Development of Mercury Criteria

* There are three factors that go into developing human health criterion.
* The first is exposure. For human health, exposure is through consumption of fish and water. For mercury, we focus only on fish consumption. In 2008, EQC directed DEQ to move forward with developing human health criteria based on a fish consumption rate of 175 g/day.
* The fish consumption rate was developed using a number of studies looking at fish consumption rates of various groups. In some of those studies, a portion of the fish consumed included salmon, as well as marine fish, some of which have high levels of mercury.
* The second factor that we look at is health effects that occur due to exposure.
* For mercury, health effects include neurological impairments. Exposure to high levels of methyl-mercury, the bioavailable form of mercury, include loss of peripheral vision; "pins and needles" feelings, usually in the hands, feet, and around the mouth; lack of coordination of movements; impairment of speech, hearing, walking; and muscle weakness.
* Children exposed to methyl-mercury in the womb also can experience impairments to cognitive thinking, memory, attention, language, fine motor skills, and visual spatial skills.
* The last element impacting criteria development is the level of “acceptable risk.” For carcinogens, this is generally based on the risk that exposure could result in one additional incident of impacts for every 1 million people exposed. For non-carcinogens, like mercury, we use a Reference Dose, which is the daily amount of exposure to the substance without appreciable risk. For mercury, because impacts are associated with fish consumption, EPA’s recommendation is to express the mercury criterion in terms of a fish tissue concentration. This differs from all other toxic contaminants, which are expressed as a water column concentration.
* Because it’s a fish tissue concentration, it takes additional modeling to determine how to translate that criterion into an acceptable water column concentration that will meet the standard. That’s where the TMDL comes in.

What if water quality criteria can’t be met

* What we currently know is that it will take decades or more to do the work necessary to control manmade sources of pollution. At some point, in the future, if DEQ has sufficient information to determine that the criteria can’t be met, the next tool in our toolbox is to develop a site-specific criterion through what’s called a use attainability analysis

Talking points regarding variances for new permits

* Before a variance would be allowed for a new permit, reserve capacity would have to be developed through the TMDL and then allocated to the new permit.
* Currently, under state rules, variances are only allowed for new permits for emergency situations or for projects that would have overall environmental benefits, such as a cleanup. It can also be allowed if the Commission finds that the benefits of a project would outweigh the environmental costs – similar to an analysis that would be done under state antidegradation rules to allow a lowering of water quality.
* We are potentially looking at removing this aspect of the rule, because it isn’t consistent with federal regulations and because the analysis suggested by the state rules already exists within antidegradation provisions for new or increased permits and finally because TMDLs already limit new dischargers through the concept of reserve capacity.

Setting the bar for MMP development

* MMPs and their effectiveness will vary for each discharger. Municipal WWTFs focus on minimizing mercury inputs within their systems – a lot has been done by removing mercury from dentists already, but we still expect some sort of inspection program, as well as outreach to other potential sources, such as schools, labs and residences. Industrial point sources often focus on material substitution.
* What we have seen from other states and some facilities in Oregon is that MMP development using EPA guidance does, over time, lead to reductions in mercury entering into collection systems and to reductions in effluent levels.
* (If they want to get technical) – In Minnesota, over the course of 20 years, they saw mercury levels in large treatment plants decreased from 180 ng/l to 70 ng/l in what was coming into WWTFs.

Technological fixes

* There aren’t currently proven technological fixes on the point source side. About the best we see if that wastewater treatment plants that have nutrient removal, as well as those with additional filtration, get down to an average of about 1 ng/l. We don’t consider the wastewater treatment plants major sources – they provide no more than 5% of the load.