Order Approving the U.S Army Corps of Engineer's Request for a Waiver to the State's Total Dissolved Gas Water Quality Standard

BEFORE THE ENVIRONMENTAL QUALITY COMMISSION

In the matter of the U.S. Army Corps of Engineers' request to spill water to assist out-migrating threatened and endangered salmon smolts	))))	FINDINGS and ORDER

Findings

1. The Department of Environmental Quality received a request from the U.S. Army Corps of Engineers dated January 09, 2009, to adjust the 110 percent t total dissolved gas water quality standard as necessary to spill water over McNary, John Day, The Dalles and Bonneville dams on the Lower Columbia River to assist out-migrating threatened and endangered salmon smolts during the fish passage season of Apr. 1 to Aug. 31. The application sought approval for five years. The public was notified of the request on Feb. 19, 2009 and given the opportunity to provide written comments until 5:00 p.m. on Mar. 23, 2009.

2. Acting under **OAR 340-041-0104(3)** the commission finds that:

   (a) *Failure to act would result in greater harm to salmonid stock survival through in-river migration than would occur by increased spill:*

   Biological assessments and opinions have concluded that providing project spill for fish passage at levels that result in exceeding the 110 percent total dissolved gas water quality standard is necessary to assure adequate passage conditions for Endangered Species Act listed fish species. The National Marine Fisheries Service Federal Columbia River Power System Biological Opinion concluded that the risk associated with a managed fish passage spill program to a 120 percent total dissolved gas level is warranted by the projected 4 percent to 6 percent increase in system survival of juvenile salmonids. The opinion estimated mortality from fish passing through turbines between 7 and 14 percent, and mortality due to fish passage spill between 0 to 2 percent. Barge and truck transport are alternative modes of fish transport to voluntary spill. The mortality associated with truck and barge transport is difficult to estimate due to the potential for latent mortality. However, the US Fish and Wildlife Service studied the transport of fall Chinook salmon directly from Spring Creek Hatchery by barge to a release site below Bonneville Dam. A high percentage of the adult returns from the barged groups strayed to other hatcheries, and the return rates to Spring Creek Hatchery were significantly lower for the barge test groups than for the voluntary spill control group. The US Fish and Wildlife Service also evaluated the possibility of raising and releasing additional fish to make up for those fish that would be lost to turbines or other causes during passage at Bonneville Dam in the

absence of spill. The USFWS concluded that it would not be possible to raise additional fish because rearing space, water supply, and waste treatment capability are limited. It would also not be feasible to release fish at a later date because of limited hatchery capacity since these fish would continue to grow and exceed hatchery capacity.

(b) The modified total dissolved gas criteria associated with the increased spill provides a reasonable balance of the risk of impairment due to elevated total dissolved gas to both resident biological communities and other migrating fish and to migrating adult and juvenile salmonids when compared to other options for in-river migration of salmon:

The Fish Passage Center estimates a 1.4 percent incidence of gas bubble trauma in salmon smolts in the Columbia River when total dissolved gas levels are managed to 120 percent in the tailrace. This estimate is based on smolt monitoring information collected between 1995 and 2007.

When the in-river total dissolved gas levels are below 120 percent, few adult fish (in some cases none) display signs of gas bubble trauma. Investigators have observed adult tolerance to total dissolved gas and hypothesized that it was attributable to the migration depth of adult salmonids. Depth-sensitive radio tags used in adult migration studies confirmed that adults migrate at depths up to 4 meters and find depth compensation protection from gas bubble trauma. For every meter below the surface water, a reduction of 10 percent total dissolved gas is measured in the water column. Resident fish and aquatic invertebrates in the Columbia River downstream of Bonneville Dam have been monitored by National Marine Fisheries Service for signs of gas bubble disease from 1993 to 1998. There were no signs of gas bubble disease observed in the aquatic invertebrates examined. There was a low incidence of gas bubble disease (less than one percent) in resident fish examined in 1993 and 1995 while in 1994, 1997 and 1998 none of the fish observed had signs of gas bubble disease. Signs of gas bubble disease were prevalent in 1996 but this was a high flow year with large volumes of involuntary spill and total dissolved gas levels above 120 percent in the tail races of dams. Given the past monitoring of gas bubble disease, the levels requested in this petition strike a reasonable balance between increased survival due to reduced turbine mortality and the risk of mortality from gas bubble disease.

c) Adequate data will exist to determine compliance with the standards:

Physical in-river total dissolved gas monitoring will be conducted at the tailraces of McNary, John Day, The Dalles, and Bonneville Dams. Hourly data will be available on the Corps' website. The Corps has submitted a physical monitoring plan. The physical monitoring plan of action is available at:
http://www.nwdwc.usace.army.mil/tmt/wq/tdg_monitoring/2010-14_final.pdf
Implementation of the physical monitoring plan will ensure that data will exist to determine compliance with the standards for the voluntary spill program identified in this Order. The Corps will report each year's physical monitoring results to DEQ.

d) Biological monitoring is occurring to document that the migratory salmonid and resident biological communities are being protected:

The corps has submitted a biological monitoring plan. Biological monitoring will occur according to the "Fish Passage Center Gas Bubble Trauma Monitoring Program Protocol for Juvenile Salmonids" document, available at: ftp://ftp.fpc.org/gbtprogram/ . Juvenile salmonids will be collected at Bonneville and McNary Dams and examined and evaluated for incidence of gas bubble trauma, and will be assigned ranks based on severity of their symptoms. The corps will report each year's biological monitoring results to the DEQ.

Order

1. The Environmental Quality Commission approves a modification to the 110 percent total dissolved gas water quality standard for voluntary fish passage spill at McNary, John Day, The Dalles and Bonneville Dams on the Lower Columbia River, subject to the following conditions:

   (i) A modified total dissolved gas standard for the Columbia River applies:

   a) during the voluntary spill period from midnight on Apr. 1 to midnight on Aug. 31 for the purpose of fish passage; and

   b) during any period of voluntary spill that occurs outside the periods specified in 1(i)(a) above, if the spill is for the purpose of Spring Creek Hatchery fish release, maintenance activities and/or biological or physical studies of spillway structures and prototype fish passage devices, then the U.S. Army Corps of Engineers must have approval from the Department prior to such spill. The corps must notify the DEQ in writing describing the action, the purpose of the action and dates of action at least one week prior to the voluntary spill for the purpose of informing DEQ and having the DEQ make a final determination of approval. The U.S. Army Corps of Engineers will conduct physical and biological monitoring during these periods of voluntary spill.

   (ii) The modified total dissolved gas criteria will apply for five-years, 2010, 2011, 2012, 2013 and 2014.

   (iii) Spill must be reduced when the average total dissolved gas concentration of the 12 highest hourly measurements per calendar day exceeds 120 percent of saturation in the tailraces of McNary, John Day, The Dalles, and Bonneville Dams monitoring stations.

   (iv) Spill must be reduced when instantaneous total dissolved gas levels exceed 125 percent of saturation for any 2 hours during the 12 highest hourly measurements per calendar day in the tailraces of McNary, John Day, The Dalles, and Bonneville Dams monitoring stations.

(v) If either 15 percent of the fish examined show signs of gas bubble disease in their non-paired fins, or five percent of the fish examined show signs of gas bubble trauma in their non-paired fins where more than 25 percent of the surface area of the fin is occluded by gas bubbles, the DEQ director will halt the spill program.

(vi) The Corps must provide written notice to DEQ within 24 hours of any violations of the conditions in the modification as it relates to voluntary spill. Such notice must include actions proposed to reduce total dissolved gas levels or the reason(s) for no action.

(vii) No later than Dec. 31 for each year of this waiver, the corps must provide an annual written report to DEQ detailing the following:
a) flow and runoff descriptions for the spill season;
b) spill quantities and durations;
c) quantities of water spilled for fish versus spill for other reasons for each project;
d) data results from the physical and biological monitoring programs, including incidences of gas bubble trauma;
e) description and results of any biological or physical studies of spillway structures and prototype fish passage devices to test spill at operational levels; and
f) progress on implementing the gas abatement measures contained in the 2002 Lower Columbia River total dissolved gas total maximum daily load and other gas abatement activities identified through adaptive management.

(viii) If requested, the corps must report to the commission on any of the above matters or other matters relevant to this order.

(ix) The commission reserves the right to terminate or modify this modification at any time.

Adaptive Management

The process for reviewing the implementation of the 2002 Lower Columbia River total dissolved gas total maximum daily load will continue. The Washington State Department of Ecology will convene an advisory group with representatives from Oregon DEQ, tribes, federal and state agencies to evaluate appropriate points of compliance for this total maximum daily load. Based on these findings, further studies may be needed, and structural and operational gas abatement activities will be redirected or accelerated if needed.

Dated: 6-24-09

ON BEHALF OF THE COMMISSION

Director