

State of Oregon  
Department of Environmental Quality

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**Industrial Stormwater Advisory Committee  
Meeting 8- April 20, 2010**

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**Subject: Discharges to Impaired Waterbodies needing TMDLs**

***Background:***

At the February Industrial Stormwater advisory committee meeting, we discussed options/considerations for developing new requirements for discharges to impaired waterbodies needing TMDLs. DEQ presented the following options for facilities that have impairment pollutants present in their discharge:

- Meet numeric effluent limits in the new general permits at the end of the pipe.
- Conduct more rigorous monitoring such as collecting composite grab samples on a quarterly basis.
- Install more rigorous BMPs such as treatment BMPs to address the pollutant(s) of concern.

DEQ received a wide variety of feedback from the advisory committee on these options. Overall, the committee thought that facilities should conduct more monitoring, but had additional questions about whether the agency should develop numeric effluent limits. In regards to developing numeric effluent limits, some committee members expressed that the agency should use the acute criteria rather than the human health criteria.

Based on that feedback, DEQ further evaluated whether the agency should require facilities to meet numeric effluent limits and if so, what water quality criteria the agency would use to develop the limits. To assist with this evaluation, DEQ researched the water quality criteria that are used in Oregon, Washington and EPA's permits to develop stormwater benchmarks or numeric effluent limits.

***EPA's permit:***

Under EPA's permit, typically the acute, aquatic life, freshwater criteria are used as the basis for the stormwater benchmark concentrations in the permit, if a water quality standard exists for the specific pollutant parameter.<sup>1</sup> EPA states that the acute criteria are more appropriate than the chronic criteria given the intermittent nature of these discharges and typical high ambient flows associated with storm events. Where no acute criteria are established for pollutant benchmarks, EPA uses the chronic, aquatic life, freshwater criteria.

EPA does not have water quality based numeric effluent limits in the permit. EPA states that numeric effluent limits are not always feasible for stormwater discharges given these discharges are highly intermittent, usually characterized by high flows occurring over short time intervals and carry a wide variety of pollutants whose source, nature and extent varies. Certain facilities

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<sup>1</sup> Where EPA established benchmarks based on water quality standards, the agency applied the acute criteria ten times, the chronic criteria four times (arsenic, selenium, iron, lead), and the human health criteria once (antimony).

are required to meet technology based numeric effluent limits due to stormwater Effluent Limit Guidelines promulgated by EPA.

*Washington's permit:*

Under the Department of Ecology's permit, typically the acute water quality criteria are used as well for the basis of the stormwater benchmark concentrations. Ecology also requires certain facilities that are discharging to impaired waterbodies needing TMDLs to meet water quality based numeric effluent limits.<sup>2</sup> These limits are based on the acute criteria. Ecology states that because most human health-based criteria are based on lifetime exposures, direct comparisons of receiving water criteria with pollutant concentrations in intermittent stormwater discharges may not be appropriate. Also given the high variation in stormwater pollutant concentrations, both between storms and during a single storm, it makes the application of human health criteria to stormwater problematic. Certain facilities are required to meet technology based numeric effluent limits due to stormwater Effluent Limit Guidelines promulgated by EPA.

*Oregon's permit:*

In Oregon's permits, DEQ typically applies the acute, aquatic life, freshwater criteria as the basis of the stormwater benchmark concentrations. Under the new permits, DEQ is developing water quality based benchmarks for copper, lead and zinc that will be based on the acute criteria as well. We currently do not have water quality based numeric effluent limits in our permit. Certain facilities are required to meet technology based numeric effluent limits due to stormwater Effluent Limit Guidelines promulgated by EPA.

***Recommendation: Apply the Aquatic Life, Freshwater Criteria***

DEQ is recommending that the agency apply the aquatic life, freshwater criteria (acute or chronic) to industrial stormwater discharges rather than the human health criteria. DEQ is basing this decision on the following reasons:

- This approach is consistent with the methodology that EPA used to establish the benchmarks in the Multi-Sector General Permit.
- Storm events vary in intensity and duration (i.e., can be isolated or part of a storm event pattern). Typically, stormwater discharges are intermittent and result in short term exposures. The human health criteria are based on lifetime exposures. As a result, it is difficult to apply the human health criteria to a limited duration stormwater discharge.

*Impairment Pollutants:*

DEQ evaluated the 2004/2006 Integrated Report for 303(d) listed parameters that need TMDLs. Please see the chart below that identifies the impairment pollutants and applicable water quality standards or toxic criteria on Tables 20 or 33(a). DEQ has aquatic life criteria for the majority of the toxic pollutants. However, there are approximately 10 toxic pollutants without aquatic life criteria and DEQ will use the human health criteria for these pollutants. DEQ did not include temperature or biological criteria in the chart because EPA has exempted these parameters for the impairment pollutant monitoring requirements. DEQ included the quantitation limits for toxic pollutants in the chart. In instances where the quantitation limit is above the water quality criteria, the quantitation limit will be used to analyze the stormwater monitoring results.

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<sup>2</sup> Facilities must meet numeric effluent limits if they discharge to waterbodies listed for the following pollutants: turbidity, TSS, pH, phosphorus, ammonia, copper, zinc, lead, fecal coliform bacteria, pentachlorophenol and mercury.

### ***Recommended Approach: Additional monitoring and Effective BMPs***

DEQ recognizes that there are many challenges with developing water quality based numeric effluent limits in a general permit. Rather than requiring facilities to meet numeric effluent limits, DEQ is recommending that facilities that have impairment pollutants present in their discharge in concentrations about the water quality standards/criteria (please see chart below) will conduct additional monitoring and implement BMPs to reduce the impairment pollutants in their discharge below these standards/criteria. Facilities will be required to install the most effective BMPs to control the pollutants of concern in their discharge, which will result in additional protection and improvement of these impaired waterbodies.

DEQ is proposing that following requirements for discharges to impaired waterbodies needing TMDLs:

- ***Step 1: Initial Screening:***
  - During the first year of the permit, facilities will screen for the impairment pollutants at each outfall that discharges to the impaired waterbody. Facilities must collect 4 composite grab samples.
  - Are the impairment pollutants present in the discharge in concentrations above the standards/criteria?
    - *No:* Maintain current BMPs and continue monitoring (collect 4 composite grab samples each year). If subsequent monitoring in years 2 through 4 of the permit establishes that impairment pollutants are present in the discharge above the standards/criteria, follow Step 2 below.
    - *Yes:* Follow Step 2 below if any of the sample results are above the standards/criteria.
- ***Step 2: Implement Most Effective BMP***
  - Conduct a comprehensive review of BMPs to address the pollutant(s) of concern. Select the most effective BMP proven to reduce the impairment pollutants in their discharge below the standards/criteria. Facilities may not consider economic constraints as a basis for selecting a less effective BMP.
  - Within 90 days of completing the screening monitoring in Step 1 above, facilities must submit an updated Stormwater Pollution Control Plan. Facilities must identify in the plan the specific BMPs that will be implemented, the anticipated BMP effluent concentrations, and the implementation schedule that includes the date the BMPs will be initiated and completed. DEQ will review this information for completeness, but will not verify the efficacy of the BMPs. DEQ is considering requiring facilities to have this portion of the plan stamped by a licensed professional engineer, certified engineering geologist, hydrogeologist, or certified professional in stormwater quality.
- ***Step 3: Monitoring***
  - Conduct composite grab samples 4 times per year to ensure that the BMPs are working effectively. If monitoring results are above the standards/criteria, within 14 days of receiving monitoring data, facilities must investigate the cause of the elevated pollutant levels, the reason the BMPs are not reducing the pollutant concentrations in the discharge and determine the appropriate corrective actions. Facilities must document in their annual report the corrective actions taken. If after taking these corrective actions, subsequent monitoring results establish that the BMPs are not effective at reducing the pollutants concentrations in the discharge (i.e., spikes of high pollutant concentrations or a pattern of concentrations above standard/criteria), DEQ can require facilities to obtain an individual permit.

<b>Toxic Impairment Pollutant</b>	<b>Toxics Criteria (µg/L)</b>	<b>Criteria Source</b>	<b>Quantitation Limit (µg/L)</b>	<b>Note</b>
Aldrin	3	acute	0.01	
Ammonia <sub>a</sub>	see note	aquatic	1000	pH and temperature dependent aquatic life criteria
Arsenic (tri)	360	acute	50	
Arsenic <sub>a</sub>	0.0022, 0.0175	HH	0.05	
Beryllium <sub>a</sub>	0.0068, 0.117	HH	0.1	
Cadmium <sub>a</sub>	3.9 <sub>b</sub>	acute	0.1	
Chlordane	2.4	acute	0.1	
Chlorpyrifos	0.083	acute	0.01	
Chromium (hex) <sub>a</sub>	16	acute	10	
Copper <sub>a</sub>	18 <sub>b</sub>	acute	10	
DDT	1.1	acute	0.01	
DDT Metabolite (DDE)	0.00022, 0.00022	HH	0.01	
Dichloroethylenes	330, 7100	HH	0.5	
Dieldrin	0.24	acute	0.01	
Guthion	0.01	chronic	1	
Heptachlor	0.52	acute	0.01	
Iron <sub>a</sub>	1000	chronic	100	
Lead <sub>a</sub>	82 <sub>b</sub>	acute	5	
Manganese <sub>c</sub>	50, 100	HH	2	DEQ is proposing to withdraw HH criteria for consumption of water and aquatic organisms. HH criteria for fish consumption will apply to marine waters. DEQ is proposing that facilities will not be required to monitor for this pollutant under new permits unless they discharge to marine waters.
Mercury <sub>a</sub>	2.4	acute	0.01	Specific quantitation limits for sources in the Willamette Basin based in the Willamette TMDL.
Nickel <sub>a</sub>	1400 <sub>b</sub>	acute	10	
PCB	2	acute	0.5	
Pentachlorophenol	0.27, 3	HH	2	

<b>Toxic Impairment Pollutant</b>	<b>Toxics Criteria (ug/L)</b>	<b>Criteria Source</b>	<b>Quantitation Limit (ug/L)</b>	<b>Note</b>
Polynuclear Aromatic Hydrocarbons	see note	HH	1	Different values of human health criteria associated with the various PAH chemicals.
Silver <sub>a</sub>	4.1 <sub>b</sub>	acute	1	
Tetrachloroethylene	0.69, 3.3	HH	0.5	
Trichloroethylene	2.5, 30	HH	0.5	
Zinc <sub>a</sub>	120 <sub>b</sub>	acute	5	
<b>Other Impairment Pollutants</b>	<b>Water Quality Standard/Criteria</b>			
Aquatic weeds/algae	No water quality standard. Phosphorus and nitrogen as surrogate. MSGP phosphorus benchmark is 30 mg/L. Additional discussion is needed on nitrogen analysis and concentration.			
Dissolved oxygen	No water quality standard. BOD as surrogate. MSGP BOD benchmark is 30 mg/L.			
E. coli <sub>a</sub>	Bacteria standard is 406 organisms per 100 mL.			
Fecal coliform	E.coli is indicator. Bacteria standard of 406 organisms per 100 mL.			
Nitrates	Human health criteria for water and organism consumption: 10 mg/L; quantitation limit is 0.1 mg/L			
pH <sub>a</sub>	Basin specific standards: Willamette Basin 6.5 to 8.5 s.u.			
Phosphorus	Basin specific standards based on loading.			
Sedimentation	Narrative water quality standard. TSS as surrogate. MSGP TSS benchmark is 100 mg/L.			
Turbidity	TSS as surrogate. MSGP TSS benchmark is 100 mg/L.			

**a** - MSGP benchmark parameters.

**b** - Toxicity is hardness dependent. The value shown is based on a hardness of 100 mg/L.

$\mu\text{g/L} = \text{ug/L} = \text{microgram per liter}; 1 \mu\text{g/L} = 0.001 \text{ mg/L}$

**Shaded values** - quantitation limit is greater than criteria

**Criteria Source:**

- **acute** - acute exposure criteria for the protection of fresh water aquatic life
- **chronic** - chronic exposure criteria for the protection of fresh water aquatic life
- **HH** - human health criteria based on consumption of water and aquatic organisms (first value) and consumption of fish only (second value)

**Quantitation Limits:**

- The quantitation limit is the method reporting limit (MRL), the lowest concentration associated with a certain degree of accuracy and precision.
- Quantitation limit values are based on DEQ's survey of laboratories and represent readily achievable quantitation limits by most state laboratories.