



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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August 10 , 2009

(See Distribution List)

RE: Petition for Rule Making – Chapter 173-201a WAC - Water Quality Standards

The Washington State Department of Ecology (Ecology) received your petition for rule making on June 22, 2009. The petition requests a change to a part of the total dissolved gas (TDG) criteria in the Washington State Water Quality Standards, WAC 173-201A-200(1)(f)(ii). The petition contends that the 115% forebay TDG criterion is unduly restrictive, at odds with sound science, and contrary to federal and state law.

Ecology is denying the petition to change the Washington State Water Quality Standards based on the results of a thorough review conducted in 2007-2009. This review was conducted in response to previous concerns raised in 2007 about the 115% forebay TDG criterion. Details of the review are available at <http://www.ecy.wa.gov/programs/wq/tmdl/ColumbiaRvr/ColumbiaTDG.html>. Ecology's analysis of the 115% forebay TDG criterion can be found in *Adaptive Management Team Total Dissolved Gas in the Columbia and Snake Rivers – Evaluation of the 115 Percent Total Dissolved Gas Forebay Requirement* ("TDG Evaluation"). The January 2009 TDG Evaluation was coauthored by Ecology and the state of Oregon, Department of Environmental Quality (ODEQ). It is available directly from <http://www.ecy.wa.gov/pubs/0910002.pdf>. Ecology and ODEQ gathered all of the technical information from experts who supported and opposed the 115% forebay criterion. In this document, Ecology made the following conclusion:

Ecology determined that there would be a potential for a small benefit to salmon related to fish spill if the 115% forebay criterion was eliminated, but there would also be the potential for a small increase in harm from increased gas bubble trauma. The weight of all the evidence from available scientific studies clearly points to detrimental effects on aquatic life near the surface when TDG approaches 120%. Based on the information in this document, Ecology does not believe the overall benefits of additional spill versus additional risk of gas bubble trauma are clear and are sufficient for a rule revision.

The issues identified in the petition were addressed in this analysis. A more detailed response to your specific concerns is attached below. If you have questions, please contact Andrew Kolosseus at 360-407-7543, andrew.kolosseus@ecy.wa.gov.

Sincerely,

Jay J. Manning,
Director

Attachment



Distribution List:

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Petition Issue 1: Spill is a vital salmon and steelhead protective measure.

We agree that spill is important for salmon and steelhead. Our 115/120% TDG criteria for the Columbia and Snake Rivers is designed to allow for more spill than our statewide 110% criterion allows. We are encouraged by the higher salmon survival rates achieved with the 115/120% TDG criterion mentioned in the petition. The petitioners argue that the 115% forebay criterion does not achieve the correct balance of benefits versus risk. With the information we have today, we believe the 115% forebay TDG limit does achieve a proper balance from the weighing of benefits to salmon migration survival against the risks of gas bubble trauma to all aquatic life.

Petition Issue 2: The 115% forebay TDG limit does not have a sound scientific basis

The petitioners argue that the 115% criterion is not based on sound science. We disagree that there is a no scientific basis for the 115% limit. The effects on aquatic life at 115% versus 120% are detailed in the TDG Evaluation in the section titled "Gas Bubble Trauma Impacts."

We do not consider the 115% limit to be too restrictive just because data and studies show there is only limited gas bubble trauma exhibited at that level. The goal of the water quality standards is to set criteria that fully protect aquatic life uses, which would usually mean setting a level that results in no gas bubble trauma. Indeed, most criteria in our water quality standards are set at a far more protective (i.e. stricter) level. After evaluation of the 115% limit, we continue to believe the current 115/120/125 criteria achieve the best balance between increased spill for salmon migration and the effects of gas bubble trauma caused by high TDG levels.

Petition Issue 3: Forebay monitors do not provide credible data necessary for monitoring compliance with water quality standards

The petitioners question the validity of the forebay monitoring data. While we agree there are concerns with the representativeness of both the forebay and tailrace monitors, difficulty in monitoring is not a valid reason to eliminate a criterion in the water quality standards. The scientific basis used to set a criterion is not related to issues regarding monitoring data collected to determine compliance with the criterion. Ecology will continue to work with stakeholders to improve the quality of TDG monitoring above and below the dams.

Petition Issue 4: The 115% forebay TDG limit does not protect the most sensitive designated use of the Snake and Columbia Rivers: salmonid habitat.

From review of TDG studies and information, Ecology is not convinced that salmon are the most sensitive aquatic life in terms of effects from high TDG. All aquatic life must be protected by the water quality standards. A description of the effects of TDG on aquatic life is available in the TDG Evaluation and the three literature reviews cited by the evaluation. The Ecology literature review found negative effects on aquatic life such as frogs, sturgeon larvae, fish, and daphnia at 115% and more at 120%. We agree with the petitioners that power generation is not a designated use and our evaluation of the appropriateness of the 115% TDG forebay limit did not consider power generation.

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The petitioners argue that the “forebay gas caps play a dominant role in reducing spill for salmon survival.” Our evaluation did not find that forebay TDG limits were a primary limiting factor for spill. The BPA and USACE analyses found that spill could increase 1-4% if the forebay TDG limits were removed. The FPC analysis found that spill could increase 2% (scenario B, average of 2003, 2005, 2006, and 2007) to 10% (scenario C, average of same years) if the forebay TDG limits were removed. Only if spill was not limited by planned operations (scenario D) would the forebay gas caps play a dominant role in reducing spill. The spill volumes are detailed in the TDG Evaluation in the section titled “Spill Volume Analysis: With and Without the 115 Percent TDG Limit.”

Ecology agrees with the salmon distribution information presented in the petition. The TDG Evaluation included 15 studies on aquatic life distribution from the Ecology literature review. The conclusion of these studies was that the mean depth of the fish was always deeper than one meter, and usually deeper than two meters. The amount of time spent at depths less than one meter was usually (but not always) less than the amount of time where significant detrimental effects were found. Aquatic life in the top meter of water are the most vulnerable to gas bubble trauma since there is no depth compensation.

The petition took issue with Ecology’s statement that “most aquatic life spends more of their time in the forebays.” The intended meaning of this statement was that aquatic life tends to spend more time in the forebays than they do in the tailraces. We agree that the total amount of time spent by migrating salmon in the forebays is relatively short. We also agree that higher spill shortens migration time.

Petition Issue 5: Ecology should amend WAC 173-210A-200(1)(f)(ii) to remedy its violations of federal and state law.

The petitioners argue that there is no risk to aquatic life near the surface when TDG approaches 120%. Ecology disagrees with this conclusion. The specific evidence that led Ecology to determine there was “detrimental effects on aquatic life near the surface when TDG approaches 120%” is detailed in the “Gas Bubble Trauma Impacts” section of the TDG Evaluation. The Ecology literature review found sub-lethal and lethal effects on aquatic life (not just salmon) at 120%. While the potential for harm is relatively small, Ecology also found that the potential benefit for salmon migration was small.

It is important to remember that keeping Ecology’s 115% criteria will not “further harm” or “increase fish residence times.” Since Ecology is not changing its standards, there is no further or increased harm or benefit from the current situation.

As mentioned in the petition, ODEQ did decide to eliminate their 115% waiver limit. The dam operators will need to meet Washington’s more restrictive 115% limit even though Oregon does not have a forebay limit. A 115% requirement is most limiting of spill at Bonneville, Little Goose, and Lower Monumental Dams. Ecology and ODEQ previously eliminated the 115% limit below Bonneville Dam. Therefore, Oregon and Washington have the same TDG limits for Bonneville Dam. Since the Little Goose and Lower Monumental Dams are entirely in Washington’s jurisdiction on the Snake River, Oregon’s waiver limit does not affect them.