

Wanapum Dam, Tainter Gate 1, Left Bank Hoist Chain Failure

In late July 2007, Grant County PUD (GCPUD) maintenance crews installed the floating bulkhead in tainter gate 1 at Wanapum dam. The gate was opened approximately one foot to discharge the leakage water and keep the space between the bulkhead and the gate from filling with water. On August 3, 2007, during routine maintenance the crew discovered the bent side plate on the left bank gate hoist chain on gate 1. Photo 1 is a picture of this bent side plate. It is the outside plate between roller pin number 41 and 42. See Drawing No. 2750534 for the location of pin 41 and the side plate. Maintenance crews removed the gate drain plugs and lowered the gate down onto its sealing surface on Monday August 6, 2007. It should be noted that after the gate was lowered and the load was removed from the chain, the bent side plate returned to its original position to such a degree that it became difficult to determine which plate was bent using visual methods. Maintenance crews removed the entire left bank hoist chain and replaced it with a spare chain on August 17, 2007. Crews also replaced the right bank hoist chain.

Roller pin No. 41 and the bent side plate were removed for inspection. The side plate was found to be approximately 0.010 inches out of flat. This was measured with a straight edge laid across the length of the plate and feeler gages slipped under the gap.

Photo 2 and 3 both show roller pin No. 41 in two pieces. The pin was pressed out of the chain without any issues. Upon initial examination, a large crack could be seen in the pin. While the pin was being cleaned it separated into the two pieces shown in the photos. Current plans are to send both pieces of roller pin 41 to an material fracture lab for examination and determination of the nature of failure.

The dead end link attachment point to the hoist frame and the Orkot bushing will be dimensionally checked to examine whether any elongation has occurred. This will occur on both the left and right chain.



Photo 1: Wanapum Dam, Tainter Gate 1, left bank hoist chain bent side bar



Photo 2: Wanapum Dam Tainter Gate 1, left bank hoist chain, roller pin 41



Photo 3: Wanapum Dam, Tainter Gate 1, left bank hoist chain, roller pin 41 end view