

**CAPACITY-RELATED LICENSE AMENDMENT
HOLTWOOD HYDROELECTRIC PROJECT
FERC NO. 1881**

EXHIBIT C

**PROJECT CONSTRUCTION HISTORY
AND PROPOSED CONSTRUCTION SCHEDULE**

December 2007

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**PROJECT CONSTRUCTION HISTORY
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1.0 CONSTRUCTION HISTORY

The Holtwood Hydroelectric Project was constructed between 1905 and 1910. The first two hydroelectric units were placed into operation in 1910, the next three units in 1911, and one unit each in 1912, 1913 and 1914. The remaining two units were placed into operation in 1924, raising the station output to 107.2 MW.

In 1924, two 25,000 KW steam turbine generators were installed at the site adjacent to the hydroelectric plant. These units were fueled with anthracite coal that was dredged from the river in Lake Aldred. These units operated until 1972 when they were shut down and retired due to age and lack of emissions control equipment. In 1955, an additional 80,000 KW steam turbine generator was installed. This unit was also fueled with anthracite coal dredged from the river in both Lake Aldred and Lake Clarke above Safe Harbor dam. Dredged coal was used until 1973 after which all fuels were transported to the plant by truck. The third steam turbine unit was shut down and retired in 1999 due to age, economics and pending environmental regulation. All plant facilities associated with the coal-burning operations were demolished in 2000.

The Holtwood Hydroelectric Plant is designated as an American Society of Mechanical Engineers International Historic Engineering Landmark for the installation of the first Kingsbury thrust bearing. The thrust bearing supports the entire weight of the rotating components of the turbine and generator, approximately 220 tons. The first bearing was installed on Unit 5 in 1912 and was dedicated in 1987. Kingsbury style bearings are installed on all the main turbines at Holtwood.

Since the initial construction and operation of the plant, numerous improvements and equipment upgrades have been completed. A listing of the more significant modifications is shown below:

- In 1999 and 2001, sections of the Holtwood dam had inflatable rubber dams installed to replace the original 4.75 ft high steel pin supported wooden flashboards that were on the dam crest. The inflatable flashboards include a 40 ft long by 10 ft high section on the east side of the dam near the fish lift exit and a 300 ft long by 4 ft 9 in high section installed adjacent to the 10 ft high segment. Both of these inflatable dams were installed in 1996. Two additional 387-ft long by 4 ft 9 in high sections were installed in 2001.
- Between 1987 and 2007, six of the ten hydroelectric units have had their turbines completely replaced with newer, more efficient designs. Generator rewinds were also performed on three of the six upgraded units between 1987 and 1991.
- Historically station electrical use was provided by two water-driven direct-current exciter units. These units were retired in 1996 and 1999 and were replaced by static excitation systems.
- New DC rectifier units were installed in 2001 to provide the remaining small DC electric energy requirements within the plant.

- As part of a cooperative effort to restore American shad to the lower Susquehanna, PPL installed a \$21 million fish elevator at the Project in 1997.
- All electrical equipment in the plant has been replaced and brought up to current standards.

2.0 PROPOSED CONSTRUCTION SCHEDULE

Under this proposed license amendment PPL is proposing to redevelop the Holtwood Project by adding additional generating capacity while enhancing migratory fish passage at the Project. The proposed plan calls for major construction activities, and has many different components to it. Details of the proposed structures at the Project can be found in Exhibit A of this license application.

Appendix A is the preliminary construction schedule showing the necessary major work components and specifying the intervals following issuance of a license when the work would commence and be completed. As can be seen in the attached schedule, PPL is proposing to move forward with construction as soon as possible, upon receipt of the license amendment. Larger size versions of this schedule are available upon request. The final construction schedule will be developed following the preparation of a plan for sequencing construction activities to avoid impacts to migration of anadromous fish and catadromous fish and T&E species.

Appendix A

Holtwood Redevelopment Proposed Construction Schedule