Just How Hazardous Is Pentachlorophenol?

Pentachlorophenol, or penta, is currently banned in 26 countries around the world. It is a chlorinated aromatic hydrocarbon, which enables it to bioaccumulate in the human body, wildlife and the environment. Commercial grade penta is contaminated with polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), and hexachlorobenzene (HCB): three related chemicals, which are all recognized as carcinogens, mutagens, teratogens and endocrine disruptors.[1] EPA's newly released draft review of penta finds extraordinary risks associated with typical exposure that a child might experience in communities across the United States that are dotted with pentachlorophenol-treated utility poles. What makes these findings even more shocking is EPA's failure to consider the risks associated with exposure to any of the contaminant ingredients that go into the alphabet toxic soup that is penta. EPA says it will get to that in the near future.

Penta is acutely neurotoxic, i.e. short-term exposure can cause sickness or death; at least 30 cases of penta exposure have resulted in death. Symptoms of mild penta poisoning include stuffy nose, scratchy throat, and tearing of the eyes. Skin contact can produce contact dermatitis and chloracne. A person experiencing systemic poisoning by penta would show symptoms of profuse sweating and intense thirst, rapid breathing and heart rate, fever, abdominal pain, nausea, weakness, lack of coordination, dizziness, anorexia, and coma.[2]

Penta targets the liver, kidneys and central nervous system with toxic effects occurring at low doses. Autopsies of victims of fatal exposure to penta reveal changes in the brain, heart, kidneys, lungs, and liver.[3]

Chronic health effects from long term exposure to penta include: impairment of the immune system,[4] interference with reproduction, birth defects,[5] cancer,[6] genetic mutation[7] and hormonal problems.[8] Clearly, penta is highly toxic.

Equally dangerous is that penta has been shown to be ubiquitous in the environment. A study in Arkansas found 100% of 197 randomly selected, 2-6 year old children tested had penta in their urine.[9] The National Health and Nutrition Examination Survey II (NHANES II) found penta in 79% of the general U.S. population.[10] A study of human milk samples provided by nursing mothers found that penta was present in all of the milk samples; there were no special, identified sources of penta exposure of the mothers.[11]

Table I. Pentachlorophenol Is Banned in 26 Countries[12]

All uses prohibited by final regulatory action due to health or environmental hazards.

Austria
Benin
Columbia
Costa Rica
Denmark
Dominican Republic
Egypt
Germany
Guatemala
Hon Kong
India
Indonesia
Italy
Jamaica
Korea
Liechtenstein
Luxembourg
Malaysia
Moldova
Netherlands
Nicaragua
Panama
Paraguay
Sweden
Taiwan
Yemen

The combination of high toxicity and widespread contamination dictates that EPA treat the wood uses of penta no differently than the nonwood uses banned in 1987. As a result, it would be prudent and responsible to cancel all remaining uses of this unnecessary poison.

The new data disclosed in this report raises troubling issues about the risks to children and utility workers from utility poles. The report challenges utility companies to seek out alternative utility pole materials that once and for all put an end to the need for pentachlorophenol.

Utility companies must develop policies that minimize the risk to the public and the environment and move toward elimination of chemically treated wood utility poles.

I. Introduction

We do not normally think of a utility or telephone pole as a hazardous material, but it is. It is so hazardous that EPA, in a preliminary science review, recently disclosed that a child exposed on an ongoing basis to the soil around a pole treated with pentachlorophenol (penta), one of several wood preservatives used in this way, has a chance of getting cancer that is 220 times higher than normal. This exposure alone accounts for at least 17,000 cases of cancer among children. Two children born every day are destined to a fate of cancer from just this exposure to penta.[1] The EPA hazard and risk evaluation, released in this report for the first time, was obtained by Beyond Pesticides/National Coalition Against the Misuse of Pesticides (NCAMP) through a Freedom of Information Act (FOIA) request.

Beyond Pesticides/NCAMP produced this study (i) to disclose and critique EPA's current effort to reevaluate the hazards of wood preservatives, including pentachlorophenol, and (ii) evaluate utility companies practices with regard to the use, storage and disposal of utility poles treated with these chemicals. The findings are troubling and at points shocking. They call for action to better protect public health and the environment from pentachlorophenol.

Two children born every day are destined to a fate of cancer from just this exposure to pentachlorophenol.

EPA also found that workers applying the chemical to the poles will get cancer and may expose others to the risk of cancer as well. Study after study show that penta and other wood preservatives have made their way into the environment, contaminating the air, water and land.

Wood preservatives have been shown to migrate out of poles, contaminating soil and water.[2] 100 percent of children tested in one study were found to have penta in their urine.[3] At least 314 superfund or chemical waste sites in the U.S. have been contaminated with penta.[4] Concern for human health risks posed by wood preservatives lead twelve leading scientists to write the Administrator of EPA, Carol Browner, urging the agency to take action to stop this exposure. (See Appendix A)

Survey Sent to Over 3,000 Utilities in the United States and Canada

In light of EPA's review and the known hazards of wood preservatives, including pentachlorophenol, a survey was conducted by Beyond Pesticides/NCAMP of utility companies across the United States and Canada to determine company practices with regard to utility poles. (See Appendix B) Since 93 percent of all penta produced is used to preserve wood telephone poles,[5] this is no small issue for utility companies. Beyond Pesticides/NCAMP also launched this study to bring real world or operational data to EPA's decision making process on continued use of some of the most hazardous materials know to humankind, wood preservatives. We began this effort with a survey of 3,000 plus utilities, which include investor owned utilities (IOUs), municipal utilities (MUNIs), rural electrification associations (REAs) and public utility districts (PUDs). Only 39 utilities in 24 states and Canada responded. None of the largest 100 IOUs chose to respond.

Beyond Pesticides/NCAMP views the survey as a basic tool for public right to know about the environmental practices of utilities across the country so that producers of treated wood poles can be adequately regulated to protect public health and environmental safety. After the distribution of the survey, the trade association for the wood treaters, the American Wood Preservers Institute (AWPI), immediately started a campaign to squelch participation

in this survey. AWPI wrote to the utilities urging them not to cooperate with the survey. AWPI has a long history of seeking to weaken EPA's regulatory position on wood preservative restrictions and was extremely successful to that end during EPA's last review of the chemicals in the 1980's. In a memo from the association's president, utilities were told,

> It has recently come to the attention of the American Wood Preservers Institute that the National Coalition Against the Misuse of Pesticides (NCAMP) is surveying utilities around the country on their use of poles treated with creosote, penta and CCA –as well as their use of poles made of alternative materials such as concrete and steel. The survey includes a wide range of questions about usage and disposal practices.
>
> Cooperating with this survey is <u>not</u> in the best interests of utilities. NCAMP is extremely biased against the use of preserved wood and will use the survey results to support their arguments against wood poles.[6] (See Appendix C)

Thanks to those utilities that believe in disclosing basic business information as requested in the survey, the survey results provide a good sampling of what is going on across the country from utilities that inventory of over one million utility poles covering at least 38,886 square miles (or 57,000 miles of road/pole miles).[7]

The culture of using utility poles treated with perhaps the most hazardous chemicals known to humankind runs deep in the utility industry. Furthermore, the method of managing, storing and disposing of poles shows a trail of poisoning and contamination with resulting hazards that surpass anyone's definition of acceptable. The public and the environment are at serious risk because of wood preservatives, including penta, and their use on utility pole.

Are utilities using utility poles that put the health of people and the environment at unacceptable risk? Yes. Could utilities decide not to use wood preservative-treated poles and utilize alternative approaches that do not present the same environmental and public health threat? Yes. Are they taking or planning to take this responsible step? No, generally they are not. These are the findings of Beyond Pesticides/NCAMP's survey of utility companies in the United States and Canada.

One of the most shocking findings in this report, in addition to the extraordinarily high risk factors associated with children and worker exposure, is the fact that the majority of utilities surveyed give away or sell to the public poles taken out of service. This practice exposes the public to serious hazards associated with handling, sawing and using the contaminated wood. Despite this widespread practice, EPA does not currently consider this exposure in its risk calculation. Apparently, the agency assumes that the activity does not go on.

One utility, Western Resources in Topeka, Kansas actually received an award in 1999 from the Kansas Department of Health and Environment for donating and converting discarded treated wood poles into such things as bird boxes and outdoor classrooms. Only one utility that we could identify distributed these poles with a Material Safety Data Sheet, which warns people that penta treated wood can cause irritation of the eyes and respiratory system. The MSDS says, "Pentachlorophenol has been found to have toxic effects in laboratory animals. . . Exposure to treated wood should be kept to a minimum. . .Exposure to penta during pregnancy should be avoided. . .Penta contains trace amounts of Hexa, Hepta, and Octochlorodibenzo-p-dioxins, Hexa, Hepta, and Octachlorodibenzofurans, and Hexachlorobenzene. The State of California has listed Hexachlorodibenzo-p-dioxin and Hexachlorobenzene as chemicals known to the state to cause cancer." (See Appendix D)

EPA's Preliminary Science Review of Penta

EPA's preliminary science review of penta finds extraordinarily high risks to children, workers and the environment (including unacceptable risk from food and water) which are discussed in this report in Chapter III. It should be noted that EPA's draft science chapter does not address perhaps the most toxic components of penta, the contaminants listed in the MSDS above, which include dioxins, furans and hexachlorobenzene. Each one of these toxic components alone account for high risk fac-

tors in addition to those calculated for penta itself. In fact, the scientific peer review of EPA's *Inventory of Sources of Dioxin in the United States* (1998) noted that, "dioxin on treated wood appears to be the largest flow of dioxins that were quantified, thus making treated wood a large reservoir of dioxin in the environment."[8]

In addition, penta and its contaminants have been determined to be endocrine disruptors, which act like hormones in the body during critical times in fetal development, when organs are forming, adversely affecting development, reproductive capacity, sexual development and causing diseases like cancer later in life. What makes these effects different from others is that they defy classical toxicology models which embrace the notion that the "dose makes the poison." In fact, with endocrine disruptors, like these wood preservatives, it is not just dose, but it is *timing* of exposure to minuscule doses at the parts per billion and even trillion level that make these chemicals so destructive.

Regulatory Issues

Can we expect the current regulatory review of wood preservatives, including penta, to take restrictive action that would stop the use of these chemicals and the resulting poisoning and contamination? The history of EPA's pesticide program would say no. The program engages in risk equations that ignore important pieces of information, such as the pole give-away programs cited in this report and basic toxicology data that is missing but would only add to the mountain of hazards already established. Equally important is the failure of the agency to consider less risky approaches than wood preservative-treated utility poles, that are economically viable but not currently embraced by the utility industry. To determine a regulatory outcome by asking an industry that has used wood preservative-treated utility poles since its inception whether it could use alternative pole materials like recycled steel, concrete or composite is to seal the fate of the decision in the hands of the status quo. That is, no change. EPA did just that in its last review of penta and other wood preservatives in 1981 (completed in 1987) when it said, "Due to the non-substitutability of the wood preservative compounds and the lack of acceptable non-wood or other chemical alternatives for many use situations, the economic impact which would result from an across-the-board cancellation would be immense." (EPA, Wood Preservative Position Document 2/3, Executive Summary, p.3, 1981.) Not true today. Our survey results show that the cost differential between treated wood and recycled steel poles is negligible in the short-term and benefits steel in the long-term.

Like other major EPA decisions that require a change in an industry's culture, very similar to moving farmers away from DDT and more modern pesticide-intensive operations, the public must get involved. The public will want to know: what the risk from contaminated soil around the pole, in front of their homes, or in the school yard means to their children's health; what are the impacts of reusing treated poles for outdoor classrooms; or, what does the storage and disposal of treated wood in their community mean for the health of people and the environment.

Rachel Carson wrote in *Silent Spring*, "Since the chlorinated hydrocarbons are persistent and long lasting, each application is merely added to the quantity remaining from the previous one."[9] The persistence of pentachlorophenol and its contaminants dioxin, furans and hexachlorobenzene have been established. The fact that they are contained in body tissues and fluids is established. The harm that they cause is established. It is time for their uses to stop. Alternatives are available and can be successfully and economically employed.

FINDINGS

Preliminary Science Findings by EPA

- Residues of penta "in drinking water (when considered along with exposure from food and residential uses) pose an unacceptable chronic risk to children."

- Children exposed to penta in the soil around treated poles face a 2.2 in 10,000 (or 220 times higher than acceptable) risk of cancer. Just this exposure accounts for at least 17,000 cases of cancer among children. Two children born every day are destined to a fate of cancer from just this exposure to penta.

- 13 of 14 occupations considered by EPA have unacceptable cancer risk, including risks as high as 3.4×10^{0}.

■ Over four people out of 10 who apply penta to wood in joinery mills and two people in a thousand who mix and load penta at pressure treatment plants are expected to get cancer from their exposure.

■ Applicators of grease formulations of penta, used for retreatment of poles, face certain cancer.

Utility Survey Findings

■ 98.5 percent of utility poles in service are chemically-treated wood poles, 1.5 percent are alternative materials

■ 56 percent of the poles in the survey are treated with pentachlorophenol.

■ 34 percent of the utilities retreat their utility poles with fresh poisons during the poles' service life.

■ 85 percent of the utilities store chemically treated wood poles on site.

■ 69 percent of utilities responding to the survey give away or sell to the public wood preservative-treated poles taken out of service.

■ One utility donated to the community treated wood poles that had been converted into bird boxes and outdoor classrooms.

■ 18 percent dispose of the treated poles in local municipal landfills.

■ Only five percent of respondents consider wood preservative-treated wood poles taken out of service as hazardous waste and dispose of them accordingly.

■ Only one survey respondent distributes a Material Safety Data Sheet on the hazards of penta with the treated wood poles being sold or given away to the public.

■ 27 percent of respondents indicated that they were considering alternative pole materials.

■ The cost differential of treated wood and recycled steel poles is inconsequential in the short-term and benefits steel in the long-term.

RECOMMENDATIONS

The EPA and other scientific findings taken together with utility company practices raise serious concern about public and environmental health and call for the following recommendations:

Immediately cancel all uses of penta and other wood preservatives with similar effects.

EPA should:

■ Immediately cancel all uses of penta and other wood preservatives with similar effects.

■ Recall all existing stocks of penta.

■ Begin phase-out the use of penta-treated replacement poles in 12 to 24 months.

■ Prohibit the use of any remaining stocks of penta and other wood preservatives with similar effects.

■ Require that all storage sites of treated poles are covered from the elements of weather.

■ Define penta treated wood poles as hazardous waste and require their disposal as hazardous waste.

■ Prohibit the giving away or sale of penta-treated poles taken out of service.

■ Require utility companies to alert the public to the dangers associated with penta-treated poles.

Utilities should:

■ Stop the purchase of treated utility poles, and begin purchase of poles constructed out of alterative materials.

■ Develop policies to protect workers, the public and environment from exposure to penta and other similarly dangerous wood preservatives.

■ Stop the sale or give-away of discarded treated wood poles for public use.

■ Dispose of discarded treated wood poles at licensed hazardous waste sites.

■ Increase the use of alternative types of utility poles, working towards elimination of the use of chemically treated wood utility poles.

II.
Utility Company Practices: A Survey and Sample Response

With government lagging behind in the protection of public health and the environment from the impact of hazardous pesticides like wood preservatives, it is often the private sector that steps in to take action that is protective at the community, state and national level. In the case of pentachlorophenol, with 93 percent of all penta used on utility poles, utility companies are critical decision makers on this key public health and environmental issue. For example, some manufacturers in the food industry have chosen to eliminate the use of specific pesticides or practices in response to safety concerns that have not been adequately regulated by EPA.

To assess the role that utility companies can and do play in addressing the hazards of wood preservatives including pentachlorophenol, Beyond Pesticides/ NCAMP developed and distributed a survey to over 3,000 utilities to analyze their knowledge of the problem and steps that they have taken or are planning to take to address the hazards of wood preservative-treated utility poles. This survey follows the release of Beyond Pesticides/NCAMP's ground breaking report *Poison Poles: A Report About Their Toxic Trail and the Safer Alternatives*, in 1997. *Poison Poles* introduced the hazards of the wood preserving chemicals and the extent of their use to an unaware public. Since that time, EPA has committed to conducting a review of the hazards of wood preservatives under its reregistration process and has recently released preliminary scientific analyses indicating serious hazards associated with the use of pentachlorophenol in utility poles. In addition, since 1997 EPA has calculated the excessive dioxin contamination associated with wood preservative-treated utility poles.

After Beyond Pesticides/NCAMP's survey was mailed to 3,000 utilities, the American Wood Preservers Institute (AWPI) immediately started a campaign against the survey, urging utility executives in a memo from AWPI's president not to cooperate.

The questions addressed in the survey include:

- What are the environmental practices employed by utilities across the United States and Canada?
- How many and what types of utility poles are in use in communities?
- Are utility companies in the habit of retreating aging wood utility poles?
- To what extent do utilities store on-site treated poles in the community?
- What happens to treated poles after they are taken out of service? Are they disposed of as hazardous waste?
- Do the utilities currently use or do they have plans to use alternatives to the poisonous treated wood utility poles?

The survey (See appendix B) was sent to over 3,000 utilities across the U.S. and Canada. The survey asks straightforward questions to which the public has a right to answers. None of this information should be considered secret, given the fact that utilities are handling and possibly exposing the public and the environment to hazardous materials.

The wood treatment industry apparently feels differently.

After Beyond Pesticides/NCAMP's survey was mailed to the utilities, the American Wood Preservers Institute (AWPI) immediately started a campaign against the survey, urging utility executives in a memo from AWPI's president, not to cooperate. (See Appendix C) This is troubling and telling, since AWPI has effectively influenced EPA decision making on this issue over the last two and a half decades behind closed doors. On one level, AWPI's response is surprising, given that the organization claims that penta and the other wood preservatives pose a minimal threat to human and environmental health.[1] What then does the AWPI have to hide from the public? Those utilities that chose to ignore the AWPI and responded are taking the initial steps toward engaging in a public discussion on this important topic.

Despite AWPI's efforts, the survey has generated a preliminary 39 responses from utilities that cover 24 states and Canada and control nearly one million poles in their service area. These utilities collectively serve an area of over 38,886 square miles or at least 57,000 road/pole miles. The respondents include smaller utilities across the U.S. and Canada and do not include any of the top 100 utility companies, which have apparently heeded AWPI's advice in not sharing basic information with the public.

Table II. Utilities From 24 States and Canada Responding to the Utility Pole Survey

Arkansas	**Missouri**
Colorado	**Montana**
Connecticut	**North Carolina**
Georgia	**Nebraska**
Hawaii	**New Hampshire**
Iowa	**New Mexico**
Illinois	**Ohio**
Indiana	**Oregon**
Kansas	**Tennessee**
Louisiana	**Texas**
Massachusetts	**Utah**
Minnesota	**Wisconsin**

Survey Overview

Toxic, chemically treated wood poles are favored by the utilities; 98.5 percent of the poles in our survey are chemically treated wood poles. Penta stands out as the chemical treatment of choice among the utility respondents; at least 56 percent of the poles are treated with penta, 20 percent with creosote, and 14 percent with copper chromium arsenate (CCA). Only 1.5 percent of poles in our survey were made with alternative materials.

There are a number of possible explanations for the very small number of alternative material poles in use. First and foremost, the EPA has failed to adequately protect the public through its regulation of the wood preservatives. When the EPA considers alternatives during its risk analysis of a toxic chemical it does not include alternative technologies in that equation. Believe it or not, the EPA only considers alternative *poisons*. The EPA chooses not to ask the simple and obvious question: Has this poisonous chemical been rendered obsolete and, therefore, unnecessary as a result of new, less hazardous, cost effective technologies on the market?

Secondly, there is a long established culture in the utility industry to use wood utility poles. Without regulatory action on the part of the EPA, utility companies have had no reason to change their practices. In addition, any change in industry practice does require an investment as workers are retrained. However, this industry investment is small in comparison to the savings in human and environmental health costs that could be realized with an increase in the use of alternative utility pole materials.

Third, the availability and economy of nonwood utility poles has changed radically in the recent past. Steel, concrete and composite poles are readily available, last longer and do not require remediation expense. In addition, steel poles taken out of service are recyclable, so utility companies can actually realize a return when disposing of steel poles. Despite this, most utilities are neither using nor considering nonwood utility poles.

The major findings of the utility survey focus on the following questions.

- How prevalent is a particular practice among the utility industry?
- What are the problems associated with those practices?

■ How will moving away from wood utility poles solve those problems?

Utility Pole Storage

The study finds that 87 percent of the utilities that responded stored chemically treated wood utility poles on site. One utility reports storing as many as 7,200 poles at given time at their facility. A typical utility pole of 12 inches in diameter and 45 feet in length contains 40 pounds of penta.[2] A utility yard storing 7,200 such poles represents 288,000 pounds (144 tons) of penta that could leach into the soil and ground water.

A typical utility pole of 12 inches in diameter and 45 feet in length contains 40 pounds of penta. A utility yard storing 7,200 such poles represents 288,000 pounds (144 tons) of penta that could leach into the soil and ground water.

Bell Canada, in 1988, conducted a study to determine whether soil and groundwater in its storage yards were contaminated by penta and/or another wood preservative, CCA. In Quebec, where the company uses mostly penta-treated poles, the clean-up criteria, or levels determined acceptable, were exceeded by factors as high as 100 at 10 out of 14 sites.[3] Another Canadian study measured the amount of penta leaching out of a pile of 15 Douglas Fir poles under natural rainfall conditions in British Columbia. The level of penta released from these poles was relatively constant throughout the study period of four months, ranging from 1.57-2.85 mg/L rainfall.[4]

It is clear that penta and its contaminants do leach from utility poles, both from the poles stored in pole yard and those in service. A study conducted by the Electric Power Research Institute (EPRI) measured soil adjacent to utility poles in service. EPRI found levels of penta in the soil around the poles as high as 100 mg/kg or 100 parts per million (ppm).[5] EPRI also evaluated the leaching of penta into lower depths of soil around 168 in-service wood utility poles and found that penta residues were relatively constant to 48 inches;[6] maximum levels were above 500 mg/kg. It has also been shown that dioxins are leaching out of penta treated wood utility poles. Significant levels of dioxin were measured in soil samples taken from around penta-treated poles, with detectable levels of dioxin found 20 centimeters from the poles.[7]

Retreatment of Poles In Service

The survey found that 34 percent of utilities retreat wood poles in an effort to increase their life span. Groundline remediation of poles not only introduces a fresh dose of toxic chemicals to the environment around the pole, it also increases the cost of using treated wood poles. These are two additional reasons for a shift from the use of wood poles to the use of alternatives.

According to EPA's calculations, the single highest risk of cancer from exposure to penta belongs to those people hired to apply liquid penta formulation for groundline remediation. EPA has determined that these unfortunate men and women have a 3.4 chance in 1 to suffer from cancer due to penta.[8] 3.4 out of 1? How is that possible? Beyond Pesticides/NCAMP has been able to make sense out of that particular datum in only one way: people that apply liquid penta to in-service poles have an 100% chance of getting cancer and become contaminated to the point that they then expose their colleagues, friends and family to penta, leading to an additional 2.4 cases of cancer. This is an extraordinary risk.

Neither utility lines made from alternative materials nor buried utility lines require remediation treatment. Our research indicates a range of $30 to $50 per pole for remedial treatment. Any cost/benefit analysis conducted by the utility industry must include an assessment of the human health cost, the environmental cost and the economic cost of retreatment of wood poles.

Disposal of Treated Poles

One of the most disturbing findings of the survey is what appears to be the standard utility industry practice of giving away or selling used chemically treated wood utility poles to the public. Over 68 percent of the utilities dispose of poles in this way. Why is this disturbing? Because the public has not been informed of the risks to their health associated from contact with that poisonous wood.

When discarded poles are cut into pieces, the saw dust

can end up on the skin and in the lungs of the handyperson and his or her family. That newly created lumber becomes fence posts, garden retainers, or a jungle gym for children.

A utility in Topeka, Kansas, Western Resources, actually won an award from the Kansas Department of Health and Environment for providing toxic lumber for public projects (See Appendix E). Instead of disposing of their poles in an appropriate landfill, the toxic lumber was converted into an environmental classroom shelter, a bird viewing blind, and bird boxes, to name just a few.

Only one of the utilities that replied to the survey provided a Material Safety Data Sheet (MSDS) along with the used poles to consumers. (See Appendix D). The MSDS states that penta "has been found to have toxic effects in laboratory animals. . . Exposure to treated wood should be kept to a minimum. . .Exposure to penta during pregnancy should be avoided. . .Penta contains trace amounts of Hexa, Hepta, and Octochlorodibenzo-p-dioxins, Hexa, Hepta, and Octachlorodibenzofurans, and Hexachlorobenzene. The State of California has listed Hexachlorodibenzo-p-dioxin and Hexachlorobenzene as chemicals known to the State to cause cancer." It is interesting to note that this same utility requires that consumers of the used poles sign an agreement freeing the utility from liability for any harm caused by the poles.

23 percent of utilities disposed of their discarded wood poles in landfills but only 5 percent treat the poles as hazardous waste. In regular landfills the chemicals inside the poles are free to leach out into the environment, contaminating our soil, groundwater and eventually our bodies (See research cited above under storage). Despite limited legal requirements in this area, Beyond Pesticides believes that the only appropriate way to dispose of chemically treated wood poles is in certified hazardous waste landfills.

Use of Alternative Pole Materials

Survey responses indicate that less than two percent of utilities are using alternative pole materials, including steel, concrete and composite. Futhermore, all the respondents indicate that they have no plans to consider switching in the future to poles constructed out of alternative materials.

Cost Analysis of Alternative Methods/Poles

Alternative methods of carrying utility lines carry far less risk to human health and the environment. Where burying utility lines may not be feasible, alternative materials such as steel, concrete, and composite are cost effective materials for utility poles.

An important cost that is eliminated with the use of alternative material poles is the environmental and economic cost of retreatment. As outlined above, groundline remediation introduces a fresh dose of chemical wood preservatives into the environment where it can contaminate our soil, water and air. This route of environmental contamination also costs the utility companies money. Not only do alternative pole materials not need retreatment but their useful life span is longer than for wood.

Research shows that concrete poles can last from 80 to 100 years in service.[9] According to sources at International Utility Structures, Inc, manufacturers of steel poles, steel poles have useful life spans of 80 years. Fiberglass poles, according to one manufacturer, Shakespeare®, have in-service life spans of up to 80 years. Penta-treated wood poles, on the other hand, have life expectancies of 35 years.[10]

An additional benefit of steel is its ability to be recycled. Utility companies can actually realize a return when they sell their old steel poles for scrap to be recycled.

Under the current regulatory regime utility companies are free to externalize the costs to human health. With appropriate regulation of penta, and the other wood preservatives, utility companies will be forced to realize these costs.

III.
The Science on Pentachlorophenol

The EPA's Risk Assessment and Science Support Branch (RASSB)/Antimicrobial Division has produced a preliminary science chapter on pentachlorophenol for a Reregistration Eligibility Decision (RED) document, which finds excessive risk associated with penta use in utility poles. The EPA review was released to the wood treatment industry early Summer 1999 and disclosed to Beyond Pesticides/NCAMP in Fall 1999. The penta science chapter is a major step towards completion of the RED for penta, and represents the EPA's current scientific knowledge about the environmental fate, the health effects on humans, and the ecological effects of penta. All three of these subsections of the science chapter are important. This section of the report focuses on the unreasonable risks to human health caused by the continued use of penta. Of particular note, is the excessive risks that EPA has calculated for children's exposure.

The risk of cancer for children exposed to soil contaminated with penta is 220 times higher than levels deemed acceptable by the EPA.

The Devastating Impact of Penta on Children

There are only two ways that children are normally going to come into contact with penta and the EPA has declared, in its preliminary science review, both of them hazardous and potentially deadly for children. These residential post-application exposure scenarios are the direct result of the widespread use of penta treated utility poles across the country. The EPA has determined that contact with soil contaminated with penta poses an unacceptable cancer risk to children as high as 2.2×10^{-4} (2.2 cancer cases in 10,000). Likewise, outdoor residential contact with industry pressure-treated wood products (e.g. utility poles, fencing, porches, shingles, steps and decks) leads to cancer in children with an unacceptable risk of 6.4×10^{-6} (6.4 cancer cases in one million).[1]

In its science chapter EPA finds that, "[R]esidues of pentachlorophenol in drinking water (when considered along with exposure from food and residential uses) pose an unacceptable chronic risk to children."[2]

The issue of protecting children from exposure to pesticides has received much attention in recent years. The landmark study, *Pesticides in the Diets of Infants and Children*, published by the National Research Council in 1993, finds that children are highly vulnerable to the negative health impacts of exposure to pesticides due to their small size, high proportional intake of air relative to body weight, and developing organ systems.[3] Because of these findings, Congress adopted legislation in 1996, the *Food Quality Protection Act*, which requires that special attention is given to the protection of children. Where data are not available to evaluate the nonthreshold affects (i.e., cancer) of pesticide exposure (dietary and nondietary) on children, EPA is required to adopt an additional 10-fold margin of safety (FQPA, Section 405, b(2)(B)iv). In its science chapter, despite the lack of data on the special vulerability of children to penta, EPA has neglected to apply the additional safety margin which would dramatically affect the acceptable exposure scenarios.

What Do the Numbers Mean?

EPA has historically said that one excess case of cancer per million population exposed is the threshold or range of acceptable risk; this is expressed numerically as 1×10^{-6}. Everyone is left hoping that their child is not the unfortunate one.

According to EPA's preliminary science review, the risk of cancer for children exposed to soil contaminated with penta is 220 times higher than levels deemed acceptable by the EPA. What does this mean for newborn children? The

National Center for Health Statistics calculated that there were 3,880,894 babies born in the U.S. in 1997.[4] This averages 10,633 children born every day. Applying the EPA's risk factor (2.2 in 10,000) to this new population results in over 2 child cancer victims a day just from this type of exposure to penta.

How many people are poisoned with penta?

Study after study have found 100% of the people tested have penta in their bodies. The following is a list of examples of penta contamination:

- A study in Arkansas found 100% of 197 randomly selected, 2-6 year old children tested had penta in their urine;[5]
- A study in Germany of human milk samples provided by nursing mothers found penta present in all of the milk samples; there was no special, identified sources of penta exposure of the donor mothers;[6] and,
- A study in Sakatchewan, Canada, found penta in 100% of randomly collected urine samples.[7]

What about those people that are exposed to penta on the job?

The penta science chapter finds that people with occupational exposure to penta are at excessive risk from short-term, intermediate-term and long-term exposure to penta. These people face extreme non-cancer risks to their health from exposure to penta from touching the chemical and breathing the chemical.[8] The cancer risks posed by penta to workers exposed on the job are off the charts.

The cancer risks that EPA has calculated for occupational exposure to penta are most telling: 13 of the 14 jobs had unacceptable cancer risks.[9] The following is a list of a few of the most shocking examples of the cancer risks calculated by the EPA from occupational exposure to penta:

- Applicators of grease formulation for groundline remediation of utility poles – 3.4 workers out of 1;
- Applicators of liquid penta at joinery mills with a low pressure handwand – 4.4 out of 10; and,
- Mixers and loaders of liquid penta at pressure treatment plants – 2 out of 1,000;
- Helpers and switchmen for applicators of liquid penta at pressure treatment plants – 1.5 out of 1,000.

EPA has determined that cancer risks that are greater than 1 worker in 100,000 is unacceptable.[10]

EPA does not have any data to estimate human exposure risks for a number of post-application exposure scenarios including: pressure treatment retort maintenance; pressure treatment facility storage yard worker; and, operators of equipment at pressure treatment plants.[11] Given the high risk of cancer associated with workers exposed to penta one could and should reasonably expect that these individuals face a particularly high risk of cancer.

The cancer risks that EPA has calculated for occupational exposure to penta are most telling: 13 of the 14 jobs had unacceptable cancer risks.

Data Gaps Plague EPA's Analysis, Suggesting the Hazards Are Even Worse Than Calculated

The penta science chapter is riddled with such data gaps; pieces of important scientific information that the EPA acknowledges it does not have. For example, a question that remains unanswered in the penta science chapter "is to what extent PCP [penta] and its microcontaminants are depleted from treated wood poles and the levels of exposure to soil, water and air in the vicinity of treated poles. Studies were not conducted to measure the levels of PCP and its microcontaminants in treated utility poles at specified times intervals including when they were placed in service."[12]

The lack of an analysis of the human and environmental health risks posed by the contaminants of penta is the single most important data gap.[13] Penta is contaminated with some of the most toxic substances known including polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs) and hexachlorobenzene

(HCB).[14] The hazards associated with this alphabet soup of poisons is well established.[15]

Dioxins, furans, and hexachlorobenzene are recognized as endocrine disruptors.[16] Endocrine disruptors act like hormones in the body during critical times, adversely affecting fetal and sexual development, reproductive capacity, and causing diseases like breast and prostate cancer later in life.[17] What makes these effects different from others is that they defy classical toxicology models that adopt the notion that the "dose makes the poison." With endocrine disruptors, like penta and its contaminants, it is the *timing* of exposure that is important. The relevant dose of such a toxic material may be thousands or even millions of times lower than the range where acute or chronic toxic effects are noted.[18] Dioxins, furans and HCB are also extremely toxic in the classical sense.

The signs and symptoms of poisoning for chemicals contaminated with dioxin include a spectrum of toxic effects. Dioxin exposures in humans are associated with increased risk of severe skin lesions such as chloracne and hyperpigmentation, altered liver function and lipid metabolism, general weakness associated with drastic weight loss, changes in activities of various liver enzymes, depression of the immune system, and endocrine- and nervous-system abnormalities. It is a potent teratogenic, fetotoxic, and carcinogenic chemical.[19]

The lack of an analysis of the human and environmental health risks posed by the contaminants of penta is the single most important data gap.

HCB has been shown to be a potent teratogenic, fetotoxic, and carcinogenic chemical. Chronic exposure to HCB causes damage to the liver, spleen and nervous system.[20]

How Much Dioxin Is In Penta Treated Poles

In its report on the meeting to peer review "The Inventory of Dioxin in the United States" (1998), EPA found that,

> A significant finding of the current inventory . . . is that very large quantities of dioxin can enter the environment in products. For example, EPA estimated that 25,000 grams TEQ[21] of dioxin may be found in pentachlorophenol (PCP) used for wood treatment. This amount of dioxins is over eight times greater than EPA's central estimate of total releases of dioxin to air, land, and water in 1995. Although the fate of dioxins on treated wood and in other products in not fully understood, the reviewers noted that **dioxins on treated wood appears to be the largest flow of dioxins that were quantified**, thus making treated wood a large reservoir of dioxins in the environment.[22] (emphasis added).

Calculating the Real Risk of Penta

There can be no doubt that any recalculation of risk to include the effects of exposure to dioxins, furans, and HCB will raise the risks of exposure to penta higher than the risks currently established in EPA's preliminary science chapter.

In addition to the cancer risks caused by penta, the penta science chapter contains a wealth of information addressing the impacts of the use of penta. Beyond Pesticides/NCAMP has included a listing by page of the numerous data gaps and the scientific data in the penta science chapter, establishing the risks to human and environmental health caused by penta (see Table III). The table focuses on two of the three substantive sections of the penta science chapter: the human risk assessment. and the environmental fate of penta.

Similar to adopting a 10-fold additional margin of safety for children where data on the impact on children is not available, it is critical that the agency assign values (best guess estimates) or an additional margin of safety to exposure scenarios for which the agency has incomplete or inadequate data. If the agency is to move forward with an analysis that is even minimally protective of public health and the environment, it should not assume zero risk associated with the data gap exposures listed in Table III and move ahead with an RED document that allows continued use.

IV.
The History of Pentachlorophenol

The Environmental Protection Agency (EPA), acting under the mandate of the *Federal Insecticide, Fungicide and Rodenticide Act* (FIFRA), 7 U.S.C. § 136 et seq., is currently in the process of reevaluating wood preservative pesticides, namely creosote, the inorganic arsenicals and pentachlorophenol (penta). The end product of such an evaluation is called a Reregistration Eligibility Decision Document (RED); the RED provides an explanation for the action taken by the agency regarding a particular poison, whether it cancels or, as most often is the case, allows the continued use of the toxic chemical, with the adoption of risk mitigation measures. Towards that end, the EPA has produced a draft science chapter on penta, which represents a significant step towards completing the RED on penta.

Beyond Pesticides/ NCAMP is emphasizing the totally unacceptable and unreasonable adverse effects on the public's health and the environment caused by penta.

Beyond Pesticides/National Coalition Against the Misuse of Pesticides (Beyond Pesticides/ NCAMP) is tracking the progress of the EPA's work on the wood preservatives. Beyond Pesticides/NCAMP obtained a copy of the science chapter on penta and critiqued the 188-page document, noting the gaps in the EPA's data and calculations made by the EPA regarding the risks of exposure to penta. The same procedure with be followed with all of the documents produced by the EPA during its evaluation of the wood preservatives. The fact that penta is first on the EPA's list explains why Beyond Pesticides/NCAMP is emphasizing the totally unacceptable and unreasonable adverse effects on the public's health and the environment caused by penta.

This is not the first time that penta has received the scrutiny of the EPA. The EPA, back in 1978, under the authority of the *Federal Insecticide, Fungicide and Rodenticide Act* (FIFRA) placed penta and the other wood preservatives in Special Review, then referred to as Rebuttable Presumption Against Registration (RPAR). The Administrator of EPA may place a pesticide into Special Review and cancel the registration of a pesticide whenever he or she determines that the pesticide no longer satisfies the statutory standard for registration (FIFRA § 6(b)). That standard requires, among other things, that the pesticide not cause "unreasonable adverse effects on the environment" (FIFRA § 3(c)(5)(C)). In 1978, when EPA began its review of wood preservatives, the agency did so because of serious concerns about the public health and environmental threat that these chemicals represent.

In announcing its January 2, 1987 Final Determination and Notice of Intent to Cancel and Deny Application for Registrations of Pesticide Products Containing Pentachlorophenol for Nonwood Uses, EPA said:

> The Agency is concerned about the ubiquity of pentachlorophenol, its persistence in the environment, its fetotoxic and teratogenic properties, its presence in human tissues, and its oncogenic risks from the presence of dioxins in the technical material.[1]

The notice covered all penta uses in five categories: herbicides, antimicrobial agents, disinfectants, mossicides, and defoliants.

Throughout this history, communities across the United States have been contaminated and its residents poisoned. A community in Pennsacola, Florida next to a wood preserving plant that created so much contamination from

its use of pentachlorophenol and creosote that EPA designated it a Superfund site and committed to relocating the community. That was 1996. In 1999, EPA has only completed a partial relocation and efforts to clean up the site have been stalled. It is the legacy of pentachlorophenol that continues as long as the chemical continues to be used on utility poles.

> The Environmental Protection Agency plans to spend $18 million relocating people from 158 houses and 200 apartment in Pensacola, FL. The homes are neighbors with the Escambia Treating Company, where the logs, telephone poles in the making were dripping chemical preservatives, first creosote, then pentachlorophenol. In 1991, long after the company went bankrupt, an emergency team from the EPA dug up the toxic mess, piled it into a 60-foot high mound laced with dioxin and other chemicals, and stored it tight under a polyethylene cover. Mr. Kaufman, EPA engineer, sugested that 'common sense' justified the relocation. 'Very few people are going to keel over and die because of a Superfund site,' he said. 'It's the long term health risks that are the problems.'
>
> The New York Times, October 21, 1996

Why Do Wood Uses of Penta Remain on the Market?

Over the nine-year Special Review process preceding the non-wood decision, EPA was challenged on every proposed wood-use restriction of penta by the American Wood Preservers Institute (AWPI) and other trade organizations representing wood preservers and chemical manufacturers, all staunch advocates for continued manufacture and use of penta. This is same AWPI that asked the utility companies to not cooperate with the efforts of Beyond Pesticides/NCAMP to collect information about their utility poles (See Appendix C).

In fact, the EPA had originally proposed much more sweeping restrictions on the uses and quality of commercial grade penta. In 1984, EPA announced restrictions requiring such things as Consumer Information Sheets (CIS) to accompany pressure treated wood and a limit on the level of dioxin contamination in commercial grade penta to one part per million (ppm) within 18 months.[2] By 1986, after enduring one legal challenge after another, the EPA capitulated to the wood treatment industry: now the CIS program is voluntary and dioxins can be as high as 4 ppm in commercial grade penta.[3]

V.
Conclusions & Recommendations

Despite warnings about their hazards, widespread contamination, levels in human body tissue and fluids, extreme effects on workers and special risks to children, pentachlorophenol and the other wood preservatives have escaped the regulation necessary to adequately protect public health and the environment. The latest EPA science review and recent findings on dioxin contamination associated with penta and treated utility poles calls for a break with the history of special interest politics that has allowed the continued use of wood preservatives. They can be economically replaced by safer alternative pole materials, such as steel, concrete and composite or by burying lines.

Wood preservatives, used to treat millions of utility poles across the country, pose a serious threat to public health and the environment. Wood preservatives constitute the single largest pesticide use in the United States, accounting for nearly one billion pounds annually. The chemicals, used widely to extend the life of wood products, including over 130 million utility poles, contain some of the most hazardous toxic contaminants on the market. The chemicals include pentachlorophenol, creosote, arsenic and chromium VI and contaminants such as dioxin, furans and hexachlorobenzene. The sole purpose of these chemicals is to preserve wood by killing insects, bacteria and fungus.

Penta leaves a toxic trail, which includes the production of wood utility poles, and their retreatment, storage and disposal. There are at least 795 wood preserving facilities across the country and hundreds of Superfund hazardous waste sites that are contaminated with penta. Treated poles continue to pollute after they are taken out of service and used as fence posts, bird houses, outdoor classrooms, or other building material.

Beyond Pesticides/NCAMP's Poison Poles Campaign began with the development and distribution of *Poison Poles: Their Toxic Trail and the Safer Alternatives*. *Poison Poles* successfully brought the issue of the widespread contamination and poisoning from the use of wood preservatives on utility poles and availability of alternatives in front of utility industry executives and decision makers, environmental regulators, consumer activists, utility regulators and the general public.

With an eye toward the EPA's current reevaluation of the wood preservatives, starting with penta, Beyond Pesticides/NCAMP recognized the importance of following up *Poison Poles* with a survey of utility companies. The survey has provided real world numbers with which to measure the EPA's risk assessment of penta. What has been discovered is alarming.

Utility companies, in general, prefer penta treated wood utility poles to any other type according to survey results. Most utility companies store treated wood utility poles on site. These stored poles represent large, concentrated reservoirs of penta, and other wood preservatives, that leach out of the poles into soil and ground water. Many utility companies retreat their aging stock of wood poles to increase their lifespan. Retreating wood poles provides a fresh source of penta to contaminate our environment and our bodies.

Most alarming is the majority of utility companies that give away or sell their used treated wood poles to the public. The unsuspecting handy-person that cuts the treated poles to size brings the highly toxic penta and its deadly contaminants into even more intimate contact with the public.

The EPA has determined that penta and its contaminants do leach out of treated wood utility poles. The EPA has noted that dioxins in treated wood appear to be the largest quantified flow of dioxins into the environment. The EPA calculated cancer risks for children as a result of their ex-

posure to penta. The agency found that children face a risk of cancer that is 220 times higher than levels deemed acceptable from exposure to soil contaminated with penta treated wood poles; the same penta treated wood poles that are planted in countless neighborhoods across the country.

EPA recognizes that the unfortunate people that are exposed to penta on the job face an astronomically high risk of cancer. The most shocking example is the risk faced by people retreating wood poles with liquid penta; according to the EPA, they have a 100 percent chance of getting cancer.

What has emerged since the survey was launched in Summer 1999 is the wood treatment and utility industries' unwillingness to have a public debate on key issues that affect public health and environmental safety. The American Wood Preservers Institute's efforts to stop the free flow of information to the public on basic utility industry practices, as evidenced by its president's memo telling utilities not to cooperate with the survey, raises serious concerns about what the industry has to hide. The new EPA assessments of extraordinarily high risk associated with penta-treated utility poles seem to shed light on why they want public debate stopped. Pentachlorophenol and its contaminants have poisoned and contaminated long enough. The industry knows this.

What will it take to reduce and eliminate this human health and environmental threat? It will take an active public to push for the adoption of alternatives and a more aggressive regulatory climate to provide improved protection of public health and the environment. It will take EPA breaking with its history and it will take a cultural shift on the part of the utility industry.

Taking Action
What people and community groups can do:

In order to begin a dialogue with local and regional utility companies, Beyond Pesticides/NCAMP developed the survey discussed in this report. (See Appendix B) The survey questions utility companies on their utility pole practices.

- Contact your local utility and arrange for a meeting with the chief executive officer.

- Ask that the survey be completed. If you cannot get a meeting, mail the survey. (See Appendix F)

- Present the findings of *Pole Pollution* and *Poison Poles*.

- Make a formal request that the utility consider and adopt a policy to stop purchasing treated wood poles and begin purchasing the alternatives.

- Ask for a response by a specific date.

- Begin a community drive for the changes you are requesting if the utility is unresponsive.

- Circulate a petition to community and civic organizations, through religious institutions, school groups and local environmental and social groups to generate support for changes.

- Enlist local leaders, such as politicians, clergy, educators and others.

- Identify wood preservative problems in your community or nearby communities.

- Notify the local media (newspaper, television and radio) about the campaign, the survey and your concerns.

- Hold a public forum and invite the community and engage the utilities in debate on the subject.

Contact EPA

Tell EPA to remove pentachlorophenol from the market because it is no longer needed. Write Carol Browner, Administrator, EPA, 401 M Street, SW, Washington, DC 20460.

Contact Beyond Pesticides/NCAMP for More Information

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Endnotes

Just How Hazardous is Pentachlorophenol?

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Chapter One - Introduction and Findings

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