

Calculating Human Health Criteria Part 2: Key Risk Management Decisions

**Proposed Rule Withdrawn on
August 4, 2015**

What Key Risk Management Decisions Were Made?

Variable	Description of variable and State Decisions
Fish Consumption Rate (FCR)	<p>Determining a fish consumption rate to apply to the human health criteria equations require making several risk management decisions, such as:</p> <ul style="list-style-type: none"> • What target population to base protections on (general population vs. highly-exposed populations)? • What statistic should be used to represent the target population (average vs. median vs. some other percentile)? <p>State Decision: Use 175 grams per day, which is representative of average rates from highly exposed populations on Puget Sound. Oregon's updated Human Health Criteria uses this same value, which is endorsed by EPA and several tribes.</p>
Risk Level (RL)	<p>Neither science nor legal and regulatory language help guide the choice of risk levels. EPA gave each state a choice in assigning an additional cancer risk level to use in the HHC equations. Generally states have chosen either one-in-one hundred thousand (10^{-5}) or one-in-one million (10^{-6}). These are all theoretical risk levels that would add a minimal additional risk to the overall risk of cancer after a lifetime of daily exposures to a pollutant (The American Cancer Society estimates that the lifetime risk in the United States is approximately one-in-two for males and one-in-three for females (http://www.cancer.org/cancer/cancerbasics/lifetime-probability-of-developing-or-dying-from-cancer)).</p> <p>State Decision: Use an additional cancer risk level of one in one hundred thousand (10^{-5}). This risk level is adopted by many other states and given Clean Water Act approval by EPA. It is well within EPA's HHC guidance levels for risk for all exposed populations.</p>
Relative Source Contribution (RSC)	<p>Selection of a relative source contribution requires knowledge of exposures to a chemical that could occur outside of surface water pathways (e.g. exposure to chemicals in food consumed other than local fish/shellfish, or exposure to a chemical from air deposition).</p> <p>A state must consider whether to develop stricter water quality criteria to account for chemical exposures that occur outside of the controls available through state water quality standards (and the Clean Water Act), even though control of these sources are outside of the jurisdiction of the Clean Water Act.</p> <p>State Decision: Use a relative source contribution of 1, which means that 100% of the assumed chemical exposure is assumed to come from sources under CWA regulation. Given the very limited ability to control sources outside the jurisdiction of the Clean Water Act, Ecology thinks this is a prudent decision.</p>



How did Ecology Calculate Human Health Criteria?

Step 1 – Do the math: Put all the chemicals (except for arsenic, asbestos, and copper that are based on drinking water standards) through the human health criteria equations for marine and fresh waters to calculate initial criteria, using science, science policy, or risk management-based values assigned to each variable.

Step 2 – Make the comparison: Governor Inslee mandated that when developing new criteria, the criteria values are to be no less stringent than the current criteria values assigned in the National Toxics Rule (NTR) that are currently applied in Washington. Therefore, the second step involved comparing the initial criteria calculated in Step 1 with the current values from the NTR.

Step 3 – Choose the proposed criterion: If the initial calculated criterion from Step 1 is less protective than current criterion from the NTR, then Ecology is proposing a new criterion equal to the current NTR criterion. Using this "policy overlay" is a key risk management decision with the following results:

- The Policy Overlay provides a backstop so no criterion becomes less stringent than the current NTR value.
- Overall, 57 of the 190 (30%) criteria in this proposed rule remain the same as the NTR due to this Risk Management decision.
- Exception: Policy Overlay does not apply to Arsenic (see Arsenic poster).

4 Equations to Calculate Human Health Criteria

	Freshwater Criteria (Consumption of Organisms and Water)	Marine Criteria (Consumption of Organisms Only)
Criteria for Carcinogens	$\frac{RL \times BW}{CSF \times [(FCR \times BCF) + DI]}$	$\frac{RL \times BW}{CSF \times FCR \times BCF}$
Criteria for Non- Carcinogens	$\frac{RfD \times RSC \times BW}{(FCR \times BCF) + DI}$	$\frac{RfD \times RSC \times BW}{FCR \times BCF}$

