

**JOINT OPERATION OF Grand Coulee AND Chief Joseph**  
***IN THE ABSENCE OF FLOW DEFLECTORS***  
***Summary of findings from General Re-Evaluation Report***  
***for Gas Abatement at Chief Joseph Dam, June 2000***

1. Executive Summary. The General Re-evaluation Report, completed in June 2000 for dissolved gas abatement at Chief Joseph Dam, recommended installation of flow deflectors at Chief Joseph combined with “Joint Operation” of Chief Joseph with Grand Coulee Dam. This combined alternative would provide the greatest benefit of Total Dissolved Gas (TDG) reduction in the Mid-Columbia River.

Flow deflectors on Chief Joseph would by themselves reduce TDG below the dam during spill conditions. Joint Operation would further reduce TDG above and below Chief Joseph by taking advantage of

- The larger generation flow capacity of Grand Coulee;
- The less saturating spillway at Chief Joseph, with or without flow deflectors; and
- The more cost-effective alternative for gas abatement at these dams.

If Joint Operation were conducted without flow deflectors, there would be a benefit of reduced TDG in Rufus Woods Lake, the reservoir formed by Chief Joseph. Joint Operation would not change the total TDG load in the river below Chief Joseph.

2. Historical Spill. Chief Joseph and Grand Coulee have spilled during the spring snowmelt season in almost half of all years. These projects spill enough to cause TDG saturation greater than 120% in about a quarter of all years. Grand Coulee has the greatest generation flow capacity (280 kcfs) in the Mid-Columbia; Chief Joseph has the second largest at 220 kcfs. Almost all spill at both projects has occurred due to lack of load, rather than due to river flow exceeding their generation capacities.

3. Flow Objective of Study. The General Re-evaluation Report determined a design flow for the river up to which the alternatives would be compared. The 7-day average flow with a 10-year return period, known as the “7Q10,” was used. For both Grand Coulee and Chief Joseph, the 7Q10 is 241 kcfs. The 7Q10 can be entirely passed with generation flow and no spill at Grand Coulee. Chief Joseph must spill to pass the 7Q10.

4. Grand Coulee Dam TDG Characteristics. Grand Coulee has a geometry unlike any other Columbia River Dam and should not be treated like other dams on the spill priority list. When Grand Coulee spills, it has the potential to supersaturate *all* the flow, both generation and spill, through the dam. As a result, Grand Coulee loads the river with more gas than Chief Joseph Dam for the same amount of spill.

5. Fixed Monitoring Stations. The fixed monitoring station (FMS) below Grand Coulee measures a mixed river, the result of thorough mixing of both generation flow and spill. The FMS below Chief Joseph measures only spill TDG. It is not an indicator of TDG on the powerhouse side of the river. Unlike Grand Coulee, generation flow and spill below

Chief Joseph do not completely mix until the water is about halfway to Wells Dam. Use of FMS measurements to determine spill priority in 1996 and 1997 resulted in high TDG levels in Lake Rufus Woods that could be avoided in future operations.

6. Joint Operation. Joint Operation of Grand Coulee and Chief Joseph, combined with flow deflectors at Chief Joseph, would reduce TDG in the Columbia between Grand Coulee and Priest Rapids Dam. Without flow deflectors, joint operation would still reduce TDG in Rufus Woods Lake and would not change TDG in the mixed river below Chief Joseph. Joint Operation would eliminate spill at Grand Coulee and increase spill at Chief Joseph. The FMS below Chief Joseph would register higher TDG limits. The generation flow would have less TDG. There would be no net increase when generation flow and spill mix downstream of the FMS below Chief Joseph.

7. Support for Joint Operation Without Flow Deflectors. Installation of flow deflectors at Chief Joseph has widespread support. The Joint Operation alternative by itself has gained support, as it has become more understood. The Colville Tribe and the Washington State Department of Ecology are interested in working with the Corps to implement Joint Operation without flow deflectors as an interim measure to improve water quality in 50 miles of the Mid-Columbia.