Occurrence and removal of hazardous chemicals and toxic metals in 27 industrial wastewater treatment plants in Korea

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Received 15 January 2014; Accepted 11 June 2014

ABSTRACT

For better understanding of the occurrence and the fate of hazardous chemicals and toxic metals through industrial wastewater treatment plants (WWTPs), 27 WWTPs in Korea with each capacity over 2,000 m³/d were surveyed. The sampling campaign was conducted in July through September, 2012 three times at each WWTP for 22 hazardous chemicals and toxic metals in influents and effluents. Concentrations of benzene, mercury, 1,1-dichloroethylene, and arsenic in influents to the WWTPs were relatively high (i.e. above the effluent limits for indirect dischargers in industrial complex). Counting phase transfers for the treatment, average removal rates of volatile organic compounds and metals were over 70 and 60%, respectively. However, neither treatment processes nor conventional pollutants exhibited significant correlation with the non-conventional pollutants, possibly due to complexity of operations in full scale plants. Removal rates of selenium (30%) and 1,4-dioxane (18%) were lower than other chemicals and metals. Since selenium and 1,4-dioxane were detected at a few WWTPs, it may be more efficient to manage concerning non-conventional pollutants at each WWTPs rather than establishing a universal limits for all WWTPs.

Keywords: Industrial wastewater; Hazardous chemicals; Toxic materials; Heavy metal; Effluent limits

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Presented at the 6th International Conference on the “Challenges in Environmental Science and Engineering” (CESE-2013), 29 October–2 November 2013, Daegu, Korea

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