

URBAN STORMWATER TOXIC POLLUTANTS: ASSESSMENT, SOURCES, AND TREATABILITY

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Description:

This paper summarizes an investigation to characterize and treat selected storm water contaminants that are listed as toxic pollutants (termed toxicants in this paper) in the Clean Water Act, Section 307 (Arbuckle et al., 1991). The first project phase investigated typical toxicant concentrations in storm water, the origins of these toxicants, and storm and land-use factors that influenced these toxicant concentrations. Of the 87 storm water source area samples analyzed, 9% were considered extremely toxic (using the Microtox® toxicity-screening procedure). Moderate toxicity was exhibited in 32% of the samples, whereas 59% of the samples had no evidence of toxicity. Only a small fraction of the organic toxicants analyzed were frequently detected, with 1,3-dichlorobenzene and fluoranthene the most commonly detected organics investigated (present in 23% of the samples). Vehicle service and parking area runoff samples had many of the highest observed concentrations of organic toxicants. All metallic toxicants analyzed were commonly found in all samples analyzed. The second project phase investigated the control of storm water toxicants using a variety of bench-scale conventional treatment processes. Toxicity changes were monitored using the Microtox® bioassay test. The most beneficial treatment tests included settling for at least 24 hours (up to 90% reductions), screening and filtering through at least 40-µm screens (up to 70% reductions), and aeration and/or photodegradation for at least 24 hours (up to 80% reductions). Because many samples exhibited uneven toxicity reductions for the different treatment tests, a treatment train approach was selected for the current project phase. This current phase includes testing of a prototype treatment device that would be useful for controlling runoff from critical source areas (e.g., automobile service facilities).

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