Swift River Company

Collins Hydro Electric LP

Collins Hydro project: setting the draft-tubes during construction in 1984

The 1,480 KW Collins project located on the Chicopee River between Ludlow and Wilbraham, MA is an example of constructive reuse of a low-head, breached mill dam. Swift River Company searched among Europe's most innovative turbine manufacturers to select 2 ESAC bulb turbines designed and built in France. The advantage of the bulb for the Collins site is that bulb require no powerhouse; controls and switchgear are located in a small building well above the river flood levels and therefore the full crest length of the dam is available to spill water in case of flood flows.

In flood Collins bulb turbines as safe and continue to generate, flashboards are lowered

The site was hard to permit because houses were built in the flood plain upstream after the dam was breached. However, by using the existing forebay as an additional spillway on the right side of the river and also designing three 4 foot high sections of hinged flashboards that are lowered during floods, the site was approved by the local conservation commission, the state dam safety agency and by federal fish environmental agencies. For 35 years Collins has operated above its design output level and few unplanned outages.

Key Benefits of Bulb Turbines

Bulb turbines where both the turbine and generator are housed under the water behind the dam are ideal for this application because:

- the ESAC equipment was delivered pre-assembled and aligned in the bulb so no powerhouse is required and installation time is 20% of the conventional powerhouse,

- the bulb can be lifted in with a crane and anchored inexpensively into the dam structure without reducing the dam's crest length required to pass floods,
- the ESAC full Kaplan turbine is very efficient over the full range of flows found in the Chicopee River, operating on a float control following the discharge rates of the Red Bridge powerplant located a mile upstream.
- The 750 kW Ideal generators are American made, are compact to fit easily inside a bulb; are air cooled generators and have operated for 35 years with no special maintenance other than checking alignment.
- ESAC turbines have a gearbox so generators are 900 rpm. In 2011 Collins rigged a gearbox and generator out to install new gears and bearings.

The hydraulic operators lift the hinged flashboards to 4 feet, but could be replaced with inflated runner crest gates

- The hydraulically operated flashboards were replaced after 30 years with new pressure treated wood and geo-textile liners on the upstream side.
- The dam has an extension with static flashboards that bend over in case of flooding, while the hydraulic boards are lowered during a flood. Collins would like to move the hinged boards to the side dam and install flap gates on the crest of the gravity dam.

Preparing to remove the bulb top so the gearbox can be extracted from the nose cone.

Installing the refurbished gearbox after 45 days at Electro Mechanics in Springfield, MA

The top of the bulb is the last component for the crane to lift back to the flume location in the river

Swift River Hydro Operations has skilled mechanics and operator who have worked on SRC's turbine generators for years. Preventative maintenance is a key to sustaining the high availability record that SRHOCO is renowned for achieving. In 2011, SRHOCO rebuilt the control building with a new roof, insulated siding and air conditioning to limit humidity.

Bulb turbines located in dam with 3 sections of hinged flashboards