

Fort Peck Fish Hatchery

Location

Fort Peck

Project Completion

December 2019

Project Budget

\$657,700

Budget Breakdown

FWP: \$382,700

SBECP: \$275,000

Annual Estimated Savings

\$18,921

Gas: 2,789 MMBTU

Project Summary

Boiler replacement project: two new 1-million BTU boilers, piping, two heat exchangers, and high efficiency pumps were installed to replace existing aging boilers and system equipment. Additionally, to enhance ability to maintain preprogrammed process water temperatures, new control equipment was installed. Control equipment included motor speed controllers on pumps and new digital control system. (2019 Legislative Session)

Background

The Fort Peck Fish Hatchery is a cold and warm water species fish-rearing facility that was transferred from the U.S. Army Corps of Engineers to the Dept. of Fish Wildlife and Parks after its construction in about 2001. Hatchery process water is pumped from the Missouri River and then filtered and tempered with heated water, towards an optimal fish rearing temperature of 52-degree Fahrenheit, allowing the fish eggs to hatch. The hatchery is located about 1-mile east of the town of Fort Peck, MT.

IN NEED OF IMMEDIATE REPLACEMENT

Just 4-years prior to this boiler replacement project, FWP had re-tubed the existing process water boilers in an effort to get a few more years of operation. Unfortunately, the tubes quickly failed and boiler replacement was necessary. At the time of replacement, the fire tubes in one boiler had deteriorated to the point that the water spraying from the tubes extinguished the boiler flame and water spraying from the other boiler was producing steam in the exhaust stack. Without boiler replacement, the facility would have lost process water tempering control and have been forced to suspend rearing warm water fish.

The hatchery rears fish to match the requests from FWP field biologists. These requests vary annually by the species and by the mass of fish reared, for each species. Because fish production variables are a function of energy use, determining the baseline energy for typical annual hatchery operations was problematic; therefore, energy savings from this project was determined using differences in boiler efficiency between the old and new boilers. When installed, the old boilers (about 20-years old) had a nominal operating efficiency of 80%, though likely since they had been gradually failing over time, their actual operating efficiency was 75% (or less) when they were replaced. Additional savings were likewise determined using differences in pump motor efficiency.

With this project, boiler efficiency improved from ~75% to 88% and pump motor efficiency improved from 65% to 91%. Uncharacterized energy savings include the new shell-in-tube heat exchangers and a piping correction that reduced boiler side pumping requirements, by as much as 35%.



Photo 1: Twin 1-Million BTU Boilers



Photo 2: Twin "Tube-in-Shell" Heat Exchangers