

Pentachlorophenol, Polychlorinated Dibenzo-*p*-Dioxin, and Polychlorinated Dibenzofuran Concentrations in Soil Surrounding Treated Utility Poles

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Background/Objectives. Deployment of preservative-treated wood utility poles can result in pentachlorophenol (PCP), polychlorinated dibenzo-*p*-dioxins (PCDDs), and polychlorinated dibenzofurans (PCDFs) leaching to surrounding soils. The potential toxicity of these compounds and the ubiquity of preserved-wood poles in North America together have raised questions about public and environmental health and safety in the communities where they are used. Data from studies by Bulle et al. (2010), the U.S. Fish and Wildlife Service (Verbrugge et al., 2018), and the Alaska Department of Transportation (ADOT, 2018) provide new information on PCP and 2,3,7,8-tetrachlorodibenzo-*p*-dioxin toxicity equivalent (TEQ) concentrations in soils near preserved-wood utility poles. Specifically, the studies assessed leaching of these chlorinated compounds from preserved-wood poles to surrounding soils. This evaluation synthesizes the results of these studies to describe the potential migration range of PCP, PCDDs, and PCDFs, together measured as TEQ, in soils surrounding utility poles.

Approach/Activities. We reviewed the three studies and synthesized the published data to evaluate whether measured concentrations of PCP and TEQ in surface soils within 0 to 3 meters of the utility poles were consistent among the studies and at what distance concentrations dropped to below relevant risk-based screening levels or background concentrations. Surface soil concentrations in the three studies were averaged and compared to relevant soil benchmarks, including U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) and EPA Ecological Soil Screening Levels (EcoSSLs), or background concentrations, if screening levels were not available.

Results/Lessons Learned. Data from the 2010, 2015, and 2018 studies depict a general trend of average PCP concentrations in surface soils decreasing within a short distance of utility poles to below EPA regulatory criteria or background concentrations. At approximately 1 meter from the poles, average PCP concentrations in surface soils were below residential and commercial/industrial RSLs and below the lowest EcoSSL for PCP, which is protective of birds, mammals, plants, and insects. At the same distance from the poles, average TEQ concentrations were also below commercial/industrial RSLs and below urban/suburban background concentrations. In deeper soils sampled by Bulle et al. (2010) and ADOT (2018), measurable PCP and TEQ concentrations were lower than in surface soils, except in soil very close to the pole. TEQ concentrations generally decreased with depth in these two studies. This first of its kind evaluation of multiple studies is an important benchmark for understanding PCP and TEQ concentration near preserved-wood poles. The consistency of results of Bulle et al. (2010), Verbrugge et al. (2018), and ADOT (2018) is relevant to community-level considerations of public and environmental health.