

Tieton Dam Hydroelectric Facility

Goldendale, Washington

Owner: Tieton Hydropower, LLC

Description: INCA Engineers, Inc., A Tetra Tech Company (INCA) performed detailed designs and prepared construction drawings and specifications for Tieton Hydropower, LLC for this two-unit, 18 MW hydroelectric power plant located on the outlet works of the existing US Bureau of Reclamation (USBR) Tieton Dam. INCA reviewed all contractors' manufacturer drawings and provided equipment inspections at sites within the US and China. INCA provided construction monitoring and commissioning and testing assistance.

Tieton Dam was built by the USBR in 1901. It has an overflow spillway and two, six-foot diameter penstocks feeding two jet-flow release valves. These valve releases are now converted to power production. The work comprised design and assistance during construction of the powerhouse with ancillary systems and services at the existing USBR-owned and operated Rimrock Dam and Reservoir on the Bull Trout River near Yakima.

Design elements include:

- ▶ Two 9 MW vertical Francis turbine-generator units with speed governors
- ▶ Excitation systems
- ▶ Electrical switchgears
- ▶ Controls, SCADA and communication systems
- ▶ Turbine shut-off valves
- ▶ Powerhouse auxiliary mechanical and electrical systems
- ▶ Powerhouse crane
- ▶ Draft tube gates, penstocks and manifolds
- ▶ Temporary bypass line with an energy dissipation valve
- ▶ Provisions for future third generating unit

The project includes the installation of ultrasonic flow meters on the existing penstocks and the relocation of two existing 6-foot diameter jet flow valves and integration of the jet flow valve controls with the turbine governors so that the Jet flow valves can be operated to regulate the flow releases when one or both units are down for maintenance or when the required releases are outside the range of flows that can be passed through the units. INCA's work included structural analysis and several generation studies for selection, sizing and optimization of energy production.

