

Sullivan Dam Cold Water Release System

As part of their relicensing of the 90 MW Box Canyon Hydroelectric Project, Pend Oreille PUD is taking specific measures for upgrading or adding features to and around Box Canyon. McMillen Jacobs Associates has been working in partnership with the Pend Oreille PUD to provide overall project management along with design, engineering, licensing and relicensing support, construction oversight, abatement, and habitat restoration. As of 2015, McMillen Jacobs has provided various services on 14 separate projects including the Sullivan Pipeline. The Sullivan Dam Cold Water Release System Project consisted of a new intake screen located 120 feet below the lake surface, a 54 inch diameter HDPE pipeline installed on the floor of the reservoir with concrete anchors, a downstream control gate, air burst cleaning system, and flow/temperature monitoring system downstream from the dam. The constructed system was designed to provide colder water temperatures downstream from the project to improve bull trout habitat.

McMillen Jacobs offered a unique advantage to PUD. While many firms can only perform the design or construction, because we are an experienced self-performing construction firm, we were able to offer services through the entire project development including design, permitting, and construction support—all in-house.

Due to our extensive construction experience, we were also able to review the design with constructability in mind. Our in-house construction estimators, safety and quality professionals, and construction managers offered valuable insights to ensure this project was designed in a way that it could be constructed cost-effectively, safely, and according to operational guidelines.

McMillen Jacobs provided conceptual design, final design plans, agency meetings, specifications, and documentation report, procurement support, assisting PUD staff with obtaining the necessary permits for construction of

the project, and construction, startup, and commissioning assistance with an onsite owner's representative. McMillen Jacobs also prepared the initial cofferdam design which consists of a sheetpile wall driven across the full width of the natural lake outlet fitted with an internal structural frame. The cold water release structure successfully improved fish habitat by lowering the creek temperatures during the summer months below Sullivan Lake Dam.

The selected approach for lowering the temperature of the water downstream was the installation of a low-level cold water release system. The system consists of the following features:

- An intake with twin stainless steel NOAA criteria tee screens located approximately 900 feet from the dam at a water depth of roughly 130 feet;
- 900 feet of 54" HDPE pipeline from the intake to the dam;
- A steel conduit and bulkhead assembly that passes through one of the existing low level outlets within the dam;
- A slide gate on the end of the pipeline to control the release of cold water;
- All the controls and monitoring equipment required to operate the system.

The project was kept on schedule by working collaboratively with the contractor and all necessary agencies. During construction, an existing timber crib dam from the 1800s was uncovered while installing the HDPE pipeline on the lake bottom. Archeologists were called to the site and approvals from the State of Washington and the U.S. Forest Service was required before excavation could resume. McMillen Jacobs assisted with coordination with PUD and the necessary agencies. We were able to obtain the necessary authorization with no delay to the project schedule.

During design, permitting, and construction, extensive measures were taken in order to minimize the impact to nearby sensitive areas such as Sullivan Lake and Outlet Creek. While working within the reservoir and dewatered areas behind the cofferdam, the management team made certain

that measures were taken to prevent any sediment or debris from entering the lake or creeks using filter bags, sediment ponds, and other measures. This focus prevented any delays in the project from local agencies.

The McMillen Jacobs design process included value engineering throughout to ensure that the final project performed all of the desired task without unnecessary costs being incurred. For example, multiple pipe materials, building locations, equipment configurations, and system arrangements were explored and we were able to determine the most cost-effective approach. As a result, our team was able to deliver the project within the estimated design estimate.