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Arsenic-Treated Wood: Background and Overview

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Summary

Arsenic is a known human carcinogen. A preservative using chromated copper arsenate (CCA) has been the principal way to protect most commercially harvested wood from decay. Such wood has been used to build play structures, picnic tables, decks, gazebos, fences, and walkways. Arsenic and chromium can be released from the preserved wood. Since December 12, 2001, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Scientific Advisory Panel (SAP), a group designed to provide balanced expert assessment of pesticide-related issues to the Administrator of the U.S. Environmental Protection Agency (EPA) has recommended *inter alia* that CCA-treated wood be coated and recoated annually to reduce release of and exposure to arsenic, and that a biomonitoring study of children normally exposed to CCA-treated wood should be conducted. However, EPA does not believe there is any reason to remove or replace CCA-treated structures. On February 13, 2004, the SAP released its final report on EPA's draft preliminary probabilistic risk assessment of the potential risks to children associating with CCA-treated playsets and decks. The agency says it will carefully consider the SAP recommendations and revise the draft risk assessment as appropriate. On March 19, 2004, EPA announced in the *Federal Register* the availability of the Preliminary Risk Assessment for the Reregistration Eligibility Decision. This notice covered both occupational and environmental assessments. On May 27, 2005, EPA released preliminary results from studies that showed that all of the 12 commercially available sealants tested reduced dislodgeable arsenic from CCA-treated wood for up to 12 months of natural weathering. While sealing can reduce the amount of arsenic getting into children's skin, the EPA study results do not reveal the magnitude of that reduction. EPA has announced a timeline of major pending actions, including making available the final report of the sealant study (end of 2005), the CCA Probabilistic Risk Assessment (end of June 2006), and the CCA Reregistration Eligibility Decision (end of September 2006).

The wood treating industry, by January 1, 2004, voluntarily converted to nonarsenical preservatives for residential uses, including copper boron azole (CBA) and ammonia copper quaternary ammonia (ACQ), whose availabilities and costs are approximately those of CCA in the past. Labeling had been on all CCA products stating that no use of CCA would be allowed for the affected residential uses after December 31, 2003. Wood treated prior to that date can still be used in residential settings, and CCA-treated wood in extant built structures is not affected.

Disposal of extant CCA-treated wood, export and possible import of CCA-treated wood and wood products, determination of the best ways to reduce arsenic exposure from extant wood, and possible adverse effects from nonarsenic wood preservatives are continuing concerns.

Three bills (S. 337, H.R. 688, and H.R. 3629) were introduced in the 108th Congress prohibiting other uses of or studying alternatives to CCA-treated wood. There are no bills on arsenic-treated wood in the 109th Congress. This report will be updated as events warrant.

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Background

Beginning on January 1, 2004, the EPA no longer allowed use of chromated copper arsenate (CCA) to preserve wood intended for most residential uses: play structures, decks, picnic tables, landscaping timbers, residential fencing, gazebos, patios, and walkways. Wood treated prior to that date may still be used in residential settings, and CCA-treated wood in extant built structures is not affected. Meanwhile, the wood preservative industry has voluntarily converted to preservatives for residential wood uses that do not contain arsenic. While the EPA "does not believe there is any reason to remove or replace CCA-treated structures,"[1] arsenic is a known carcinogen in humans and any reduction in the levels of potential exposure to arsenic is desirable; the agency is continuing study of the entire range of CCA uses.

Disposal of extant CCA-treated wood, export and possible import of CCA-treated wood and wood products, determination of the best ways to reduce arsenic exposure from extant wood, and possible adverse effects from nonarsenic wood preservatives are continuing concerns.

Health Effects of CCA

High pressure was used to inject CCA into wood. While some people (such as construction workers, wood treaters, or firefighters) might touch, inhale, or ingest CCA itself or CCA-treated sawdust or smoke from fires, the largest concern was possible exposure of children to CCA, which slowly leaches from CCA-treated wood.[2]

Copper, an essential nutrient of relatively low toxicity, is the component in CCA causing the lowest level of concerns about safety or health. As such, EPA did not conduct an exposure or risk assessment for copper.

Chromium leaches from CCA-treated wood mostly as chromium III (CR(III)), one of a few forms of the element. There may be trace amounts of chromium VI

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[1] "Draft Preliminary Probabilistic Risk Assessment for Children Who Contact Chromated Copper Arsenate (CCA) Treated Playsets and Decks," which can be found at [http://www.epa.gov/pesticides/factsheets/chemicals/draft_cca_qa.htm].

[2] The amount and rate of leaching varies greatly, depending on many factors, such as local climate, acidity of precipitation and soil, age of the wood, concentration of CCA, amount of contact with skin, and degree of protective coating.

(CR(VI)), a more toxic form of the element. The rarity of CR(VI) in CCA leachate led EPA to conclude that the toxicity of CR(III) was the most appropriate toxicity endpoint. The low toxicity of CR(III) led EPA to conclude that it was unnecessary to present short-term, intermediate-term, or lifetime risks of exposure to CR(III).

Arsenic is a known human carcinogen and is acutely toxic. The degree of carcinogenicity and toxicity depends highly on degree and route of exposure. EPA has over several years been trying to assess the risk of exposure to arsenic from CCA-treated wood.

Wood Preservatives: Overview

Untreated lumber cut from most commercially harvested tree species is subject to attack by insects and marine organisms, or decay caused by fungi and bacteria. Decay or insect hazard generally is greatest where the wood is subjected to moisture, especially in hot and humid climates, or aquatic environments.

To protect untreated wood, the lumber is placed in cylinders filled with the preservative solution, and the preservative is pressurized until it penetrates the wood. Most commonly, copper (usually derived from recycled sources) from the preservative deposited in the wood renders it useless as a food source for termites and fungi. The American Wood Preservers Institute estimates that CCA increases the life of wood products exposed to the environment from 7 to 12 times, which is about 20 to 50 years (representing a significant reduction in need for replacement wood). By enabling wood to last longer, CCA-treated wood is better positioned to compete with stone, concrete, brick, or other long-lived building materials, expanding the market for wood.

The most common pressure-treated wood preservative has been CCA. More recently, copper boron azole (CBA) has been used. CBA was introduced in 1982 and does not contain arsenic. Introduced very recently, ammonia copper quaternary ammonia (ACQ), like CBA, provides arsenic-free protection to wood.[3] In the past, CCA was prevalent and low-cost. With the voluntary industry transition to nonarsenical wood preservatives, CBA and ACQ have become more widely available at a cost approaching that of CCA in the past. The industry saw a decline during 2002 in production of CCA products for residential uses of 25%, with a corresponding shift to alternatives. Labeling was required on all CCA products stating that no use of CCA would be allowed for the affected residential uses after December 31, 2003.

Cedar, redwood, plastics, metals, and concrete continue to be available as construction materials that do not require the use of wood preservatives. These wood and nonwood alternatives generally cost more than pressure-treated woods (up to twice the cost of pressure-treated woods).

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[3] Azole also is used as an antifungal drug in humans, e.g., fluconazole (Diflucan is a brand name for this compound) and ketoconazole (Nizoral is a brand name). Concern has been raised by some about the potential for azole compounds losing antifungal potency in humans because of its use in the environment.

As a way of recognizing the presence of CCA, while new and bare (i.e., unpainted or uncoated) CCA wood tended to have a green tint (caused by chemical reactions that took place between the wood and the preservative's ingredients), as a practical matter virtually all pressure-treated wood before 2004 was treated with CCA. There has been some interest in requiring labeling or banning of CCA wood already in use: Beyond Pesticides (a national environmental group) petitioned EPA in December 2001 to ban all residential uses of CCA; CPSC was petitioned in May 2001 by the Environmental Working Group and the Healthy Building Network to ban CCA wood for play structures.[4] On November 4, 2003, CPSC announced that it had denied the petition, noting that CCA manufacturers and EPA had previously agreed to phase out CCA treatment of wood for most consumer uses by the end of 2003.[5]

For regulatory purposes, wood preservatives are considered pesticides, and are regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Establishing maximum levels of pesticides in or on food, and regulating the sale, distribution, and use of pesticides in the United States, are the responsibilities of EPA under FIFRA. The agency also is responsible for ensuring that older pesticides continue to meet current science and regulatory standards. To this end, EPA reassesses the science and uses of older pesticides in a reregistration program, and determines whether changes are needed to ensure the safety of continued use of older pesticides (those initially registered before November 1, 1984). The agency presently is reassessing CCA under the reregistration program. In preparation, EPA is conducting two risk assessments: one focuses on workers (an occupational risk assessment), and the other focuses on children. A draft probabilistic risk assessment for children was released in November 2003 for scientific peer review.

On February 12, 2002, EPA announced a voluntary decision by industry to move away from CCA as a preservative of wood for consumer use, with the regulatory requirement of having only non-CCA pressure-treated wood manufactured for consumer use after December 31, 2003.

The agency describes its reregistration review process as having three major parts:

- *Reliance on Sound Science.* EPA reports that it is conducting a review of CCA-related public health and environmental studies, is consulting with other federal entities, and will use external peer review in its ongoing risk assessment.

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[4] EPA, the wood preservative industry, various consumer groups, and others agree that consumers should be informed of the presence of CCA wood preservative, especially so that steps are taken to limit exposure to CCA. Such steps include coating the wood, not burning the wood, not using the wood for kitchen countertops or where it may become a component of food, and properly disposing of sawdust and scraps. Some others hold that an outright ban is needed.

[5] *CPSC Denies Petition to Ban CCA Pressure-Treated Wood Playground Equipment*, News from CPSC, November 4, 2003. This notice can be found at CPSC's website: [http://www.cpsc.gov/CPSCPUB/PREREL/prhtml04/04026.html].

- *Involvement of Stakeholders.* The agency reports working closely with wood treaters, CCA product registrants, retailers, other federal entities, trade associations, and public interest groups, and consulting with foreign and state governments[6] that have taken regulatory actions on CCA to understand their scientific assessments and reasons for their regulatory standards.

- *Participation by the Public.* EPA reports that by making its assessments public, opening comment periods, and conducting public meetings, it seeks to maintain open dialogue with the public, toward the goal of comprehensive and balanced regulatory decisions.

The agency reports that it was especially concerned about two major issues relating to CCA-treated wood: making CCA safety and health information readily available to consumers, and determining the potential risks to children from play structures treated with CCA. EPA started an assessment early in 2001 focused on the potential exposure of children to CCA-treated wood play structures.

By early 2001, the agency was concerned that its consumer awareness program, which was started in 1986, was not informing the public as well as intended. EPA therefore met in summer 2001 with representatives of the wood preservative industry, registrants (makers or users of CCA registered with EPA), major retailers, and public interest groups to expand the CCA consumer awareness program, which included labeling on all pieces of CCA-treated lumber, in-store displays, and additional information packets available to the public.

By May 30, 2001, EPA's Office of Pesticide Programs (OPP) had developed an internal draft assessment of risks associated with CCA-treated wood. The Scientific Advisory Panel met in October 2001 to discuss issues related to children's exposure to CCA from wood, and on February 12, 2002, the agency announced the voluntary action by industry to move away from CCA preservatives.

Recommendations of an Independent Panel

FIFRA, as amended by the Food Quality Protection Act of 1996, provides for the establishment of the FIFRA Scientific Advisory Panel (SAP) to provide advice, information, and recommendations to EPA's Administrator regarding the impact on health and the environment of pesticide-related regulatory actions. The SAP provides scientific peer review of the EPA Office of Pesticide Programs, and is designed to provide balanced expert assessment of pesticide-related issues. SAP

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[6] Differences exist among some state and foreign governments in the ways they regulate use and disposal of CCA wood. California, for example, requires that all CCA-treated public play structures be coated. And while most states allow CCA-treated wood to be handled similarly to other discarded wood products, Minnesota does not. Switzerland, Vietnam, and Indonesia have banned arsenic-treated wood, while Japan, Denmark, Sweden, Germany, Australia, and New Zealand have either restricted it or proposed restrictions. Differences also exist as to what types of products may be made of CCA-treated wood.

members were chosen because of their expertise. Following an open meeting in October 2001, the SAP reported recommendations in a memorandum in December 2001 to the Director of EPA's Office of Pesticide Programs. The SAP's report was not reviewed for approval by EPA, and does not necessarily represent the views of the agency, or of any other agencies in the federal government. EPA received the recommendations and has reported that it has considered them. The panel offered several conclusions and recommendations, including the following.[7]

- While the SAP noted the need for additional studies (especially of performance of different types and brands of coatings), the panel found the evidence already sufficiently strong to recommend that EPA should inform the public that certain coatings can substantially reduce the amount of CCA that can be leached or dislodged from wood. Reductions of 70% to 95% in dislodgeable arsenic were seen in CCA wood with coatings such as polyurethane, and subjected to natural weathering.

- The SAP found no evidence that water repellents added directly to the CCA treatment solution reduced the amount of leachable or dislodgeable CCA.

- While the panel to that point found no evidence that any particular coating was clearly superior or inferior to any other, confidence was highest for polyurethane, as it resulted in 70% to 95% reduction in dislodgeable arsenic in a well-controlled field study, a "real-world" application allowing for effects of use, and a short-term controlled laboratory study.

- The SAP recommended a reapplication of a coating every year, although polyurethane still provided up to 95% reduction after two years of exposure.

- A biomonitoring study of children normally exposed to CCA-treated play structures should be conducted, with the goals of clarifying the magnitude of exposure of children to arsenic and possibly chromium from play structures, and to help support development of a probabilistic exposure assessment.

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[7] FIFRA Scientific Advisory Panel Meeting, October 23-25, 2001, held at the Sheraton Crystal City Hotel, Arlington, Virginia, "Preliminary Evaluation of the Non-dietary Hazard and Exposure to Children from Contact with Chromated Copper Arsenate (CCA)-treated Wood Playground Structures and CCA-contaminated Soil," SAP Report No. 2001-12. Available at [http://www.epa.gov/oscpmont/sap/meetingindex.htm].

Scientific Peer Review of Draft Risk Assessment

On November 13, 2003, EPA released its draft preliminary probabilistic risk assessment for children exposed to CCA-treated wood. The agency released the draft for scientific peer review. EPA convened its SAP on December 3-5, 2003, to seek expert independent scientific advice on the data and methodology used in the draft risk assessment. Public comments were made during the SAP meeting.[8] The agency on February 12, 2004, announced the availability of the SAP's report on the draft preliminary probabilistic risk assessment. EPA said it "will carefully consider the SAP recommendations[9] and revise the draft risk assessment as appropriate."[10] On March 19, 2004, EPA announced in the *Federal Register* the availability, for comments, of the Preliminary Risk Assessment for the Reregistration Eligibility Decision. This notice covered both the occupational and environmental assessments. On May 27, 2005, EPA released preliminary results from studies which showed that all of the 12 commercially available sealants tested reduced dislodgeable arsenic from CCA-treated wood for up to 12 months of natural weathering.[11] Michael Shannon, M.D., chair of the American Academy of Pediatrics' Committee on Environmental Health, agreed that "a sealant can cut down on the arsenic that gets into children's skin, but no one knows by how much."[12]

EPA announced on its website the following timeline of major pending CCA actions:[13]

- December 31, 2005 — announce availability of sealant study final report.
- June 30, 2006 — announce availability of the CCA Probabilistic Risk Assessment.

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[8] FIFRA Scientific Advisory Panel Previous Meetings, available at [http://www.epa.gov/oscpmont/sap/meetingindex.htm].

[9] The recommendations relate to the completeness, clarity, assumptions, mathematical manipulations, and documentation of computer models used in the assessment, and to a proposed biomonitoring pilot study. SAP Meeting Minutes No. 2003-04, FIFRA SAP Meeting, December 3-5 2003, *A Set of Scientific Issues Being Considered by the Environmental Protection Agency Regarding Draft Preliminary Probabilistic Exposure and Risk Assessment for Children Who Contact CCA-Treated Wood On Playsets and Decks And CCA-Containing Soil Around These Structures.*

[10] See [http://www.epa.gov/oscpmont/sap/2003/index.htm].

[11] *Questions and Answers on CCA-Treated Wood Sealant Studies (Interim Results),* United States Environmental Protection Agency. This is available at EPA's website: [http://www.epa.gov/oppad001/reregistration/cca/timeline.htm].

[12] *Poison on the Playground? Arsenic-Treated Wood Structures Raise Concerns,* MedPage Today, August 9, 2005. This is available at MedPage Today's website: [http://www.medpagetoday.com/PublicHealthPolicy/EnvironmentalHealth/tb/1509].

[13] *Chromated Copper Arsenate (CCA): Timeline of Major CCA Actions,* U.S. Environmental Protection Agency, May 27, 2005. This information is available at EPA's website: [http://www.epa.gov/oppad001/reregistration/cca/timeline.htm].

- September 30, 2006 — announce availability of the CCA Reregistration Eligibility Decision.

Disposal Issues

The Resource Conservation and Recovery Act (RCRA) *inter alia* requires certain solid wastes (hazardous wastes) to be managed more stringently, owing to potential risks to human and environmental health. According to the group Beyond Pesticides, some CCA wood fails EPA's Toxicity Characteristic Leaching Procedure, which simulates conditions in a landfill.[14] Further, some CCA wood leaches arsenic "many times above the U.S. primary drinking water standard" under EPA's Synthetic Precipitation Leaching Procedure, which simulates leaching by rainwater.[15]

While research is ongoing to more fully characterize leaching under more conditions, Beyond Pesticides petitioned EPA on July 22, 2002, to require that CCA wood be considered hazardous and disposed only in landfills with hazardous waste management permits. A hazardous waste landfill has a double liner, leachate and gas collection systems, and piping of leachate to a wastewater treatment plant. In 1980 EPA exempted CCA wood from hazardous waste status. As such, unless a state says otherwise,[16] CCA wood may be disposed like other wood waste — for example, it may be put into construction and demolition landfills, or burned in waste-to-energy facilities, or made into mulch.

If the wood were now to be reclassified as hazardous, especially with the projected growth in disposal of CCA wood, concerns would exist regarding increased costs, availability of sufficient hazardous waste management facilities, and illegal dumping.

While EPA continues to exempt CCA wood from hazardous waste status, the agency says that treated wood should never be burned in open fires, fireplaces, or stoves, food should not come into direct contact with the wood, hands should be thoroughly washed after contact with wood, wood should be coated on a regular basis, nonarsenical alternatives be considered, and EPA's Consumer Safety Information Sheet precautions should be followed.[17]

Legislative Proposals

The following bills relating to arsenic in wood were introduced in the 108th Congress.

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[14] See [http://www.beyondpesticides.org/wood/media/rcra_petition_7_22_02.htm].

[15] "Good Wood Gone Bad," *Waste Age*, August 2001, p. 42, at [http://www.wasteage.com].

[16] Minnesota has not adopted the exemption. *Waste Age*, ibid.

[17] See [http://www.epa.gov/oppad001/reregistration/cca/cca_consumer_safety.htm].

- S. 337, the Arsenic-Treated Residential-Use Wood Prohibition Act, would, *inter alia*, amend FIFRA to prohibit the use of arsenic-treated lumber as mulch or compost. This bill was referred to the Committee on Environment and Public Works on February 10, 2003.

- H.R. 688, the Wood Preservation Safety Act of 2003, would direct the Secretary of Agriculture to conduct a study of the effectiveness of silver-based biocides as an alternative treatment to preserve wood. This bill was referred to the Committee on Agriculture, and to the Committee on Resources, on February 11, 2003. Executive Comment was requested from the Department of Interior and from the United States Department of Agriculture.

- H.R. 3629, the Arsenic-Treated Wood Prohibition Act, is similar to S. 337. This bill was referred both to the Subcommittee on Conservation, Credit, Rural Development and Research of the Agriculture Committee, and to the Subcommittee on Environment and Hazardous Materials of the Energy and Commerce Committee, on November 21, 2003.

There are no bills on arsenic-treated wood in the 109th Congress.