

Project: Priest Rapids Total Dissolved Gas Exchange Study

PI: Mike Schneider

Branch/Group: Inland Hydraulic Structures Branch, Environmental Hydraulics Group

Project Description/Activities/Capabilities:

Intends to describe spatial and temporal dynamics in TDG both near Priest Rapids Dam and downstream of the dam in the receiving waters under a variety of spillway operations. The primary goal of the investigations was to provide a description of current dissolved gas conditions and processes as related to Priest Rapids Dam operation.

Sponsor: Grant County Washington Public Utility District (GCPUD), POC Cliff Sears

Personnel: Mike Schneider (CHL), Calvin Buie (CHL), Joe Carroll (EL), Carolyn Schneider (EL), Kathryn Barko (Dyntel Corp.), Cliff Sears (GCPUD), Darrell Pock (GCPUD), and Dana Jeske (GCPUD)

Project Location and Description:

Priest Rapids Dam is located at river mile 397.1 on the Columbia River about 27 miles east of Yakima, Washington. Priest Rapids Dam impoundment extends 18.7 miles upstream to Wanapum Dam and typically contains 191 kacreft of storage. As a run-of-the-river hydroelectric facility, the Priest Rapids Project has limited water storage capacity with a forebay water surface elevation ranging from 481.5 to 486 ft. The tailwater elevation normally ranges from 400.5 to 411.6 ft varying in response to total river flows. Priest Rapids Dam is owned and operated by the Grant County Public Utility District No. 2. The dam is a reinforced concrete structure 2,450 ft in length consisting of one powerhouse and spillway. The powerhouse is 1,035 ft in length and consists of 10 turbines with a rated output of 788 MW and a hydraulic capacity of 187 kcfs. The turbines are numbered consecutively from right to left bank with the lower numbered units closest to the spillway. The spillway has a total length of 1,132 ft and consists of 22 bays. The nominal width of each bay is 40 ft and the adjoining piers are 12 ft in width. The spillway crest is located at elevation 436.5 ft or about 50 ft below the water surface elevation during normal conditions. The stilling basin extends 70 ft and spans the length of the spillway at 387 ft elevation and has a sloped end sill at elevation 391 ft that bounds the downstream end of the stilling basin. A training wall separating the stilling basin from the powerhouse bounds the east end of the stilling basin.

Facilities: Field Study

Related Topic Areas: Hydraulic Structures, Environmental Studies, Spillway Flow Deflectors, Total Dissolved Gas, Hydropower, reservoir

