



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
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SEATTLE, WASHINGTON 98124-3755

CENWS-PM-PL-ER

**PROTOTYPE SPILL TEST
CHIEF JOSEPH DAM DISSOLVED GAS ABATEMENT PROJECT
Douglas and Okanogan Counties, Washington**

Supplemental Finding of No Significant Impact

Background.

The National Marine Fisheries Service's (NMFS, also called NOAA Fisheries) 2000 Biological Opinion concerning operation of the Federal Columbia River Power System (FCRPS) included a number of actions intended to reduce the impact of the operation of the FCRPS on threatened and endangered species. Subsequently, these actions were incorporated into the Bonneville Power Administration (BPA), USACE, and Bureau of Reclamation's (together the Action Agencies) Updated Proposed Action plan which was then adopted in NMFS's 2004 Biological Opinion. One designated action was to construct flow deflectors at Chief Joseph Dam on the mainstem upper Columbia River in Washington, to ameliorate dissolved gas levels from involuntary spill, which could be harmful to aquatic life. Construction began in 2006 on the deflectors, and is scheduled to be complete in 2010.

This environmental assessment documents potential effects of a prototype spill test intended to allow measurement of uplift pressure on dam monoliths. It supplements, and except as specified, hereby incorporates information contained in an Environmental Assessment and Finding of No Significant Impact (USACE 2000; see http://www.nws.usace.army.mil/ers/reposit/Abatement_EA.v3.1.pdf) which were completed in 2000 for deflector construction.

Purpose and Need.

Need: Previous data have shown that uplift pressures under certain monoliths at Chief Joseph Dam increase during spill. A detailed investigation and stability analysis indicated that the transmission of high surface hydrodynamic pressures through the spillway monolith joints during spill was the most likely mechanism for the observed foundation uplift increases leading to possible exceedence of structural stability criteria. CJD has undertaken an extensive project to repair the spillway joints, which are located along the center lines of the spillway bays. A method is needed to determine whether uplift pressures are acceptable during spill for the modified spillway condition (i.e., with deflector installation and monolith joint repair).

Purpose: The purpose of the proposed spill test is to 1) observe whether the seal improvements to the deflector and high pressure zone above the deflector limit the transmission of high surface

pressures to the foundation; 2) determine the effect on foundation uplift pressures from changing the pressure distribution on the spillway as a result of deflector installation; and 3) assess deflector degassing performance and verify that there are no "red flags."

Preferred Alternative

The spill test would consist of spill from two completed deflector bays (gates 12 and 13) in the monoliths where high uplift values have been observed during previous spills (Monoliths 16, 17, and 18). In addition, total dissolved gas (TDG) measurements would also be collected at lower flows to provide some initial data to assess deflector performance. Flows would be ramped up in five steps and held for a duration of 4 hours each, for a total test length of 20 hours. The flow steps would be 2, 4, 6, 11, and 16 kcfs per bay, for a total of 4, 8, 12, 22, and 32 kcfs respectively from the spillway during the test.

The results of this test would be compared to previous information taken during spill without the deflectors in place, in order to derive an estimate of the effect of the changed (with-deflector) condition and the seal improvements. This is because without the deflectors, the high pressure occurs at the toe of the spillway, whereas with them, the pressure is transferred to the deflector itself. That condition is important to assessing the performance of the seal improvements.

Although there could be involuntary spill when high spring flows exceed generating demand or capacity, this test would be conducted in a planned fashion. That is, it would use voluntary spill, so all measuring and monitoring capability can be put into place with as much preparation as possible. In other words, although involuntary spill could occur during the time of the planned test, it could not and would not be counted on to occur.

Summary of Impacts.

Pursuant to the National Environmental Policy Act, an EA has been prepared for the proposed work. This document describes the environmental consequences of the proposed work, which are briefly summarized below.

Although unlikely, it is possible that uplift pressure would exceed dam stability criteria. This would most likely occur at the higher flows of 6, 11 and 16 kcfs per bay. Pressures would be closely monitored to ensure appropriate response to such a condition. If sensors indicate that maximum criteria for uplift pressure are exceeded, the spill test would be terminated immediately. Based on the duration and magnitude of the test, along with continual management during the event, there would be no opportunity for dam safety to be compromised as a result of the test.

The test would involve spilling water and thus making it unavailable to the turbines for power generation at Chief Joseph Dam. Although water has greater value and potential for power generation the higher in the system it is and the more dams it passes through, this effect would be confined to Chief Joseph Dam only, and not other dams. The total volume of water spilled would equal approximately 25,740 acre-feet (given spill amounts and the fact that one cubic foot per second [cfs] of flow over 1 day equals approximately 1.98 acre-feet). Because of hydropower's flexibility, Chief Joseph Dam supports load fluctuations throughout the northwest.

When spill reduces generating capacity, other generators need to provide this support. Thus, there might be some minor impact to the flexibility of the power system in general from the test.

Normally, impacts on aquatic organisms from TDG saturation levels less than 120% over limited periods of time are considered minimal. However, this test would be conducted with only two deflectors available, and at higher spill flows than the optimal gas abatement maximum per bay. Thus, TDG levels immediately below the spillway bays in use might be as high as 120-135% saturation. These are upper estimates that refer to unmixed values immediately below the spillway. They would be diluted by powerhouse flows, and would meet criteria at the fixed monitoring station located 0.75 miles downstream of the dam. They would also attenuate downstream to some extent as the affected water arrived at the mouth of the Okanogan River and crossed a bar that is there. The Washington Dept. of Ecology requires compliance at the fixed station. The water quality criterion of 125% one hour average saturation is not expected to be exceeded at that point. Also, due to the short duration of the spills, the 12 hour average of 120% saturation would not be exceeded both in the tailrace monitoring site nor at the Wells Dam forebay. TDG levels above 120% for prolonged periods of time could harm fish within 1-2 meters of the water's surface in the unmixed spill plume. With generation flow added to the spill, there would be reduced risk once mixing occurs. To the extent that fish are in the spill plume and near the surface especially close downstream of Chief Joseph Dam, they may be impacted, but predicting extent of incidences or symptoms is not possible based on existing capabilities. There may also be entrainment of fish over the spillway. Although some flow deflector systems are considered less harmful than others, the spillway at Chief Joseph Dam could result in some unknown amount of injury or mortality to fish entrained during spill. If fish are impacted, eagles and other fish-eating wildlife may temporarily benefit from them as a food resource. It is not anticipated that there would be a long-term impact in terms of a measurable reduction in food for predators and scavengers of fish.

No significant adverse impacts to dam stability, power generation, water quality, or fish and wildlife are anticipated as a result of the project. No impacts to other resources are anticipated.

Finding.

Based on the analysis detailed in the Environmental Assessment (attached), this project is not considered a major Federal action significantly affecting the quality of the human environment and does not require preparation of an environmental impact statement.

19 April 2007
Date



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