

Pentachlorophenol Contamination of Private Drinking Water From Treated Utility Poles

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In 2009, after resident calls regarding an odor, the Vermont Department of Health and state partners responded to 2 scenarios of private drinking water contamination from utility poles treated with pentachlorophenol (PCP), an organochlorine wood preservative used in the United States. Public health professionals should consider PCP contamination of private water if they receive calls about a chemical or gasoline-like odor with concurrent history of nearby utility pole replacement. (*Am J Public Health*. 2013;103:276-277. doi:10.2105/AJPH.2012.300910)

Pentachlorophenol (PCP) is an organochlorine wood preservative used to treat utility poles in the United States. It is applied to pine poles by vacuum pressure treatment at a manufacturing facility with binding agents from hydrocarbons, including diesel fuel and kerosene. About 36 million PCP-treated poles are in service across the United States (60% of the total 60 million treated utility poles).¹

The US Environmental Protection Agency (EPA) maximum contaminant level (MCL) for PCP in drinking water is 0.001 milligrams per liter.² The odor threshold for PCP in water is 0.857 milligrams per liter at 30°C (86°F).³ A PCP concentration in drinking water could be above the MCL but below the odor threshold, thus the odor property is not necessarily protective.

PCP is absorbed by oral, dermal, and inhalation routes.⁴ It does not build up in the

body, and its elimination half-life is 33 hours, primarily in urine.⁴ Dose, duration of exposure, individual traits, and presence of other contaminants influence health effects.⁵ Effects of PCP exposure can range from skin, eye, and respiratory irritation; hepatotoxicity, including elevation of serum alkaline phosphatase, aspartate aminotransferase, and lactate dehydrogenase; kidney toxicity, including albuminuria, glycosuria, aminoaciduria, and elevated blood urea nitrogen; to impaired oxidative phosphorylation and hyperthermia, which can result in death.^{6,7} PCP is classified by the EPA as likely to be carcinogenic to humans.⁸

METHODS

We reviewed state records and literature and interviewed Vermont Department of Environmental Conservation and Agency of Agriculture partners about 2 separate scenarios of private drinking water contamination.

The first scenario occurred in June 2009. The Vermont Department of Health (VDH) received a call from a Vermont resident about an odor in her private drinking water. On the basis of a chemical-like odor, history of a new utility pole upgradient of the water source, and VDH's knowledge of PCP, VDH advised the caller not to ingest, have dermal exposure to, or inhale vapors of the water. The source was a shallow dug well, and the pole was likely in contact with the water table (Figure 1).

In July 2009, VDH received a similar call from a Vermont resident in a different location also concerned about an odor in his private drinking water. Three utility poles had recently been replaced upgradient of a private spring. On the basis of a chemical-like odor, history of new utility poles near the water source, and similarity to the first scenario, VDH again advised the resident not to ingest, have dermal exposure to, or inhale vapors of the water.

RESULTS

After the first call, VDH notified the Vermont Agency of Agriculture, Food, and Markets, which took tap water samples in June 2009. The water had a PCP concentration of 2.06 milligrams per liter, and a subsequent sample had a concentration of 1.15 milligrams per liter, respectively about 2000 and 1000 times the

EPA maximum contaminant level (0.001 mg/L). In response, the Vermont Department of Environmental Conservation and the utility company were contacted to coordinate cleanup.

In July 2009, the utility company replaced the pole with a nontreated cedar pole and paid for a new 705-foot drilled well, which tested negative for PCP. The old well was converted to a monitoring well.

After the second call, a tap water sample was taken; it had a PCP concentration of 0.007 milligrams per liter, and a subsequent sample had a concentration of 0.002 milligrams per liter, both also above the EPA maximum contaminant level (0.001 mg/L).

In August, the utility company replaced the poles with nontreated cedar poles and paid for a point-of-entry charcoal filtration system. PCP was not detected in tap water samples taken after filtration. Samples collected directly from the spring had diminishing PCP, with none detected after October 2009.

DISCUSSION

Treated utility pole placement near private water sources can increase the likelihood of drinking water contamination. One possible explanation for PCP-contaminated drinking water in Vermont is an increase in placement of utility poles near road rights-of-way rather than forest rights-of-way because fewer outages occur, and repairs and replacements are easier, making service more reliable.

The Federal Insecticide, Fungicide, and Rodenticide Act authorized the EPA to regulate the sale and use of pesticides. However, the act has a treated article exemption.⁹ The Code of Federal Regulations defines exemption character as an article or substance treated with or containing a pesticide to protect the article or substance itself,¹⁰ which creates a regulatory dilemma. Placement of PCP-treated poles is not considered a pesticide application and does not fall under the regulatory authority of the act as enforced by states and the EPA. Other environmental laws are not applicable to PCP-treated poles. In 2011, a California federal court held that PCP-contaminated discharges from utility poles into the environment via storm water runoff or dust were not actionable or in violation of the Clean Water Act or the Resource Conservation and Recovery Act.¹¹



FIGURE 1—First scenario: pentachlorophenol-treated pole near contaminated well.

Vermont introduced legislation in January 2012 that proposed regulation of both the siting of treated utility poles near drinking water sources and the reapplication of treatments.¹²

We recommend the following actions:

- Consider PCP contamination of private water if a chemical or gasoline-like odor is concurrent with a history of nearby utility pole placement.
- Require manufacturers to provide placement guidelines in End User Information or Handling Sheets.
- Develop policies and procedures to restrict installation of treated utility poles in areas near wells.
- Use safer alternatives, such as nontreated cedar poles, cement or metal poles, burial of wires, or less toxic wood preservatives.
- Remove the Federal Insecticide, Fungicide, and Rodenticide Act treated-article exemption for utility poles. ■

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Contributors

L. Karlsson interpreted data and regulations and drafted and revised the article. L. Cragin assisted in data interpretation and revised the article. G. Center led investigations, interpreted data, and revised the article. C. Giguere led investigations and data collection, analyzed and interpreted data and regulations, and revised the article. J. Comstock led investigations and data collection, analyzed and interpreted data and regulations, and revised the article. L. Bocuzzo coordinated cross-agency investigation and collaboration and revised the article. A. Summer assisted in coordinating cross-agency collaboration and revised the article.

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Human Participant Protection

No human participant protections was required because no human participants were used in this research.

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