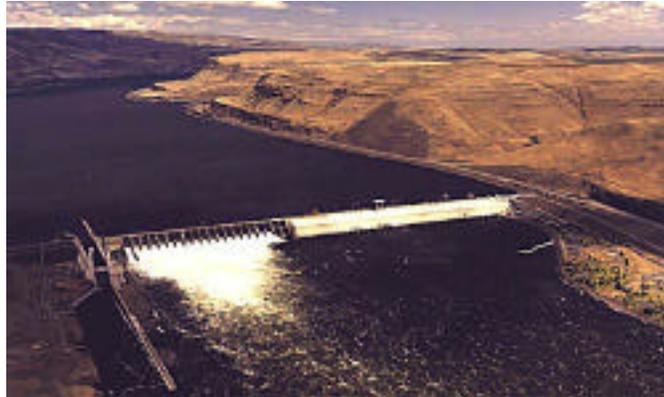


Science.
Technology.
Innovation.

Columbia River Dams -- Flow Prediction

Pacific Northwest National Laboratory (PNNL) has developed a fluid dynamics capability for simulating flow conditions in areas upstream, through, and immediately downstream of hydroelectric dams. This capability can aid engineers as a design tool for modifying the operations and physical structure of dams.



Spillway and
Stilling Basin Flows
at John Day Dam

Contacts

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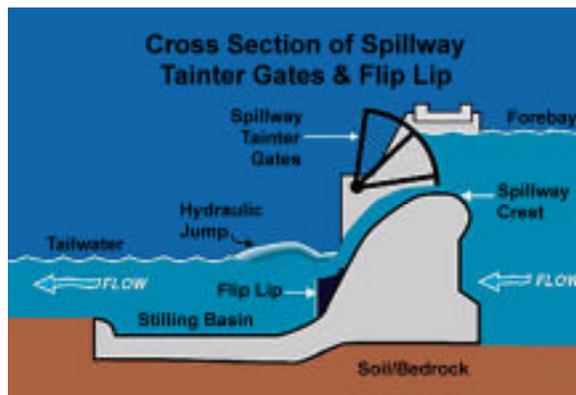
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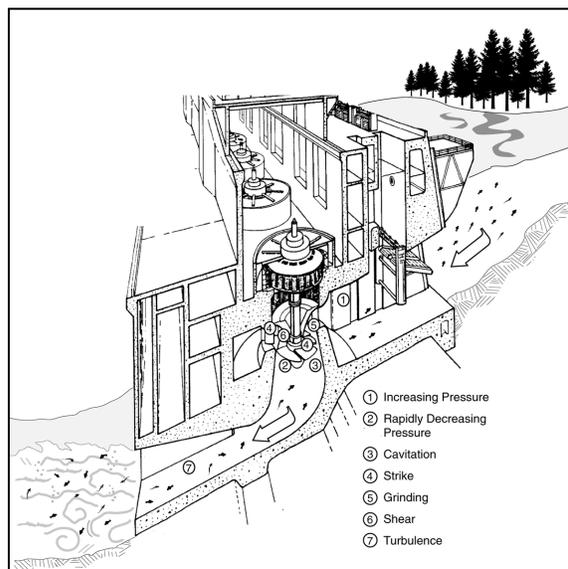
Research Engineer

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Forebay and
Tailrace Zones

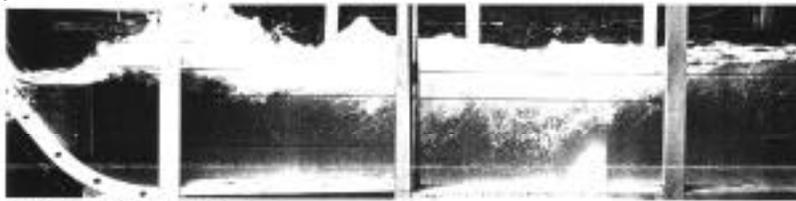
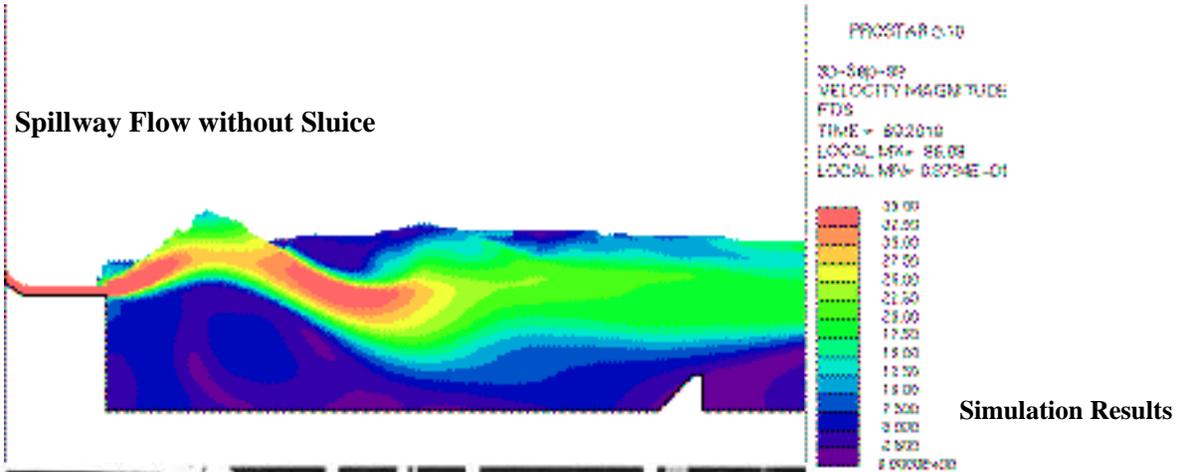


Draft Tube Flows

**Pacific Northwest
National Laboratory**
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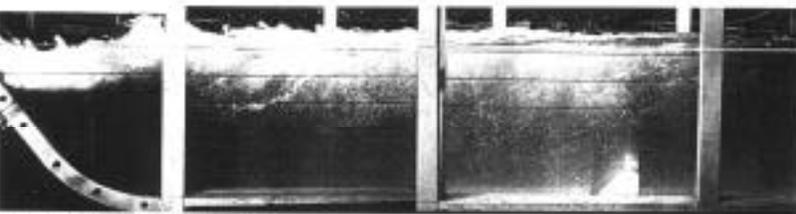
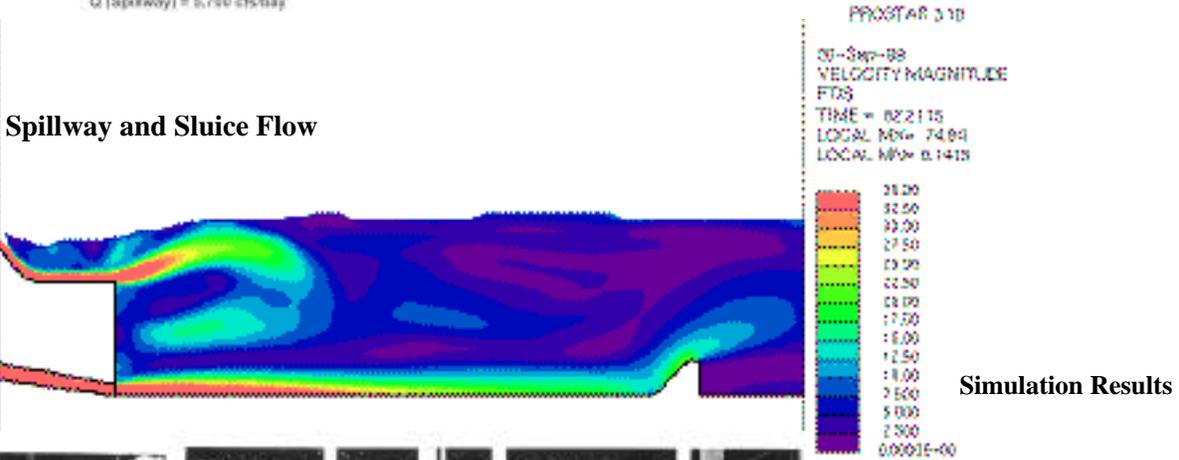
John Day Dam Test Applications

To reduce production of dissolved gas in water downstream of hydroelectric dams, the U.S. Corps of Engineers has investigated modifying the John Day Dam spillway to include submerged sluiceways. Laboratory studies of the proposed design were conducted, and the capability to simulate the flow was tested using STAR-CD, a computational fluid dynamics software developed by Computational Dynamics, Ltd. A comparison of the results from the simulations and the results from reduced scale model laboratory tests is shown below.



Deflector Performance Characteristics
 Sluice Gates Closed
 Q (Spillway) = 5,700 cfs/bay

Laboratory Results



Deflector Performance Characteristics
 Q (Sluice) = 4,800 cfs/sluice
 Q (Spillway) = 5,700 cfs/bay

Laboratory Results