2009).

agency comments and recommendations, and a description of how the agency comments are accommodated by the plan. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

LICENSEE'S PLAN

4. The licensee's plan notes that water quality monitoring at the project will consist of recording water temperature and dissolved oxygen concentrations upstream and downstream of the Holtwood dam. The schedule for monitoring will occur from April through September, each year, for five years following the start of operation of the new station. Continuous monitors will be used and programmed to measure DO and temperature at 30-minute intervals regardless of river flows. Monitoring will be done in three locations as required in the WQC and include the Holtwood forebay, the tailrace and Piney Channel. The forebay water quality monitoring instrument will be secured to the new skimmer wall and will record data at approximate mid-depth of the water column. In the tailrace, a monitor will be placed in an area subject to turbine discharge flows. In Piney Channel, the monitoring instrument will be located downstream of the new Unit 1 release. To the extent possible, this equipment will be positioned so that minimum flow releases will be monitored. Monitoring will be done using a Hydrolab DataSonders® or comparable instrumentation and will be maintained and calibrated regularly. The licensee will use United States Geologic Survey 2006 guidelines for operating, computing and data recording for continuous water quality monitors.

5. By December 31 following each testing season, the licensee will file with the PADEP and the Commission a water quality report for the year. If during the season, DO concentrations were not meeting the State of Pennsylvania water quality standards, the licensee will inform the PADEP within 30 days of any occurrence. Within 90 days the licensee would submit a plan to resolve additional incidents. The plan also proposes several measures to be taken in the event that DO standards are not met. In the forebay the plan notes that low season DO conditions are known to occur presently. The licensee proposes to work with the hydro operators at the upstream Safe Harbor Project (FERC No. 1025) if low DO levels are shown to be result of low DO levels in the flows released by that project. The plan also outlines several possible measures to be undertaken when low DO levels are detected in the tailrace or Piney Channel areas.

CONSULTATION

6. The licensee distributed the plan to the USFWS, the PAFBC, and the PADEP for review by email communication dated May 4, 2010. A reminder email communication

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was sent on September 10, 2010. No comments were received prior to the licensee filing the plan with the Commission. Since that date, no comments have been received by the Commission.

DISCUSSION AND CONCLUSION

7. Redevelopment of the project would result in a major re-distribution of flows from the bypassed reach into the tailrace. As the licensee notes in the plan, the new units, which would be of a modern design and more efficient, would not likely provide any aeration through the units. Assuming these units would be preferentially operated during the low-flow summer months, their operation could result in reduced dissolved oxygen levels in the tailrace compared to existing conditions. The plan, as developed, addresses these potential impacts. The licensee, however, specifies that deficiencies will be reported only to the PADEP within 30 days. We will require that the licensee report any deficiency in water quality standards to the Commission as well. With that addition, we conclude that the plan addresses the concerns of the PADEP regarding the impacts to water quality as a result of the redevelopment of the Holtwood Project, meets the requirements of articles 47A and 53 and the PADEP's WQC, and, therefore, should be approved.

The Director orders:

(A) PPL Holtwood LLC's (licensee) dissolved oxygen monitoring plan, filed on October 29, 2010, for the Holtwood Project (FERC No. 1881), pursuant to license articles 47A and 53, is approved.

(B) If monitoring reveals any deviations from dissolved oxygen standards, the licensee shall file a report with the Commission within 30 days of the incident. The report shall, to the extent possible, identify the cause, severity, and duration of the incident, and any observed or reported adverse environmental impacts resulting from the incident. The report shall include, at a minimum: (1) any operational data necessary to determine compliance with Articles 47A and 53; (2) a description of any corrective measures implemented at the time of occurrence and the measures implemented or proposed to ensure that similar incidents do not recur; and (3) comments or correspondence received from the Pennsylvania Department of Environmental Protection regarding the incident. Based on the report and the Commission's evaluation of the specific incident, the Commission reserves the right to require modifications to project facilities and operations in order to ensure future compliance.

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(C) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the Federal Power Act, 16 U.S.C. § 8251 (2006), and the Commission's regulations at 18 C.F.R. § 385.713 (2010). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

Steve Hocking
Chief, Biological Resources Branch
Division of Hydropower Administration
and Compliance

Document Content(s)

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