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March 20, 2015

Cheryl Niemi  
Washington State Department of Ecology  
Water Quality Program  
P.O. Box 47600, Olympia, WA 98504-7600

Dear Ms. Niemi:

On behalf of the board of directors and members of the Washington State Water Resources Association (WSWRA) we are writing to provide comments on the proposed rule for human health criteria water quality standards. WSWRA is the coordinating agency for irrigation districts in Washington State. You'll find technical comments attached to this letter regarding the methodology for determining human health criteria water quality standards and specifically as they relate to the standard for the future use of acrolein by irrigation districts under the Irrigation Systems NPDES and State Water Quality Discharge Permit.

The WSWRA and its members have worked cooperatively with the Department of Ecology staff to shape the content of our irrigation systems NPDES permits. We are offering technical comments on the proposed water quality standards impacting the future use of acrolein under our NPDES permits. The preliminary draft rule proposes a limitation of one part per billion for the use of acrolein. This limitation will severely hamper our effective use of acrolein under the permits. The HHC water quality standard for acrolein is unnecessarily low considering that episodic use of the product under the permit does not create a chronic threat to human health at the current NPDES permit points of compliance.

WSWRA member irrigation districts depend upon the use of acrolein as a vital tool for effective aquatic weed control. While only 6 out of more than 100 irrigation districts use acrolein in Washington, those six provide water to approximately 777,735 acres of 1,100,000 total acres of farmland being represented by the WSWRA. Over 70% of the acreage being served relies on acrolein. These figures clearly illustrate the significance of acrolein to our members.

We request that the Department of Ecology reconsider the water quality standard being adopted for the use of acrolein for human health criteria. We also request the opportunity to work with Department of Ecology staff to address the issues associated with the episodic use of acrolein under the revised water quality standards. The attached comments suggest some ways of approaching the permit's discharge limitations in the future.

WSWRA appreciates the continued cooperation and support of the Department of Ecology at all levels. WSWRA understands that acrolein is only one of many chemicals listed in the proposed rule further emphasizing the efforts by Ecology to engage us directly when so many are impacted by the rule. We recognize there are many other stakeholders with interests in this rule placing significant demand of your department's resources.

We hope that you will find our comments on the proposed rule useful. We look forward to continuing to work with Ecology staff to find solutions to important issues related to acrolien and future permits. We appreciate their willingness to work with us on this issue vital to the successful control of aquatic weeds in our canals and drains.

If you have any questions please let us know.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Thomas G. Myrum', with a long horizontal flourish extending to the right.

Thomas G. Myrum  
Executive Director

Attachment: Comments on HHC WQ rule

## General Comments on the Preliminary Draft of WAC173-201A-240

The Yakima Basin Joint Board (YBJB), members of the Yakima Basin Defense Coalition, represents the Roza, Sunnyside Valley and Naches-Selah irrigation districts. Comments herein address the operational impacts of the proposed Human Health Criteria (HHC) limitation on acrolein identified in the *Preliminary Draft of the Toxics Language & Table (WAC 173-210A-240)* released by the Washington Department of Ecology ("Ecology") on September 30, 2014 (WDOE 2014a). These technical comments are submitted on by the YBJB, but also represent the collective concerns of irrigation districts across Washington. These comments were reviewed and endorsed by the Washington State Water Resources Association (WSWRA), the coordinating agency representing irrigation districts statewide.

Acrolein is an essential, cost-effective tool for irrigation districts within the Yakima Basin and for districts statewide for the chemical control of nuisance aquatic plants in water delivery conveyances. Under the draft proposed HHC rulemaking, the acrolein discharge limit decreases by ninety-five percent (95%), a limit that is excessively restrictive because it is inconsistent with available toxicity data and does not reflect irrigation district operational practices. This should be of particular concern for WDOE because if the Governor's proposed criterion of 1 ppb is implemented, efficient water delivery to customers is not guaranteed. Further, operational and economic costs for irrigation districts and Washington state agricultural interests will likely increase dramatically.

Following a detailed review of the draft proposed rulemaking document, recent EPA recommendations, and the current state of the science surrounding acrolein, we determined that the rationale for decreasing acrolein limitations from 21 ppb to 1 ppb is not scientifically defensible. Moreover, the new acrolein criterion does not recognize that irrigation districts use acrolein intermittently ("episodic" discharges) during the irrigation season. For example, acrolein treatments typically occur three times per season for Sunnyside Valley Irrigation District (SVID). Therefore, the HHC limitations, which are based on chronic exposure scenarios, are not appropriate. We request that WDOE reconsider this limitation in light of available toxicity data and mixing zones, which have a large impact on contaminant concentrations, and consult with irrigation districts about their operational practices. We assert that the proposed 1 ppb criterion should not be applied to irrigation districts and the 21 ppb criterion should be preserved at the point of compliance (POC) into state waters. In our specific comments below, we also recommend that outdated, irrelevant data be abandoned in favor of new available science, which corroborates our rationale for preserving the 21 ppb discharge limitation.

We have outlined our primary concerns about the proposed acrolein criterion below. These technical comments offer scientific support for our recommendations regarding Ecology's rulemaking.

**1. The method and input parameters in the Governor's proposed 1 ppb Human Health Criteria (HHC) determination for acrolein do not consider the current scientific approach that accounts for bioconcentration.**

Table 240 (WDOE 2014a) and supporting documents (WDOE 2014b) do not provide a reference for the methodology or details for each input parameter used to calculate acrolein's HHC limit. However, based on the limited information provided, Ecology proposes to adopt standards that do not reflect a comprehensive, and acceptable scientific approach to account for bioconcentration. Ecology should consider the federally recommended approach for determining the bioconcentration of acrolein, as outlined in the Ambient Water Quality Criteria (AWQC) (USEPA 2014). The bioconcentration parameter input has been updated to account for mechanistic processes, metabolic biotransformation, and bioavailability in all surrounding media. The bioaccumulation factor (BAF) replaces the historic bioconcentration factor (BCF) parameter input (USEPA 2002). We have summarized historic and current input parameters used to calculate human health criteria for EPA and Ecology in Table 1. In addition, since irrigation districts apply acrolein on a seasonal, intermittent (or "episodic") basis, caution should be taken when considering AWQC recommendations for acrolein since it is derived from a chronic exposure assumption. The episodic nature of discharges from irrigation districts therefore, never put the human population at risk of a chronic exposure to acrolein. More plausibly, an acute exposure could take place during chemical applications for weed treatment. Table 1 further outlines hypothetical criteria determination for Washington to account for BAF and acute exposure.

***Recommendations:*** (1) Ecology should clarify its chosen methodology and all input parameters used to calculate HHC; (2) Ecology should consider EPA's 2014 recommendations for calculating AWQC, and BAF should replace BCF to determine a more relevant acrolein criterion; (3) Ecology should not impose a strict mandate of the state's acrolein HHC on irrigation districts due to the episodic nature of discharges and the improbable occurrence of chronic exposure. We suggest modifying the acrolein criterion for irrigation districts by accommodating input parameters representative of acute exposure and/or language in the proposed rulemaking that allows for "variance" on the NPDES permit, which would accommodate mixing zones for criterion compliance (mixing zones further discussed in item 3).

**2. The Aquatic Life Criteria (ALC) is an outdated value and data used to determine criterion is not relevant to the Pacific Northwest.**

We are concerned with the potential for Ecology adopting the federal ALC to replace the existing criterion. The draft HHC states on page 2: *The department may revise the following criteria for aquatic life on a statewide or water body-specific basis as needed to protect aquatic life occurring in waters of the state and to increase the technical accuracy of the criteria applied.* The ALC (USEPA 1985) is derived from toxicity data of the most sensitive species for a given toxicant (Table 2). For acrolein,

the freshwater criterion is based on a single study testing the African clawed frog, *Xenopus laevis* (Holcombe et al. 1987), a species that does not inhabit the Pacific Northwest. We are not aware of any studies that document amphibian species at irrigation district POCs in Washington, which makes it difficult to discern the relevance of the clawed frog study to water quality rulemaking.

**Recommendations:** The federal ALC should be used only as a reference for Ecology. Scientifically defensible data is needed to ensure that "...aquatic communities and the existing and designated uses of waters are being fully protected" (WDOE 2014a). These data uncertainties can be resolved by adopting one of the following two approaches: (1) substituting existing *X. laevis* data with data collected on amphibians native to the Pacific Northwest; or, (2) apply data from surrogate species. For example, rainbow trout (*Oncorhynchus mykiss*) may prove to be a reasonable surrogate, since similar patterns in relative toxicity between amphibian species and *O. mykiss* were recently reported (Birge et al 2000; Weltje et al 2013). We surmise that this would be an ideal approach because of the importance of salmonids in the region. However, the currently accepted *O. mykiss* data presented in Table 2 represents only one study (Holcombe et al. 1987) and the LC50 should be verified. As indicated in Table 2, either amphibian or *O. mykiss* LC50 data would need to be collected in a laboratory study before implementing rule changes because available data are not sufficient to make a credible ALC determination. Irrigation districts have historically worked with Ecology to address similar data needs when herbicide toxicity uncertainties existed (Courter et al. 2011).

**3. Proposed HHC Rulemaking should include language that allows irrigation districts to monitor compliance downstream of points of discharge into natural water bodies, areas known as "mixing zones."**

Many districts discharge into large volumes of flowing water. For example, delivery conveyances in the Roza and Sunnyside Valley Irrigation Districts release water into the Yakima River, where receiving flow is up to 10,000 cfs during the application season (Table 3). This significantly reduces chemical exposure of aquatic life. For this reason, it is prudent to account for this effect when choosing the location of the POC. Irrigation districts can be expected to comply with an acrolein effluent limit of 21 ppb within mixing zones because districts have successfully complied with Ecology's current 21 ppb effluent limitation. Table 3 provides an illustration of the ability of irrigation districts to meet reasonable criteria to protect human and aquatic life in mixing zones.

**Recommendation:** We recommend that POCs occur within mixing zones to more accurately reflect acrolein exposure concentrations. Ecology should maintain the current 21 ppb effluent limitations at POCs for irrigation districts. The language in the new proposed rulemaking could provide the opportunity for a variance to allow for POCs within mixing zones on the new NPDES permit.

**Tables**

	NTR <sup>1</sup>	EPA		Washington		
		2009 <sup>2</sup>	2014 <sup>3</sup>	Proposed 2015	BAF Hypothetical, Chronic	BAF Hypothetical, Acute
Methodology <sup>4</sup>		2000	2000	<i>NI</i>	2000	2000
RfD (µg/kg/d)		--	0.50	0.50	0.50	<i>TBD</i>
ADI (µg/kg/d)		15	--	--	--	--
RSC			0.20	<i>NI</i>	0.20	<i>TBD</i>
BW (kg)		70	80	80	80	80
DI (L/d)		2	3	2	2	2
FI (kg/d)		0.0175	--	--	--	--
FCR (kg/d)		--	0.011*	0.175	0.175	0.175
BCF (L/kg)		215	--	215	--	--
BAF (L/kg)		--	0.984*	--	0.984*	0.984
<b>Criteria (µg/L)</b>	<b>320</b>	<b>6</b>	<b>3</b>	<b>1</b>	<b>3.70</b>	<b>&gt; 3.70</b>

**Table 1.** Summary of historical criteria and input parameters of federal and Washington standards for Human Health Criteria for Acrolein for the consumption of water and organisms. Hypothetical columns under Washington accounts for recommended adjustments outlined in the text. "BAF Hypothetical, Chronic" considers Washington's proposed HHC input parameters, but adopts a BAF approach to replace BCF. Similarly, "BAF Hypothetical, Acute" considers the same, but suggests an RfD to accommodate the realistic acute exposure potential. *NI* - denotes Information not supplied in Ecology's 2014 *Preliminary Draft of Toxics Language and Table* (WDOE 2014a), or the 2014 *Draft – Washington Human Health Criteria Review Documents* (WDOE 2014b); *TBD* – denotes information to be determined based on acute exposure.

\*mean value for TL2, TL3 and TL4

RfD (Reference Dose; considers ADI, safety factor and margin of safety)

ADI (Acceptable Daily Intake)

RSC (Relative Source Contribution)

BW (Human Body Weight)

DI (Drinking water intake)

FI (Fish Intake)

FCR (Fish Consumption Rate)

BCF (Bioconcentration Factor)

BAF (Bioaccumulation Factor)

<sup>1</sup> National Toxics Rule (1986)

<sup>2</sup> USEPA (2009)

<sup>3</sup> USEPA (2014)

<sup>4</sup> USEPA (2000)



GMAV (µg/L)	Species	SMAV (µg/L)	# of studies value based on	Study, lifestage, endpoint
32.98	Coho salmon, <i>Oncorhynchus kisutch</i>	68	1 (Lorz et al 1979)	Flow-through, smolt, LC50
	Rainbow trout, <i>Oncorhynchus mykiss</i>	16	1 (Holcombe et al 1987)	Flow-through, fry, LC50
28.77	Fathead minnow, <i>Pimephales promelas</i>	28.77	4	
27.19	Bluegill, <i>Lepomis macrochirus</i>	27.19	2	
14	White sucker, <i>Catostomus commersoni</i>	14	1	
7	African clawed frog, <i>Xenopus laevis</i>	7	1 (Holcombe et al 1987)	Flow-through, juvenile, LC50
<b>3</b>	<b>Aquatic Life Criterion</b>			

**Table 2. Acrolein's ALC is derived from one study involving a non-native amphibian species. *O. mykiss* (a potentially relevant, surrogate species) data is also derived from a single study.** This table outlining the Genus Mean Acute Values (GMAV) is adapted from the *Ambient Aquatic Life Water Quality Criteria for Acrolein* (USEPA 2009). GMAVs are based on averaged data across toxicity research studies, and used to derive the Freshwater Final Acute Value (FFAV) using the *Guidelines* (USEPA 1985). The ALC is determined to be half the FFAV.

Year	District	Actual Effluent (cfs), ± SEM	Actual Receiving (cfs), ± SEM	End Concentration, Complete Mixing (ppb), ± SEM; [range]
2008	SVID	3.13 ± 0.54	1,856 ± 267	0.08 ± 0.01; [0.00, 0.05]
2008	Roza	49.58 ± 9.16	2,212 ± 359	1.04 ± 0.17; [0.00, 2.97]
2011	Roza	1.20 ± 0.10	4,440 ± 2550	0.01 ± 0.00; [0.00, 0.02]
2013	SVID	3.40 ± 1.04	1,492 ± 317	0.06 ± 0.02; [0.00, 0.14]

**Table 3. Theoretical mixing zone scenarios for Roza and Sunnyside Valley Irrigation Districts where 21 ppb acrolein effluent is released into receiving state waters.** The theoretical mixing zone in receiving waters assumes homogeneous mixing of a Theoretical Max Effluent of 21 ppb. "End Concentration" = ("Theoretical Max Effluent" x "Actual Effluent")/"Actual Receiving". The range of "End Concentration" values are provided to illustrate minimum and maximum concentration values.

## References

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