



United States Department of the Interior

FISH AND WILDLIFE SERVICE

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May 24, 2017

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 April 26, 2017

A seasonal inspection of the fish passage facilities at the Holtwood Hydroelectric Project (Project) was performed at 9:00 am on Wednesday, 04/26/2017. The Project is owned by Brookfield Renewable. The USFWS (Service) review team was led by Sheila Eyler and Richard McCorkle. Consultants from Normandeau Associates, Inc., and personnel from Pennsylvania Fish & Boat Commission, Maryland Department of Natural Resources, and NOAA-Fisheries were also present. On the day of the inspection the river flow was around 74,000 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. There are two separate hoppers at this fish lift. The first hopper provides passage to the entrance channel that catches fish from the tailrace of the powerhouse (entrance gates A and B), and a second hopper provides passage to the entrance channel that catches fish from the spillway side (entrance gate C). The licensee typically operates their fishway from the beginning of April until early June for migratory anadromous fish. 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 - During the site visit, entrance gate A to the fish lift, located in the tailrace of the powerhouse, was stuck in a fully-opened position because of an ongoing mechanical issue. This fully-opened condition at the entrance gate produces no head differential between the water surface elevation in the fish lift channel and the water surface elevation in the tailrace (as a rule of thumb, the Service recommends to maintain a head differential of 4 to 6 inches at the entrance of any fishway in order to meet fish passage water velocities criteria). The ability of an entrance gate to properly track the fluctuation of the tailwater elevations is crucial to the effectiveness of a fishway to attract and successfully pass migratory fish. The Service was informed that any work to fix gate A would have to wait until the end of the fish passage season. As a result of entrance



gate A being all the way down, the licensee has been forced to keep entrance gate B completely closed and inaccessible for fish passage.

- Protrusion from the entrance gate horizontal bars - The Service noticed horizontal steel bars at each of the three entrance gates. The location of these horizontal bars, in combination with the hydraulics in the fishway channels, causes them to sometimes protrude into the flow path of migratory fish. The Service recommends 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 account, and attempt to keep the fish passage flow path free of potentially dangerous protrusions like these. Further investigation is warranted.

Auxiliary Water System

- Inspection of a de-watered fish lift - The Service would like to schedule a site visit during the fish passage off-season to do an assessment of the fish lift while it is non-operational and de-watered. During this proposed visit, the Service would like to assess the conditions of all underwater elements of the fishway that are usually not visible when it is operating, including the floor diffuser pits at each of the fishway channels. Please let the Service know about any potential dates for when such a visit could be arranged.

Additional observations made during this review:

- Before the beginning of this year's fish passage season, the licensee completed the necessary work to fix entrance gate C so that it could be once again controlled and operated remotely from the control room. The fish lift operator informed the Service that gate C is now working well and effectively tracking tailwater fluctuations. During our site visit we were able to observe a clear attraction jet being discharged from gate C, and a head differential of approximately 9 inches between the fish lift channel and the tailwater.
- The Worthington "Tuff Boom" that has been installed immediately upstream of the fishway exit continues to produce good results on the issue of debris accumulation at the location of the fishway exit. It appears that this trash boom, in combination with functioning spillway gates, has provided the operators with an effective method to manage incoming debris.
- The licensee continues to work on addressing the undesired high velocity areas that still remain within the tailrace zone of passage (ZOP).
- During last year's 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 and/or any fish passage study. Is there still an active effort to install the necessary instrumentation to collect this data?

Thank you for the opportunity to participate in this review. For questions please contact Jesus Morales at 413-253-8206.