



## **Petition to the United States Consumer Product Safety Commission to Ban Arsenic Treated Wood in Playground Equipment and Review the Safety of Arsenic Treated Wood for General Use**

May 22, 2001

Ann Brown, Chairperson  
U.S. Consumer Product Safety Commission  
Washington, DC 20207-0001

Dear Chairperson Brown:

The Environmental Working Group (EWG), a non-profit research organization, and the Healthy Building Network (HBN), a non-profit advocacy organization, petition the Consumer Product Safety Commission (CPSC) to enact an immediate ban of chromated-copper-arsenate (CCA) treated wood for use in playground equipment and to begin a review of the safety of CCA-treated wood for general use, on grounds that the continued sale of these items violates provisions of the Federal Hazardous Substances Act and the Consumer Product Safety Act.

In 1990, the Consumer Product Safety Commission issued a study on the "Estimate of Risk of Skin Cancer from Dislodgeable Arsenic on Pressure Treated Wood Playground Equipment." The study concluded that the risks to children playing on manufactured playground equipment were small, but that "a possible hazard might be created when playground equipment is built with unfinished pressure-treated wood from retail sources." At the time, the CPSC declined to take any action against the use of CCA-treated wood in playground equipment. However, during the ten years since, many changes in scientific understanding have made clear that playground equipment and other wood treated with CCA poses imminent and unreasonable health risks to consumers, particularly children.

CPSC is urged to consider the following new information:

- A 1999 National Research Council (NRC) study which concluded that arsenic is a much more potent carcinogen than previously recognized, and a cause of other cancers such as bladder and lung cancer in addition to skin cancer.
- Research by the NRC and others since 1990 which has also shown arsenic to be an endocrine disruptor, and has linked arsenic ingestion to immune system suppression, increased risks of high blood pressure, cardiovascular disease, and diabetes.
- Numerous studies conducted since 1990 which have confirmed that significant quantities of arsenic can be dislodged from the surface of CCA-treated wood, that these levels are greater than what even the wood preservatives industry itself has determined to be safe, and that the cancer risk could be as great as 1 in 1,000.
- The 1990 CPSC study which examined the risks posed to children playing on manufactured playground equipment. However, subsequent studies show that playground equipment represents only a small fraction of the places where children may come into contact with treated wood – other places include, for

example, decks, railings, picnic tables, fences and docks. Another exposure pathway that has not been considered by the CPSC and other analyses is ingestion of arsenic-contaminated soil beneath CCA structures.

- There have been two important changes in the market for pressure treated wood used in children's play structures. First, "unfinished" pressure treated wood appears to be more widely used now in these applications. Second, alternatives to pressure treated wood (including composite "plastic lumber" and wood treated with less toxic treatment compounds) are now widely available and have proven performance.

From the weight of the evidence described in this petition, it is clear that the Consumer Product Safety Commission must take immediate action in order to protect American children from playground equipment that is hazardous to their health. In addition, it is clear that the CPSC must further take prompt action to assess the health threats to consumers posed by the general use of CCA-treated wood.

In this petition, EWG and HBN document that:

1. Arsenic is a more potent and broad-acting carcinogen than previously recognized, and a cause of other cancers such as bladder and lung cancer in addition to skin cancer.
2. Exposure to arsenic from CCA-treated wood is more significant than previously recognized.
3. The health risks from CCA-treated wood are more significant than previously recognized. Arsenic is an endocrine disruptor, and has also been linked to immune system suppression, increased risks of high blood pressure, cardiovascular disease, and diabetes.
4. Many exposure pathways besides manufactured playground equipment exist and need to be addressed.
5. Comparable, less toxic alternatives to CCA-treated wood exist.
6. The Consumer Product Safety Act and the Hazardous Substances Act require the CPSC to ban CCA for use in playground equipment and promptly review the safety of other uses.

## Background on CCA

Chromated copper arsenate (CCA) is a mixture of chromium, copper and arsenic used to protect wood from insect attacks and fungal decay. It is 22 percent arsenic by weight (Solo-Gabrielle et al. 2000). Recognized to pose unreasonable risks to workers and nearby residents, CCA has been banned by the EPA for all non-wood uses. (EPA 1993) CCA has also been banned for use as a wood preservative by several other countries. In the United States, however, CCA is by far the most common chemical used to produce "pressure-treated" lumber. In 1997, over 90 percent of the treated lumber, timbers, posts, and plywood, and about 75 percent of treated wood volume overall was produced with CCA (Solo-Gabrielle et al. 2000). In 1996, more than 144 million pounds of CCA was used to treat almost 460 million cubic feet of wood. (AWPI 1997) This corresponds to more than 30 million pounds of arsenic, making the United States the world's largest consumer. In fact, the U.S. wood treatment industry uses 50 percent of the arsenic produced worldwide. (USGS 1999) Between 1964 and today, an estimated 550 million pounds of arsenic have been put into pressure-treated wood.

## Background on Arsenic

The risks associated with CCA stem from arsenic exposure. When ingested or inhaled, arsenic is readily taken up by the body. But people may be completely unaware of their exposure since this toxic metal is tasteless, colorless and odorless. Arsenic causes a wide range of adverse health effects at high, moderate and low doses.

An ounce of arsenic is enough to kill 250 adults (ATSDR 2000). High levels that are not immediately deadly can cause nerve damage, vomiting, fatigue, diarrhea, nausea and the decreased production of red blood cells. Similar effects can also occur after long term ingestion (5 to 15 years) of arsenic at low to moderate levels. (NRC 1999) Recent research has also linked arsenic ingestion to immune system suppression, increased risks of high blood pressure, cardiovascular disease, and diabetes (NRC 1999).

Regulation concerning the exposure to arsenic in drinking water, however, has focused on the risk of cancer. The current drinking water limit for arsenic (MCL, or maximum contaminant limit) is 50 micrograms per liter (ug/L or ppb), which has been the standard since 1947. A new MCL of 10 micrograms per liter was proposed by the EPA under the Clinton administration, but was suspended by the Bush Administration for further review.

## **1. Arsenic is a more potent and broad acting carcinogen than previously recognized.**

Arsenic is classified by the EPA and the World Health Organization as a known human carcinogen. The association between arsenic ingestion and skin cancer has been recognized for more than a hundred years (ATSDR 2000). In 1990, the Consumer Product Safety Commission evaluated the risks of skin cancer from arsenic exposure through treated wood play structures. Over the past 10 years, however, the scientific picture of arsenic carcinogenicity has changed significantly.

In 1999, the National Research Council reviewed the growing body of evidence that arsenic was even more harmful than previously thought. They concluded that there are indisputable links to skin, bladder and lung cancer, and that there is some evidence to suggest links to kidney and liver cancer. These findings were based on human epidemiological studies in Taiwan, Chile, and Argentina where whole populations were exposed to arsenic in drinking water- notable because such extensive human data is rare (NRC 1999).

The NRC concluded that the current drinking water standard was not adequately protective of public health and “requires downward revision as promptly as possible.” In fact, NRC analyses showed that consuming arsenic at the current MCL (or 100 ug of arsenic a day) could lead to a cancer risk of 1 in 100 to 1 in 1,000 (NRC 1999). A Dartmouth College research team also found that arsenic acts as an endocrine disruptor at low concentrations: between 25 and 50 micrograms per liter (Kaltreider 2001).

Recent research has also shown that children metabolize arsenic differently, likely making them more susceptible to its harmful effects. Arsenic is metabolized through a process called methylation which converts the metal into a less toxic form which is easier to excrete. Methylation reduces the amount of time the body is exposed to arsenic’s toxic effects. Yet studies have shown that substantial variations exist in people’s ability to methylate arsenic, and that children are not able to convert arsenic into less toxic forms as readily as adults (NRC 1999). Furthermore, research has also shown that people with poor nutrition may be more susceptible to arsenic related health effects, meaning that low-income children may be especially at risk from treated wood (NRC 1999).

In light of this new information, it is clear that the question of the cancer risk posed by arsenic treated wood needs to be reevaluated by the CPSC. The cancer slope factor used by the CPSC, for instance, is 3 times lower than what is now used by the EPA (Roberts and Ochoa 2001).

## **2. Exposure to arsenic from CCA-treated wood is more significant than previously recognized.**

The 1990 CPSC study found detectable arsenic on only two of the seven play structure samples tested. However, most of these samples had previously been coated with an oil-based stain. Recent studies indicate that these findings may not be representative of the levels of arsenic that are dislodgeable from the

surface of CCA-treated play structures, decks and other structures that children and adults come into contact with on a daily basis.

A research team from the Connecticut Agricultural Experiment Station looked at arsenic levels on the surface of pressure treated wood boards and municipal play structures. Wipe samples of boards that are typically used for decking found a range of 6 to 122 ug of arsenic per 100 cm<sup>2</sup>, with an average of 40 ug/100cm<sup>2</sup> (Stilwell 1998). Wipes from horizontal boards of municipal play structures were found to have between 2 and 45 ug of arsenic per 100 cm<sup>2</sup>, and averaged 9 ug. Vertical poles were found to have much higher levels, ranging between 5 and 632 ug/100 cm<sup>2</sup>, with an average of 105 ug.

Two studies conducted in Canada found surface arsenic levels ranging from 0.05 to 42 micrograms of arsenic per 100cm<sup>2</sup>, and averaging 15 and 4.3 micrograms (HWC 1992, Galarneau et al. 1990). Sampling conducted by the Environmental Working Group on two municipal playstructures in California found levels of surface arsenic ranging from 118 to 132 micrograms per 100cm<sup>2</sup>.

These results are consistent with a study done by the California Department of Health Services (CADHS 1987) which found a range of 31 to 314 ug/100cm<sup>2</sup> on municipal play structures (no average given) and a mean arsenic level of more than 1000 ug/100cm<sup>2</sup> on a pier. CADHS has also been the only agency to date to look at the amount of arsenic children and adults get on their hands from touching pressure-treated wood. It found that volunteers who rubbed municipal playground wood for five minutes had an average of 236 ug of arsenic on their hands, with levels reaching up to 1,260 ug in one case.

A recent analysis commissioned by the Florida Department of Environmental Protection estimated the daily dose of arsenic associated with exposure to CCA-treated wood from different surface levels of arsenic found in the scientific literature (Roberts and Ochoa 2001). It found that a child might get a dose of 482 ug of arsenic a day if playing on a structure with surface levels of 632 ug of arsenic per 100 cm<sup>2</sup>, a dose of 76 ug a day if the structure had arsenic levels of 100 ug/100cm<sup>2</sup>, or a dose of 38 ug a day if surface arsenic levels were 50 ug/100cm<sup>2</sup>. This is consistent with the CADHS findings which estimate that a child might get a dose of between 24 and 630 ug of arsenic per visit to a play structure made of CCA-treated wood (CADHS 1987).

Taking the results from all studies which have looked at arsenic on the surface of playground equipment (a total of 7 studies and 122 samples), the mean surface arsenic level is 32 ug per 100 cm<sup>2</sup>. This has been estimated to correspond to a 24 ug dose of arsenic per day for children, just from playing on CCA-treated play structures (Roberts and Ochoa 2001).

By comparison, the U.S. Food & Drug Administration recently analyzed the typical ingestion of inorganic arsenic through food and found that a six year old child would be consuming an average of 4.6 ug of arsenic per day (Tao and Bolger 1998). Because 90 percent of drinking water systems in the U.S. have arsenic concentrations which are lower than 10 ug/L, and children age 4 through 6 drink an average of 0.45 liters of water a day, most children are ingesting less than 4.5 micrograms of arsenic per day from water (USGS 2000, EPA 2000).

The average child, therefore, is ingesting less than 10 ug of arsenic a day through food and drinking water. A child playing for just a few minutes on treated wood may easily get more arsenic on her hands than she would be ingesting daily from food and water for a day. This fact was recently recognized by the Connecticut Department of Public Health. In a 1998 publication titled "What you need to know about pesticides used in pressure treated wood," the agency states that "exposure from CCA-treated wood can be the major source of arsenic for children who frequently play on CCA-treated playscapes, treehouses, or decks" (CDPH 1998).

It has become evident that significant exposure to arsenic can occur from playing on or handling pressure-treated wood, that these exposures were not adequately assessed in the CPSC's previous analysis, and that these exposures could easily be in excess of those from food and drinking water.

### **3. The health risks from CCA-treated wood are more significant than previously recognized.**

In light of the attention that this issue has received in recent months, the Florida Department of Environmental Protection and the wood treatment industry have taken a new look at the health risks of arsenic in CCA-treated wood. Both studies indicate that the levels of arsenic present on the surface of treated wood put public health at risk.

Commissioned by the Florida Department of Environmental Protection, University of Florida researchers combined data from a number of previously conducted studies to estimate the cancer risk posed to children exposed to CCA-treated wood structures for 5 years during childhood. Including arsenic absorption from skin, and using up-to-date cancer risk assessment factors, they found that the cancer risk from children regularly touching CCA-treated wood ranged from 4 in 100,000 to more than 1 in 1,000 (Roberts and Ochoa 2001). These results are supported by previous work by the California Department of Health Services, which estimated that children faced an additional lifetime skin cancer risk of between 6 in 1,000 to 1 in 10,000 from playing on treated wood play structures (CADHS 1987). At the mean surface arsenic level found on play structures (32 ug/100 cm<sup>2</sup>), the researchers shows a cancer risk of 1 in 10,000 for children playing on treated wood for 5 years during childhood (Roberts and Ochoa 2001).

Even the wood preservatives industry's own studies have found that the amount of arsenic on the surface of wood is too high to be safe. Early in 2001, the American Wood Products Institute (AWPI) commissioned and publicized the results of a study to refute media attention showing CCA-treated lumber could be causing harm. In April, however, the industry admitted that the study contained a mathematical error which underestimated the risks by a factor of 1,000. Although the AWPI still maintains that the risks of CCA-treated wood are low, a memo explaining the adjusted values tell a different story (HSWMR 2001, attached). In calculating the amount of arsenic that should be allowed on the surface of wood, the AWPI analysis showed that to protect human health, arsenic levels should be 2 ug per 100 cm<sup>2</sup>, a level which is significantly lower than what wipe and hand samples have found.

Numerous cases where consumers have suffered arsenic poisoning from working with CCA-treated wood have also been documented, highlighting the fact that acute risk is present.

- The CADHS began investigating the risk of treated wood in playgrounds after workers building a pier in Monterey, California, developed arsenic poisoning from CCA-lumber in 1978.
- In 1983 a U.S. Department of Agriculture employee experienced internal bleeding followed by complete disability after building picnic tables with treated wood. He sued CCA manufacturers and won more than \$700,000 in settlement, discovering in the process that manufacturers had reports of illness from workers sawing treated wood as early as 1968.
- A Washington State schoolteacher was partially paralyzed for three months from arsenic poisoning after building a swimming dock made of wood treated with CCA and settled with manufacturers in 1992.
- A contractor in Bloomington, Ind., suffers from decreased mobility and endured multiple emergency room visits and hospitalizations after getting splinters in his shin while building a deck with treated wood in 1996.

It is becoming increasingly clear that CCA-treated wood presents greater health risks than previously recognized. Moreover, these risks warrant an emergency ban of CCA-treated wood use in playground equipment and an immediate assessment of the safety of treated wood for general use.

#### **4. Many exposure pathways besides manufactured playground equipment exist and need to be addressed.**

The 1990 CPSC study examined the risks posed to children playing on manufactured playground equipment. Other studies (e.g. CADHS 1987, Roberts and Ochoa 2001) examining the risks associated with arsenic ingestion from CCA-treated wood performed similar focused analyses. However, playground equipment represents only a small fraction of the places where children may come into contact with treated wood.

Pressure-treated wood is ubiquitous. Accounting for nearly a fifth of all softwood boards and timbers sold, treated wood is used not only for children's play structures, but also for decks, railings, picnic tables, fences, docks – basically anywhere wood is used outside. As previously described, almost all of this wood is treated with CCA and therefore is a potential source of arsenic exposure. It is easy to imagine a scenario where children would be coming into contact with treated wood many times during the day. Since kids have a tendency to put their hands in their mouths frequently (an average of 6 and up to 45 times per hour, according to a recent study), it is likely that kids would be ingesting arsenic from each of these sources (Zartarian 1997).

Another exposure pathway that has not been considered by the CPSC and other analyses is soil ingestion. CCA is known to leach from treated wood into the soil below. One study conducted in Connecticut, for example, found levels of arsenic up to 350 parts per million (ppm) and averaging 76 ppm under CCA-treated decks in place for 4 to 15 years. Soils a few meters away averaged only 3.7 ppm (Stilwell and Gorny 1997). Another study of treated wood structures in Florida found the soils underneath to contain up to 217 ppm of arsenic, with an average of 28.5 ppm, while control soils averaged 1.5 ppm (Townsend et al. 2001). The Canadian government found levels of arsenic up to 80 ppm and averaging 50 ppm under CCA treated playground equipment (HWC 1992). These findings have been confirmed by recent tests of soils under municipal play structures in Florida which have shown elevated arsenic levels.

Current analyses that overlook these alternate exposure pathways to arsenic from CCA-treated wood are critically underestimating the risks involved. It is clear that a comprehensive analysis needs to be conducted.

#### **5. Comparable, less toxic alternatives to CCA-treated wood exist.**

Safer alternatives to CCA have been used overseas for years and have been gaining acceptance in the U.S. This is a significant change since the EPA last reviewed CCA's registration in 1986, and since the CPSC assessed the safety of CCA treated manufactured play structures in 1990. Wood treated with one alternative chemical, ACQ, is only slightly more expensive than CCA-treated wood, and this price gap is expected to narrow in the future (EBN 2001). Few consumers, however, know of the dangers associated with CCA or the existence of less toxic alternatives.

The most widespread non-arsenic based wood preservative is ammonium copper quat (or ACQ) which is a mixture of copper and didecyl dimethyl ammonium chloride, commonly called quat. Approximately 60 million board feet of ACQ wood was sold in 1998, but a recent agreement by two major wood treatment companies is predicted to significantly expand the availability of ACQ-treated wood (Solo-Gabriele et al. 2000; EBN 2001). ACQ-treated wood is a light tan to olive color, has no detectable odor or vapor, can be painted or stained, and can be used anywhere CCA is used besides marine applications. It has been approved by the American Wood Preservers Association, and was also accepted by the International Conference of Building Officials in 1994 for inclusion in the Uniform Building Code.

Toxicological and ecotoxicological testing has shown that ACQ-treated wood has low mammalian toxicity, and unlike CCA, the chemical contains no EPA-listed compounds and no known or suspected carcinogens (Solo-Gabriele et al. 2000). Although copper (which is also in CCA) is known to be toxic to some aquatic life, quat is used in shampoos and many other human contact applications. Additional alternatives to CCA also

exist, including one other preservative that has been accepted by the International Conference of Building Officials. This chemical, copper boron azole or CBA, has been used extensively in Europe and Japan, but is relatively unknown in the US (Solo-Gabriele et al. 2000). Governor Jeb Bush has recently asked the Florida legislature to stop the use of CCA in the state's own wood treatment plants out of concern over arsenic. A number of wood treatment plants around the US have switched in recent years to using less toxic alternatives.

With comparable, less toxic alternatives already on the market, there is no reason why a lethal and carcinogenic compound should be used for treating wood children and adults are handling daily.

## **6. The Consumer Product Safety Act and the Hazardous Substances Act require the CPSC to ban CCA for use in playground equipment and promptly review the safety of other uses.**

The Consumer Product Safety Act authorizes the CPSC to enact a ban on products which pose “imminent and unreasonable risk of death, serious illness, or severe personal injury” where “no feasible consumer product safety standard would adequately protect the public from unreasonable risk of injury” (15 U.S.C. §2061(a)). The Federal Hazardous Substances Acts “imminent hazard” provision also authorizes a ban on hazardous products as a temporary remedy during the course of regulatory proceedings, such as a CPSC review (15 U.S.C. §1261(q)(2)).

Although the manifestations of arsenic exposure from CCA-treated play structures may not be immediately apparent – as in the ultimate development of cancer – the legal standard is imminent risk, not imminent injury. Recent research findings (e.g. Roberts and Ochoa 2001) make it clear that children are facing imminent risk in the form of greatly increased cancer risks as a result of playing on CCA-treated playground equipment. The development of a product safety standard is not an adequate response because the playground equipment purchased or constructed during the interim would expose thousands of children to unnecessary “imminent and unreasonable” risk for many years to come (as long as the playground equipment is in use).

The Consumer Product Safety Commission has the legal authority, under the Consumer Product Safety Act and the Hazardous Substances Act, to immediately ban CCA-treated wood for use in children's playground equipment while the Commission reviews the safety of all CCA-treated wood products. Any failure to do so will continue to jeopardize the health of millions of people, including children, from the harmful effects of arsenic exposure.

## Conclusion

This petition demonstrates the urgent need and clear legal authority for a CPSC-imposed ban on the use of CCA-treated wood for playground equipment and a new CPSC assessment of the safety of CCA-treated wood for general use. Recent research has shown that arsenic is more carcinogenic than previously recognized, that arsenic is present at significant concentrations on CCA-treated wood and in underlying soil, that the health risks posed by this wood are greater than previously recognized, and that past risk assessments were incomplete. Furthermore, the availability of comparable, less toxic alternatives make these risks unnecessary.

Sincerely,

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