

IMPLEMENTING OREGON'S HUMAN HEALTH WATER QUALITY CRITERIA

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Oregon's More Stringent Human Health Water Quality Criteria

- In 2011, Oregon revised its water quality standards to reflect a more than 25-fold increase in the fish consumption rate, from **6.5** to **175** grams per day (g/d)
- In general, the higher fish consumption rate produced very low criteria. For example:
 - PCBs: 0.0000064 micrograms per liter ($\mu\text{g/L}$) (6.4 picograms per liter (pg/L)) (**6.4 parts per quadrillion**)
 - Dieldrin: 0.0000053 $\mu\text{g/L}$ (5.3 pg/L) (**5.3 parts per quadrillion**)
 - Dioxin (2,3,7,8-TCDD): 0.00000000051 $\mu\text{g/L}$ (510 attograms per liter) (**510 parts per sextillion**)

Negligible Effects Thus Far

- Four years after adoption, the revised criteria have produced no change in water quality and no significant effects on dischargers
 - Permitting delays from unrelated litigation
 - Regulated sources are a small proportion of the loading of toxic pollutants to waterbodies
 - For many toxics, both the former and current criteria are well below analytically quantifiable levels

| (pg/L) | Former Criterion | Current Criterion | Quantitation Level |
|----------|------------------|-------------------|--------------------|
| PCBs | 79 | 6.4 | 500,000 |
| Dieldrin | 71 | 5.3 | 50,000 |
| Dioxin | 0.013 | 0.00051 | 5 |

Concerns of Regulated Sources

NPDES Sources Must Comply with Water Quality Standards

- NPDES permits must include discharge limits or other conditions sufficient to ensure that the authorized discharge does not “cause or contribute” to a violation of water quality standards
 - Does not apply to municipal stormwater discharges
- The infeasibility of water quality-based discharge limits is not a basis for less stringent limits
 - Infeasibility, however, may in some circumstances allow the permittee to delay compliance

Human Health Criteria Compliance Challenges

- Many human health criteria are below both:
 - Waterbody concentrations caused by natural, legacy, and other legally or practicably unregulated sources
 - Concentrations that wastewater treatment systems can feasibly achieve
- If a criterion is not met in a waterbody, discharge limits generally must be set equal to the criterion without considering instream dilution
- A permittee is responsible for all pollutants in its discharge, including those in intake water, stormwater run-on, and trace contaminants in raw materials
 - There may be no practicable means of eliminating these pollutants
 - Especially challenging for municipal sewage treatment plants

Discharging to a Waterbody Used for Intake Water When It Does Not Meet Criteria

- Suppose:
 - Intake/receiving water concentration: **10 µg/L**
 - Human health criterion: **5 µg/L**
 - Pollutant mass added by process: **0**
 - 5x concentration increase by evaporation: **50 µg/L (discharge)**
 - Intake/discharge flow: **1.0/0.2 cfs**
 - River flow upstream of intake: **1000 cfs**
 - River concentration after complete mix: **10.008 µg/L**
- Because dilution could not achieve the criterion, the facility's discharge limit would be **5 µg/L**
- The facility would be required to treat its wastewater to reduce the discharge concentration from **50 µg/L** to **5 µg/L**, which might be prohibitively expensive
- The treatment would have almost no effect on the river concentration (**9.999 µg/L** vs. **10.008 µg/L**)

Oregon Relief Provisions

- Intake credit
- Compliance schedule
- Variance

Intake Credit (OAR 340-045-0105)

- Applies if:
 - The facility obtains its intake water from the same body of water to which it discharges; and
 - The mass **and** concentration of the pollutant in the discharge are no greater than the mass and concentration of the pollutant in the intake water
- Not helpful if:
 - Intake water is from another waterbody;
 - Pollutant is also from other sources (e.g., raw materials, stormwater run-on, air deposition); or
 - Evaporative losses concentrate the pollutant (e.g., from recycling cooling water)

Compliance Schedule (OAR 340-041-0061(14))

- Allowed for water quality-based effluent limits that are “newly applicable to the permit”
- Limits must be achieved “as soon as possible”
- Appropriate only if a feasible compliance method is known but time is needed to construct or otherwise implement it

Variance (OAR 340-041-0059)

- Available only upon a demonstration that:
 - Achieving the criterion is infeasible for one of the same six reasons needed to support the removal of a designated use, *e.g.*,
 - Naturally occurring pollutant concentrations
 - Human causes that cannot be remedied
 - Achieving the criterion would result in “widespread economic and social impact”
 - Variance would not impair an existing use
- Procedural requirements
 - Limited to the term of the permit, but may be renewed
 - Variance and any renewal must be approved by EPA
 - Extensive application requirements
- Oregon has never approved a variance, and no one has applied for a variance from the revised human health criteria

Specific Criteria Revisions

- Endrin, iron, manganese, and methylmercury
- Arsenic
- Site-specific background pollutant criteria

Endrin, Iron, Manganese, Methylmercury

- Iron and Manganese
 - Oregon repealed the human health criteria for iron and the freshwater human health criteria for manganese because the criteria were based on aesthetic effects (laundry staining, taste), rather than health effects
 - Oregon retained the human health criterion for manganese in saltwater, which was based on health effects from fish consumption
- Endrin and Methylmercury
 - Oregon used a higher relative source contribution (RSC) factor than EPA recommended for endrin and methylmercury
 - Endrin: 80% RSC rather than 20% because of an absence of exposure pathways other than water and fish consumption within the state
 - Methylmercury: Oregon used an RSC of “1” because the fish consumption rate factor included marine fish, thereby accounting for all likely exposure pathways

Arsenic

- Using EPA's recommendations and the same fish consumption rate (**175 g/d**) and risk level (**1×10^{-6}**) as for other toxics would have resulted in a criterion of approximately **0.005 µg/L**
 - But natural concentrations in much of the state are **1 µg/L or more**, and treatment to **0.005 µg/L** is not feasible
- To avoid a criterion that would naturally be violated throughout the state, Oregon reevaluated or adjusted the criteria factors to adopt freshwater and saltwater criteria of **2.1 and 1.0 µg/L**:
 - Higher risk factors ranging from **1.0×10^{-5}** to **1.0×10^{-4}**
 - Reevaluated, using Oregon species, EPA's recommended bioconcentration factor and applied an "inorganic factor"
 - But retained the **175 g/d** fish consumption rate and established an arsenic reduction policy and specific provisions to protect public drinking water supplies (OAR 340-041-0033(6))

Site-Specific Background Pollutant Criteria (OAR 340-041-0033(5))

- Allows a *de minimis* increase in instream toxic pollutant concentrations when criteria are exceeded
 - Allowed only for existing NPDES sources
 - Applies only to carcinogens
 - No net increase in pollutant mass is allowed
 - Instream concentration increase may not exceed **3%** after mixing with 100% of the receiving water flow (25% for Columbia and Willamette Rivers)
 - Risk level after mixing may not exceed **1 x 10⁻⁴**
- Process
 - Site-specific criteria are also discharger-specific
 - Must be reevaluated at permit renewal
 - EPA approval is not required

Questions?

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