

State of Oregon
Department of Environmental Quality

**Industrial Stormwater Advisory Committee
Meeting 11- September 15, 2010**

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Subject: Additional Monitoring

Background:

Currently, facilities operating under the 1200-Z and 1200-COLS permit monitor their stormwater discharge for approximately six to nine benchmark parameters.¹ DEQ is proposing in the new permits that facilities will also monitor impairment pollutants, if facilities are discharging to impaired waters, and sector specific benchmarks identified in EPA's Multi-Sector General Permit. DEQ is evaluating whether there are any additional pollutants facilities should monitor to better characterize the pollutants in their discharge.

Evaluation:

DEQ conducted a literature review of scientific peer reviewed journal articles and documents produced by government agencies that evaluate the various pollutants commonly found in industrial stormwater and information regarding specific pollutants that are based on industry/sector specific activities. DEQ also reviewed data sources such as Portland Harbor stormwater data which was collected to evaluate stormwater sources of contamination.

Based on this review, the following scientific peer reviewed journal articles were evaluated:

- Line, D.E., Arnold, J.A., Jennings, G.D., Wu, J., 1996. Water quality of stormwater runoff from ten industrial sites. *Journal of the American Water Resources Association*. 32 (4) 807-816.
 - Study determined the runoff concentrations of selected metals, organic compounds, pesticides and conventional pollutants in stormwater runoff from North Carolina businesses in the following industrial groups: auto salvage, metal fabrication, scrap and recycling, vehicle maintenance and wood preserving.
- Stenstrom, M.K., Lee, H., 2005. Utility of Stormwater Monitoring. *Water Environment Research*. 77 (3), 219-228.
 - Study evaluated the classification of land-uses via stormwater runoff pollutants and the industrial stormwater permit program in Los Angeles County, California
- Stenstrom, M.K., Lee, H., 2007. Design of stormwater monitoring programs. *Water Research*. 41, 4186-4196.
 - Study evaluated a number of stormwater monitoring programs to determine their value in finding high-risk discharges and in developing TMDLs.

DEQ evaluated the industrial stormwater fact sheets developed by EPA as part of the issuance of the 2008 Multi-Sector General Permit. The fact sheets summarize the types of facilities in

¹ 1200-Z benchmarks: copper, lead, zinc, total suspended solids, oil and grease, pH and E.coli (E.coli only applies to landfills, if septage and sewage biosolids are disposed at the site, and sewage treatment plants). In addition, the 1200-COLS facilities sample for phosphorus, biological oxygen demand and E.coli (applies to all facilities) in addition to the 1200-Z benchmarks listed above.

each of the 29 sectors regulated under the permit, the pollutants associated with each sector, and the types of stormwater control measures generally used.

DEQ also discussed with the agency's toxics coordinator whether there are additional pollutants that are addressed in statewide toxics reduction strategy that may be found in industrial stormwater.

Recommendation:

Monitoring by All Industries:

- *Cadmium, Nickel and Chromium Monitoring:*

The 2007 Stenstrom study found that industrial land uses had highest concentrations of heavy metals, specifically cadmium, chromium, lead and nickel. In addition, EPA identified in the industrial stormwater fact sheets heavy metals as pollutants that are associated with many of the industrial sectors.

Facilities monitor total copper, lead and zinc in the current permits. DEQ believes that if facilities implement BMPs to control copper, lead and zinc that they will also control other metals that may be present in industrial stormwater.

Based on the literature review, DEQ is recommending expanding the number of metals that facilities monitor. DEQ is proposing that facilities monitor total chromium, nickel, and cadmium in addition to copper, lead and zinc. DEQ will use this data to evaluate whether the current approach of monitoring copper, lead and zinc as indicator pollutants for a broader suite of metals that may be present in industrial stormwater is appropriate.

- *Polycyclic Aromatic Hydrocarbons (PAHs) Monitoring:*

PAHs are toxic constituents of petroleum products and combustion by products, some of which are classified as probable carcinogens. Several PAHs are on both DEQ's agency-wide "Focus List" of toxic chemicals and the agency's Priority Persistent Pollutant (P3) list for water quality protection (mandated by Senate Bill 737). PAHs can be found in either new or used petroleum products like motor oil ("petrogenic" PAHs) or in combustion by-products such as those resulting from field burning ("pyrogenic" PAHs). Industrial operations with high levels of motorized equipment and vehicle use or storage could produce both petrogenic and pyrogenic PAHs at their sites, but also may be affected by ambient sources in the area. The presence of PAHs in stormwater and sediments raises concerns because of the potential risk and impact of these contaminants on aquatic organisms.

DEQ has determined the general types of sources of these petroleum or combustion by-products. Toxicologists in DEQ's Cleanup Program have used PAH analyses to characterize the three major sources: specific "near shore" sites, urban stormwater discharges, and regional ambient sources (e.g., air deposition), that are contributing to in-stream sediment contamination sites in the Portland area. Requiring industrial facilities to monitor PAHs in the new permits can assist the facilities and DEQ to focus pollution prevention efforts on the most appropriate sources of PAH pollutants.

DEQ is proposing that all industrial facilities operating under the new permits sample for a suite of 16 PAHs that have been identified by EPA as priority pollutants.² Based on the monitoring data collected, DEQ will conduct additional analysis to determine whether industrial facilities may be a significant contributor of PAHs in stormwater runoff.

Based on the proposed impairment pollutant monitoring under the new permits, some facilities will already be required to monitor PAHs.³

Sector Specific Monitoring

- *PCBs and Mercury by Sector N Industries:*

DEQ did not find a lot of information based on the literature review to support requiring additional monitoring based on specific industries/sectors because it is difficult to characterize specific pollutants based on certain industry/sector activities. The 2005 Stenstrom study found that industrial stormwater data is too variable to draw conclusions about pollutants associated with specific industry activities and industry practices may not be consistent thereby contributing to data variability. Also, stormwater may contain legacy pollutants that are not associated with specific facilities' industrial practices.

DEQ's intention with requiring additional monitoring by certain industries or sectors is to collect additional data that is related to the specific industry or sector activities. DEQ evaluated EPA's fact sheets which include specific pollutants that may be associated with certain industry sectors. Many of the pollutants that EPA listed in the fact sheets were fairly broad (e.g., heavy metals) and not necessarily unique to an industry sector (e.g., pollutants associated with vehicle maintenance is universal to many sectors). However, DEQ found that EPA's fact sheet for scrap and waste recycling facilities (Sector N) provided information regarding additional pollutants that are commonly present at these facilities, but are not currently being monitored. Based on this information, DEQ is proposing that facilities in this sector monitor the following pollutants:⁴

- PCBs: These facilities are processing, stockpiling and storing waste materials outside that can result in corrosion and deterioration thereby releasing PCBs into the environment.
- Mercury: These facilities process waste materials such as mercury float switches, which leak and result in the release of mercury into the environment.

Based on the proposed impairment pollutant monitoring under the new permits, many facilities will already be required to monitor PCBs and mercury.⁵ Approximately 20% of the Sector N facilities are discharging to an impaired waterbody listed for PCBs or mercury.

² The 16 PAH analytes are: Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)Anthracene, Benzo(a)Pyrene, Benzo(b)Flouranthene, Benzo(g,h,i)Perylene, Benzo(k)Flouranthene, Chrysene, Dibenz(a,h)Anthracene, Fluoranthene, Fluorene, Ideno1,2,3-(cd)Pyrene, Naphthalene, Phenathrene, and Pyrene.

³ The following waterbodies are impaired for PAHs and have industrial facilities discharging to them: Johnson Creek; Willamette River (river mile 0-24) and Columbia River (river mile 98-121).

⁴ There are approximately 37 facilities currently operating under the 1200-Z or 1200-COLS permit that are classified under Sector N based on their primary SIC code.

⁵ The following waterbodies are impaired for mercury and/or PCBs and have industrial facilities discharging to them: Amazon Creek Diversion Channel, Columbia River, Johnson Creek and Willamette River.

Purpose of data:

DEQ is proposing that facilities monitor these pollutants during the first two years of the new permit to determine if the pollutants are present in their discharge. Facilities will collect grab composite samples four times per year. This monitoring can occur at the same time as the benchmark and impairment pollutant monitoring, if applicable. However, these pollutants will not be considered benchmarks nor will there be any corrective action requirements associated with the results of the monitoring data. DEQ intends to use this data to evaluate whether the agency will develop benchmarks for these pollutants in the next iteration of the permit (est. 2016).

Summary of Potential Monitoring Costs:

Analytical Suite	Suite Description	Pollutants	Estimated Analytical Costs (per storm event, per outfall)⁶
Benchmarks	Base suite all facilities will monitor; does not include any additional sector specific benchmarks and any additional 1200-COLS benchmarks (phosphorus, E.coli and BOD)	metals (total): copper, lead, and zinc; TSS, oil and grease, and pH	\$150
Impairment Pollutants	Impairment pollutants on the 303(d) list for the lower reach of the Willamette River (river mile 0-24); impairment pollutants will vary depending on location of facilities.	pesticides: aldrin, DDT, DDE, dieldrin; metals (total): iron, arsenic, manganese; mercury; semi-volatiles: pentachlorophenol, PAHs; PCBs, E.coli, dissolved oxygen	\$800- estimated maximum (based on lower reach of Willamette River)
Additional Pollutants	Pollutants proposed for monitoring by all facilities based on literature review and consultations with DEQ staff and experts	metals (total): cadmium, chromium, and nickel; PAHs	\$250

⁶ The number of years that facilities will incur these costs will be dependent on type of pollutant. DEQ is proposing that facilities are eligible to obtain a monitoring waiver for benchmarks and impairment pollutants after the first monitoring year. DEQ is proposing that facilities monitor for the additional pollutants for a total of two years.