



KEY STATISTICS

Customer: Snohomish County Public Utility District No. 1

Location: Near Snoqualmie, WA, USA

Turbine type: Twin Jet Horizontal Pelton

CALLIGAN CREEK

Power: 6496 kW

Net Head: 304 m - 997ft

Flow: 2492 l/s - 88 cfs

Speed: 450 rpm

HANCOCK CREEK

Power: 6438 kW

Net Head: 326 m - 1,071ft

Flow: 2294 l/s - 81 cfs

Speed: 450 rpm

In the summer of 2015, Gilkes was honored to receive the orders from Snohomish County PUD No.1 for their prestigious Hancock Creek and Calligan Creek projects. This followed the hugely successful Gilkes 7.5MW horizontal twin-jet Pelton turbine installed at the Youngs Creek project; commissioned in 2011 and the first new project developed in WA State in over 20 years.

With a difference of only 22.5m (74ft) in the net head and 198 liters per second (7 cfs), the hydrology of the two sites were extremely closely matched. This allowed the Gilkes engineering team to select the same size turbine and generator operating speed for both projects; a rare occurrence in the hydro industry.

Incorporating a wide scope of supply, Gilkes were responsible to deliver a full-blown water-to-wire package which included the complete supply from the powerhouse Turbine Inlet Valve (TIV) through to the high voltage switchgear and connecting utility line switch.

Gilkes design, engineering, and US project management team worked in conjunction with the owner's mechanical, electrical, and operations engineering departments to ensure the design of the project matched the specification documents and customer requirements.

Mechanical installation occurred concurrently with Gilkes engineers overseeing work at both sites to direct local crews, and maintain the project schedule; ensuring online generation target dates were achieved.

A from-scratch PLC, SCADA, and communications system was developed and constructed to operate the two plants independently from each other, from the Districts' plant operations center at another powerhouse many miles away, as well as their corporate load dispatch center. Imperative to this was the need for both remote sites to operate completely unmanned and potentially unattended for multiple weeks, should adverse weather preclude crews from getting to site safely.

A further consideration was that the generated power needed to be supplied directly to a neighboring and separate Utility's substation, via a 35kV buried transmission line, 8 miles away.

This brought operational challenges for the governing of the units, separately and in tandem, as they were required to meet strict requirements at the substation interconnect point, for both power and VAR control. Capacitance on the 35kV line was of particular consideration and the design needed to incorporate a third and independently operated hydro generating facility that was also operating on the line.

During the commissioning phases of both projects, the Gilkes and clients' commissioning engineers worked with the neighboring utility to ensure the site's operating characteristics matched all of the parameters required at the substation. Being run-of-river facilities, with seasonal changes in flows and outputs, multiple scenarios needed to be tested and proven.

The projects were successfully delivered and commissioned on time, within budget, and to the satisfaction of the owner.

Gilkes thanks Danny Miles whose drive, desire, knowledge, leadership, and sheer passion for hydro projects was the force behind the success of these projects. Danny is sadly no longer with us and all at Gilkes who worked with Danny cherish the memories and accomplishments.



CASE STUDY

HANCOCK AND CALLIGAN CREEK

PROJECT SCOPE OF SUPPLY

- Turbine Inlet Valve - 28" PN50 Ball Valve
- Gilkes Twin-Jet Pelton Turbine - 1590mm Mean Diameter Runner
- Generator – 6.9kV @ 450rpm (900 rpm overspeed)
- Indoor 7.2kV, Metal Clad Generator Switchgear
- Full Station Service Package Including, Transformers, Metering Cabinet, DC Battery and Charging System, AC/DC Panelboards, Inverters, etc.
- Motor Control Centers
- Powerhouse Control Panels with full PLC, SCADA, Communications Systems
- Intake Control Panels with full PLC, SCADA, Communications Systems
- Outdoor 6.9kV to 34.5kV Generator Step-Up Transformer
- Outdoor 38kV Metal Clad Switchgear and HV Line Switch
- Emergency Outdoor Propane Stand-By Generators with Automatic Transfer Switch and Fuel Tanks
- Video Surveillance System Integration
- Accessories and Spare Parts
- Installation, Commissioning, Ten-Day Operations Test, Training