Wanapum Dam Incident Report, Priest Rapids Project No. 2114

Following the discovery of movement at Pier 4 between Gates 3 and 4 on February 25, 2014, an in-depth investigation and evaluation of the spillway was initiated as well as lowering of the reservoir pool. In addition to inspections by Grant County PUD staff, private consultants and OEP staff, an underwater inspection of the concrete monolith which contains Pier 4 was conducted by divers. On February 27th while inspecting the upstream face of the Pier 4 monolith, divers discovered structural damage in the location of an existing construction cold joint across the monolith face located about 75 feet below the water surface. The construction joint was reported to have developed into a crack with a 2 inch vertical opening and a 1-1/2 inch downstream offset. This crack extends across the entire width of the monolith. Although underwater inspections are still underway, preliminary indications are that the crack may extend through the monolith to the downstream face. As a precautionary measure, the PUD lowered the reservoir 3.5 feet beginning on February 25th and is in the process of lowering the reservoir pool further to El. 560 feet with further drawdowns possible. This will result in 11.5 feet of total drawdown. The latest alignment surveys taken over the last two days have not shown any additional movement of the spillway section. Engineers continue to evaluate the damage and appropriate corrective measures. The PUD is working to assemble a Board of Consultants to investigate the crack and movement and recommend repair options. Wanapum Dam is a high hazard potential dam and is located on the Columbia River in Kittitas County, Washington State. Both Wanapum Dam and Priest Rapids Dam are developments of the Priest Rapids Project, FERC No. 2114.

Temporary measures included installing lights onto the spillway deck so PUD staff can monitor the conditions overnight - twice daily inspections and surveys are being conducted by the PUD. The PUD has contacted the local Emergency Management Agencies to notify them of the situation and are monitoring the conditions. They are prepared to activate the Emergency Action Plan at any moment if conditions warrant. The PUD is providing daily telephone updates of the situation.

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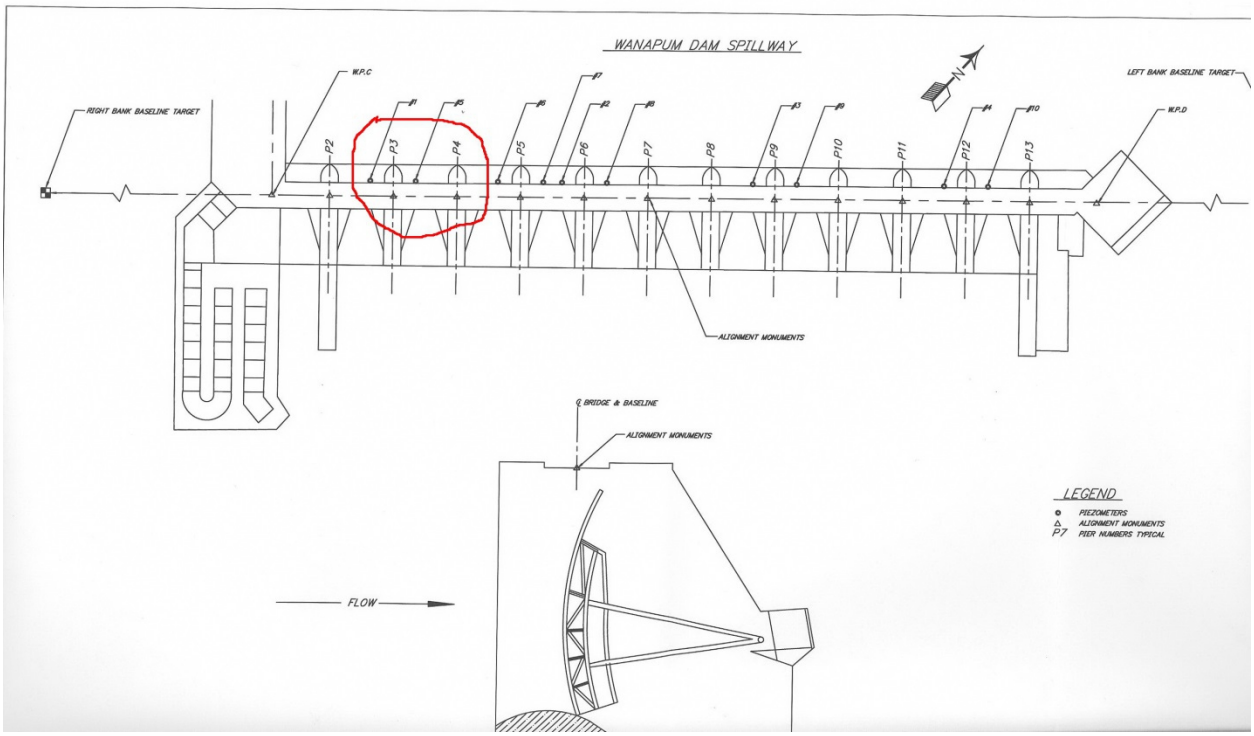
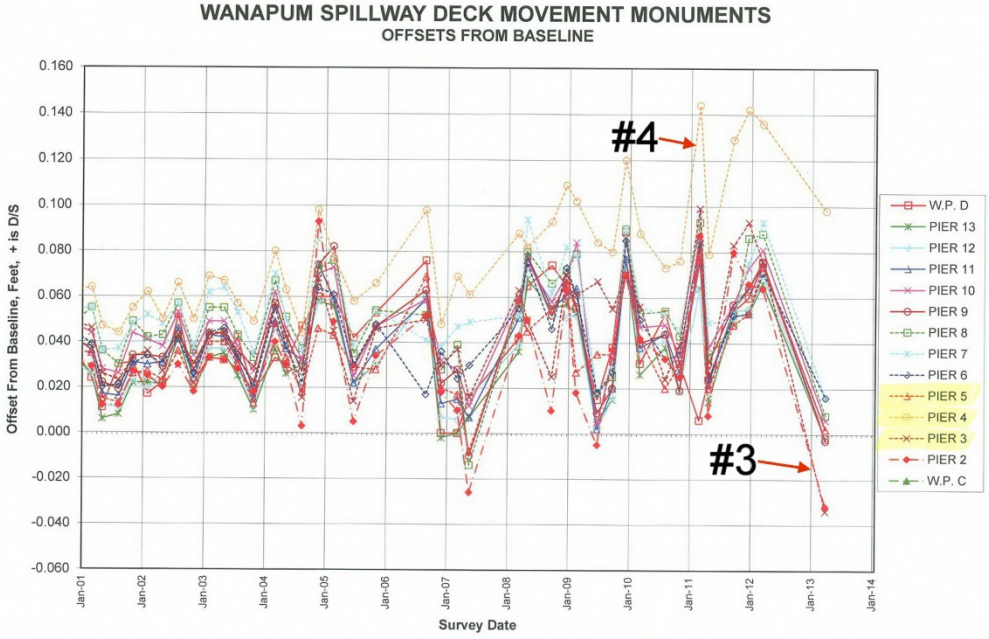
Wanapum Dam comprises left and right embankments, gravity sections, and fishways; a 10-monolith powerhouse plus a 6-monolith future unit section now infilled with concrete; and a spillway section. The spillway section (below) is an 832-foot-long reinforced concrete gravity structure containing 12 tainter gates. The stilling basin is a

level concrete apron that extends 80 feet downstream from the ogee section and terminates in a 4-foot-high end sill. The spillway deck elevation is 579.0 feet msl. .

As documented in previous Dam Safety Inspection Reports, Portland Regional Office staff reported “sighting down the upstream parapet revealed no movement of the spillway monoliths; they were observed to be well-aligned”.

The latest DSSMR includes a plot (below) showing historical movement for piers 3 and 4. It appears that Pier 4 is moving downstream, while Pier 3 has moved upstream. This appears to indicate rotation of the spillway monolith. Since 2001, Pier 4 has shown a total movement of about 1 inch in the downstream direction. In the last couple years, Pier 3 has shown movement of 0.3 inches in the upstream direction.


WANAPUM DAM SPILLWAY
RIGHT BANK BASELINE TARGET
W.P.C
LEFT BANK BASELINE TARGET
W.P.D
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
P13
ALIGNMENT MONUMENTS
℄ BRIDGE & BASELINE
ALIGNMENT MONUMENTS
FLOW
LEGEND
PIEZOMETERS
ALIGNMENT MONUMENTS
P7 PIER NUMBERS TYPICAL


WANAPUM SPILLWAY DECK MOVEMENT MONUMENTS
OFFSETS FROM BASELINE
Offset From Baseline, Feet, + is D/S
0.160
0.140
0.120
0.100
0.080
0.060
0.040
0.020
0.000
-0.020
-0.040
-0.060
#4
#3
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Survey Date
W.P. D
PIER 13
PIER 12
PIER 11
PIER 10
PIER 9
PIER 8
PIER 7
PIER 6
PIER 5
PIER 4
PIER 3
PIER 2
W.P. C