

# Upriver Dam Stability and Seismic Analysis

Spokane River, Washington

**Owner:** City of Spokane

**Description:** The Upriver Hydroelectric project (FERC Project No. 3074-WA) is located on the Spokane River, approximately 5 miles north of the City of Spokane. The project includes a gated concrete gravity spillway structure, an emergency spillway, and two powerhouse structures. The Upriver Dam is classified as a high hazard dam under the FERC guidelines.

INCA performed static and seismic stability analyses for the spillway structure. The spillway structure is a reinforced concrete gravity structure that was constructed in 1937 and founded on non-cohesive medium dense to dense sand and gravel. The spillway has eight tainter gate bays and is approximately 229 feet wide and 70 feet long.

A seepage barrier extends upstream across the full width of the river. Steel sheet pile cutoff walls are also located beneath the spillway to control seepage below the spillway.

INCA reviewed the dam technical information and performed static stability analyses for the worst static load case and the ice load case. The sliding and bearing stress factors of safety were checked for compliance with the FERC Engineering Guidelines. INCA performed sensitivity analyses to determine the effect changes in the assumptions to determine soil strength properties and uplift pressures had on the stability safety factors.

INCA determined the seismic yield acceleration using a pseudo static seismic stability analysis. The seismic yield acceleration was determined so that a Newmark sliding analysis could be performed.

