United States Department of the Interior

FISH AND WILDLIFE SERVICE

300 Westgate Center Drive
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October 7, 2016

MEMORANDUM

To: Susquehanna River Coordinator, Mid-Atlantic Fish & Wildlife Conservation Office
Attention: Sheila Eyler, Project Leader

From: Jesus Morales, Hydraulic Engineer, Fish Passage Engineering

Subject: Inspection of fishways at Holtwood Hydroelectric Project (FERC #1881) on May 5, 2016

A seasonal inspection of the fish passage facilities at the Holtwood Hydroelectric Project (Project) was performed at 9:00 am on Thursday, 05/05/2016. The Project is owned and operated by the Brookfield Renewable. The USFWS (Service) review team was led by Sheila Eyler. Consultants from Normandeau Associates, Inc., and personnel from Maryland Department of Natural Resources and NOAA-Fisheries were also present. On the day of the inspection the river flow was around 50,000 cfs.

This site review included the upstream passage facilities. From the top floor of the fish lift, the group observed a lift cycle in process for each one of the two hoppers. The first hopper serves the entrance channel that catches fish from the tailrace, and the second hopper serves the channel that catches fish from the spillway side. The licensee typically operates their fishway from the beginning of April until early June. The fish lifts are also operated through the summer and fall for resident fish.

Based on this review, the salient passage issues appear to center on the following:

Entrance gates:

- Mechanical issues - For a second year, the adjustable entrance gate at the spillway area (Entrance C) was kept fully opened for most of the migratory season because of ongoing mechanical difficulties. This fully-opened position results in little-to- no head differential between the water surface elevations of the entrance channel and the tailrace (the Service recommends to maintain a head differential of 4 to 6 inches at the entrance of any fishway). The ability of an entrance gate to properly track the tailwater elevations is crucial to the effective performance of a fishway to attract and guide migratory fish.

- Protrusion from an entrance gate horizontal bar - The Service noticed horizontal steel bars at entrance gates A and B. During the time of the inspection, the horizontal bar at the Entrance B gate was under water while the fishway was operating. The location of these bars, in combination with the hydraulics in the fishway channels, causes them to sometimes protrude into the flow path of the fish. The Service preference is that fish not be exposed to protrusions, sharp edges, and other objects in the flow path that could cause injury. The operational scheme for this

fishway should take this issue into consideration, and attempt to keep the fish passage flow path free from potentially dangerous protrusions like these.

Additional observations made during this review:

- The new Obermeyer Pneumatically Actuated Spillway Gates were installed before the beginning of this year's fish passage season, and they seem to be operating properly.
- A newly installed Worthington "Tuff Boom" immediately upstream from the fishway exit seems to have resulted in significant improvement on the issue of debris accumulation at this location. Perhaps this trash boom in combination with functioning spillway gates has provided the operators with an effective method to manage the incoming debris.
- During the site visit, the Service had conversations with the licensee and Normandeau Associates about collecting and recording hydraulic data in the fish lift channels, the tailrace, and the spillway area, during the fish passage season. The licensee seemed to be receptive to this idea, and agreed to continue conversations with the Service about this proposed data collection program with the goal of maximizing fish passage efficiency at their Project.
- The licensee continues to work on addressing the undesired high velocity areas that still remain within the tailrace zone of passage (ZOP). The Service awaits updates on the modeling efforts and future plans to fix these velocity barriers.

Thank you for the opportunity to participate in this review. We look forward to supporting your efforts to restore the Susquehanna River ecosystem. For questions please contact Jesus Morales at 413-253-8206.