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FYI.
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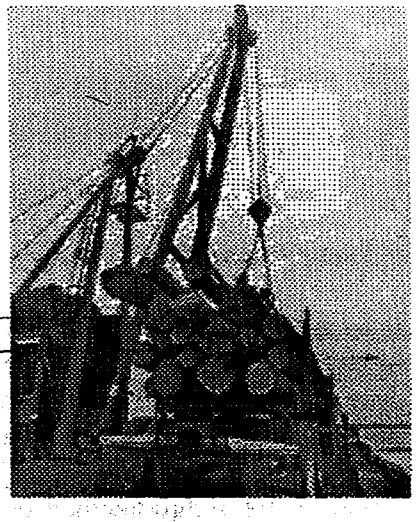
Pentachlorophenol and Dioxins



Pentachlorophenol (penta) is the dominant wood preservative used for the treatment of utility poles and crossarms. Penta has been in commercial use for more than 60 years, and this long history of use has demonstrated its effectiveness as a wood preservative, and that when properly used, it presents only a very minimal risk to human health or the environment.

Penta, like many other chemicals, contains trace levels of various chlorinated dioxins and furans created as unintentional by-products of the manufacturing process. In the last 20 years, there has been a great deal of focus on these compounds because, as widely reported in the press, "dioxin" is one of the most toxic chemicals ever identified. A more complete understanding of the dioxin issue is necessary in order to understand why society reaps substantial benefit from the use of penta as a wood preservative with very little incremental risk.

As a preface to this discussion several facts need to be understood. First, penta as registered for sale in the U.S. does not contain the specific dioxin compound which has been identified as exceptionally acutely toxic and potentially genotoxic. Second, technical penta which is registered for sale and use in the United States does contain very low levels of several other chlorinated dioxins and furans. Third, EPA has evaluated those compounds present in penta and has established manufacturing limits on the levels allowable in penta. This ensures that these microcontaminants are not of toxicological significance when compared to the toxicity of penta itself.

The Dioxin Issue

Dioxins are a family of compounds, including 75 individual compounds. Some of these compounds are highly toxic to some test organisms, while others are virtually nontoxic. A related family of compounds, chlorinated dibenzofurans, consists of 135 individual compounds. Only a few of these 210 total compounds have been well studied. Of these, the compound

2,3,7,8-tetrachlorodibenzo-p-dioxin (commonly called 2,3,7,8-TCDD) is the compound that has been shown to be the most toxic to some test animals. This is the compound that was present in Agent Orange, the defoliant used in Vietnam, and when the term "dioxin" is used, the reference is usually to 2,3,7,8-TCDD. This compound is not present in penta registered for sale in the U.S., and the manufacturers are required to demonstrate its absence.

In general terms it has been shown that: dioxins and furans with chlorine substitutions at the 2,3,7,8 positions are more toxic than those that have other substitutions; the dibenzofurans are less toxic than the corresponding dioxins; the toxicity decreases when the number of chlorine atoms increases above 4 or decreases below 4. For instance, octachlorodibenzo-p-dioxin (octa-dioxin), which has 8 chlorine atoms, has a very low oral toxicity. Scientists have not published an LD50 (a single dose which is lethal to 50 percent of the test organisms) for octa-dioxin, because they have not been able to administer doses high enough to kill 50 percent of the test animals. Octa-dioxin is, by far, the dioxin found in the highest concentration in penta.

The dioxins in penta of primary concern to EPA are the hexachlorodibenzo-p-dioxins (HxCDD). A mixture of 2,3,7,8 substituted HxCDD's was found to cause cancer in test animals when fed at doses that caused other toxic effects in the animal. But it is not yet clear if this is due to the actual genotoxicity of dioxin, or the result of acute toxicity. To evaluate potential toxic effects of dioxins and furans in technical penta, the National Toxicology Program (NTP) conducted a cancer study on the B6C3F1 mouse using technical grade penta and a purified penta. The results of this study showed a carcinogenic response, but only at dosages that were causing other toxic responses, and the study showed that the microcontaminants in penta contributed little, if any, to the toxicity. All prior cancer bioassays on penta had been negative. A new cancer bioassay in rats is underway at this time.

Based on the existing data, EPA established 2 parts per million (ppm) as an acceptable average concentration of hexachlorodibenzo-p-dioxin in penta, with a maximum concentration in any one batch of 4 ppm. Each batch that is manufactured must be analyzed prior to sale. All registrants of penta sold in the U.S. must meet these requirements and report their test results to EPA. It should now be clear why the presence in penta of very low levels of certain compounds classified as dioxins or furans is of little significance from a health and environmental perspective. The toxicity of penta is well established. EPA has studied the expected exposure to penta and its contaminants from its use as a wood preservative and has concluded that the wood preserving uses of penta constitute a minimal and acceptable risk that is far outweighed by the benefits to society from this use. More than 60 years of successful use, and the millions of existing penta-treated utility poles, provide a standing testament to the wisdom of this conclusion.