

Grand Coulee G22 – G23 Wicket Gates Replacement

This project is part of the Third Powerplant overhaul at Grand Coulee Dam. The full overhaul effort involves a mechanical overhaul of units G19 - G24. The purpose of the overhaul is to increase reliability of these units as they have been in service since the mid-1970s and have been heavily utilized.

The overhaul outage and disassembly of G24 was initiated in March 2013. The contract included a limited scope for refurbishment of the wicket gates. The determination of the actual condition of the wicket gates can only be done when the unit is entirely disassembled. Upon inspection and analysis, it became clear that the gate repairs needed exceeded the scope of the original contract. Further, only nine spare gates were on-hand for the entire G22 - G24 overhaul. To avoid further delays to G24, Reclamation used all nine available spare gates to replace the worst of those in G24. The remaining fifteen gates will be refurbished. Reclamation has determined that the wicket gates in the remaining units (G22 and G23) will be in similar condition to those in G24. To maintain the overhaul schedule, Reclamation is recommending replacement of all wicket gates in G22 and G23.

The new wicket gates will be made out of stainless steel and will likely last 50 years. The new design will lessen the need for cavitation repairs and reduce the risk of an unexpected failure of the gates and the generating units, as the existing gates can “slam” shut instead of feathering in to the closed position. When the gates slam shut, it can cause the shafts to twist, causing loss of control of that particular gate and hampering the ability to control the water flow through the turbine. The result can be an emergency outage to inspect and possibly disassemble the unit to effect repairs. The new design is expected to produce a 0.20 efficiency gain, although the exact amount is uncertain.