

# IMPLEMENTATION OF OREGON'S REVISED WATER QUALITY STANDARDS

# WHAT ARE THE IMPACTS?

In 2004, the Oregon Environmental Quality Commission (EQC) proposed revised statewide water quality standards (WQS) that were derived using a fish consumption rate of 17.5 g/day. This consumption rate was an increase, by a factor of nearly three, over the rate of 6.5 g/day that had been used previously to develop the state's WQS. The rate was taken from USEPA (2000) guidance for developing ambient water quality criteria (AWQC) and was based on an upper bound estimate of consumption reported for the general U.S. population by the U.S. Department of Agriculture. USEPA (2000) recommended this as a default rate to represent average consumption by sport anglers. In discussing the risk level upon which to base AWQC, USEPA (2000) stated that "both 10<sup>-6</sup> and 10<sup>-5</sup> may be acceptable for the general population and that highly exposed populations should not exceed a 10<sup>-4</sup> risk level." It went on to say that "[i]n cases where fish consumption among highly exposed population groups is of a magnitude that a 10<sup>-4</sup> risk level would be exceeded, a more protective risk level should be chosen" (USEPA 2000, p. 2-6). However, Native American tribal governments asserted that DEQ's proposed criteria were not protective of tribal consumers who ate fish at substantially higher rates due to cultural traditions. Recognition of the tribal governments' arguments led EPA to reject DEQ's 2004 proposed revisions to the WQS.

Subsequently, a Focus Group was convened to discuss the selection of an appropriate and relevant fish consumption rate that would be protective of the health of Oregonian fish consumers. This six-member Focus Group, which received input from tribal members and health officials, concluded:

- The consumption rate of 17.5 g/day did not reflect consumption of Oregonian fish consumers, particularly those who are most vulnerable.
- All types of fish, including Pacific salmon, should be included in the fish consumption rate.
- The revised WQS should be based on a fish consumption rate of 175 g/day, which was the 95th percentile consumption rate reported in a survey of multiple tribes conducted by the Columbia River Inter-Tribal Fish Commission.

On June 16, 2011, the EQC approved the more stringent WQS that were developed using the recommended fish consumption rate of 175 g/day to replace the current WQS, which are based on 6.5 g/day. The proposed standards are awaiting review and approval by EPA.

Because EPA was involved in the selection of the fish ingestion rate, it is anticipated that EPA will approve the proposed WQS later this year. Once approved, the standards will be formally adopted.

### **REVISED WQS**

Selection of a fish consumption rate of 175 g/day substantially reduces WQS for those chemical constituents in surface water for which the most important route of potential exposure is through the ingestion of fish tissue. For example, for 2,3,7,8-tetrachloro-dibenzo-*p*-dioxin (2,3,7,8-TCDD), the current WQS is  $1.3 \times 10^{-8} \mu g/L$  but the proposed WQS is  $5.1 \times 10^{-10} \mu g/L$ , due to the change in the fish consumption rate. The proposed WQS are more stringent than those currently in place for 56 constituents, and WQS have been developed and proposed for 38 constituents for which there currently are no WQS, and for 10 constituents for which WQS have been established but not on the basis of fish consumption.

### POTENTIAL IMPACTS OF THE REVISED WQS

The EQC acknowledges that the more stringent WQS may be difficult to achieve because of background sources, upstream discharges, technical feasibility, and cost, and therefore has included some options for addressing these issues.

- Entities may apply for variances in the National Pollutant Discharge Elimination System (NPDES) or Total Maximum Daily Load (TMDL) processes, but there will be additional costs associated with those applications and there is no guarantee that the variances will be granted. In addition, they may be partially granted, still requiring that new, costly treatment technologies be implemented.
- Dischargers can take an intake credit that acknowledges background or upstream concentrations in the water that they use. While they will be permitted to have a 3 percent increase in concentrations over those in intake water, they cannot increase the mass of the pollutant. This effectively means that dischargers would have a zero discharge limit from their facilities.

Consequently, these more stringent water standards will have substantial impacts on many entities, including municipal and industrial facilities that are permitted to discharge to Oregonian waters. Other practices such as agriculture, forestry, and construction are also likely to be impacted by the new standards. These potential impacts may include the following:

- Reductions in discharge limits and changes in NPDES permits that may require the implementation of additional or new treatment technologies.
- Increased costs for permittees associated with applications for variances.
- Increased costs due to the need to employ additional or new treatment approaches.
- More WQS that are below reliable quantitation limits. Approximately 40 percent of Oregon's current water quality criteria have quantitation limits that are higher than their WQS. According to DEQ, with the adoption of the proposed values, this number will increase to 48 percent of the constituents with WQS.
- Reduction in remedial goals for other media (including soil, sediment, and groundwater) that can affect chemical concentrations in water to ensure the protection of humans consuming fish.
- Requirement for new rulemaking to define conditions that would allow for a variance from the standard.
- Potential lawsuits due to perceived inequities in the way that variances are developed, granted, and applied.
- Listing of additional water bodies under the Clean Water Act.
- Increased numbers of TMDLs and decreased limits for individual entities.

#### WEAKNESSES OF THE PROPOSED WQS APPROACH

There are a number of weaknesses of the proposed approach for establishing WQS:

- The increased consumption rate is based largely on the consumption of anadromous species by tribal members. However, anadromous species are not present in all regulated water bodies in Oregon and the tribal rates of consumption of resident species, which would be present in those water bodies, are considerably lower, making the proposed WQS overly restrictive for those water bodies.
- The WQS are based on bioconcentration factors, which measure uptake from the water column; however, concentrations in the water column are not good predictors of concentrations of hydrophobic chemicals in fish tissue. Bioaccumulation studies could be used instead to improve these estimates.

#### DISCUSSION

The proposed WQS, if adopted, will likely have a profound impact on dischargers, as discussed above. In addition, there are likely to be future ramifications of these proposed changes, including the following:

- EPA is proposing to change its toxicity values for arsenic, 2,3,7,8-TCDD, and several other compounds. In anticipation of these proposed changes being adopted, EPA may require that the proposed toxicity values be incorporated into the new WQS before they can be approved. This would further reduce the WQS for these chemicals so that some would be well below background levels, resulting in zero additional discharges.
- It is likely that the WQS proposed for 2,3,7,8-TCDD will eventually be applied to all "dioxin-like" compounds. While the WQS has been specifically derived for 2,3,7,8-TCDD, the fact that EPA increasingly expects other dioxins, furans, and "dioxin-like" PCB congeners to be evaluated using toxic equivalency factors has been ignored. Application of the WQS proposed for 2,3,7,8-TCDD to other compounds is particularly likely to occur when compliance with WQS is being assessed because concentrations of 2,3,7,8-TCDD are generally not detectable in the water column and regulators are not likely to be willing to ignore the potential uptake of other "dioxin-like" constituents. Thus, there is likely to be pressure, at least for site-related work, for the WQS for 2,3,7,8-TCDD to be compared to toxic equivalents for mixtures of these compounds. Such an approach will be inappropriate because of the differences in bioaccumulation of these constituents.
- It is possible that hazardous waste sites that have been closed and remediated will be reopened because the previously established remedial goals will not support the attainment of the proposed WQS.
- There is likely to be pressure on neighboring states to modify their WQS in a similar manner, particularly because upstream releases from other states will affect the attainment of WQS in Oregon.
- There is also likely to be pressure on other states to use the same approach in deriving their WQS when tribes or other highly exposed subpopulations are present.
- There are likely to be increases in the numbers of advisory waters and in the fish species included in advisories because of the more stringent WQS and the addition of WQS for a number of chemical constituents that did not previously have WQS based on the consumption of fish.

The current WQS already meet the level of protection recommended in EPA's AWQC methodology. They are based on a 10<sup>-6</sup> risk level and a fish ingestion rate of 6.5 g/day. The recommended tribal rate of 175 g/day is higher, by a factor of 27, than the current rate of 6.5 g/day. Recalculation of risks for tribal populations using the higher fish consumption rate and the same parameters used in the current WQS would result in a risk to tribal populations that is slightly higher than 10<sup>-5</sup> but still well within the risk guidelines that are recommended by EPA for highly exposed population groups.

## HOW INTEGRAL CAN ASSIST CLIENTS

Integral's scientists have a thorough understanding of the science related to fish uptake and bioaccumulation of toxic chemicals, as well rates of fish consumption by humans. We can assist clients in understanding the impacts of the proposed WQS on their facilities. We can also assist clients in their applications for variances, if the WQS are formally adopted, and can provide support for those variances by conducting site-specific bioaccumulation and consumption studies and evaluation of alternative technologies for water treatment. This will allow clients to develop discharge permits that take site-specific conditions and processes into consideration, resulting in more reasonable and scientifically based discharge limits. Integral scientists also have expertise in fate and transport modeling, toxicological analyses, and ecological modeling to support development of site-specific soil, groundwater, and sediment guidelines to achieve water quality targets. For further information, contact Laura Jones at ljones@integral-corp.com or Randi Wexler at rwexler@integral-corp.com.

#### REFERENCE

USEPA. 2000. *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health* (2000). U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology. EPA-822-B-00-004. October.