# CCA-TREATED WOOD GETS A LOT OF ATTENTION IN FLORIDA!

Solid waste managers take on the world's undesirables every day, but in doing so, a potential bomb – chromated copper arsenate (CCA)-treated wood – is waiting to drop on the industry. In approximately 15 years, the amount of CCA-treated wood headed for disposal is expected to peak. And like an unwelcome mother-in-law, over time, the effects of arsenic leaching from the wood could wind up being a nagging problem.

CCA-treated wood recently has received much attention over soil and water contamination from structures made from this common building material; the possible effects on those working with the wood; and the potential danger to children who play on treated wood structures. These issues continue to unfold.

However, for the past five years, a team of researchers led by Helena Solo-Gabriele of the University of Miami, Fla., and Timothy G. Townsend of the University of Florida, Gainesville, with funding from the Florida Center for Solid and Hazardous Waste Management, a state-wide research center located at the University of Florida, have been studying the implications of the material's disposal.

"The research has been good and quite strong, and there is a bona fide concern," say Bill Hinkley, chief of the bureau of solid and hazardous waste for the Florida Department of Environmental Protection (FDEP), Tallahassee. While all aspects of CCA-treated wood use currently are facing scrutiny in the state, Florida research primarily has focused on the effects of discarded CCA-treated wood.

Preserved or treated wood is a common component of the solid waste stream. A 1998 U.S. Environmental Protection Agency (EPA) study estimated that 136 million tons of building-related construction and demolition (C&D) debris were generated in 1996, with wood representing the largest component. According to the report, approximately 500 wood processing facilities in the United States derive wood from C&D.

Common U.S. wood preservatives include creosote and pentachlorophenol. But the predominant preservative used today is CCA, which introduces concentrations of copper, chromium and arsenic to the wood. CCA solutions vary among wood treaters, but there are three typical formulations, as defined by the American Wood Preservers Institute (AWPI), Fairfax, Va. Of types A, B and C, C is most commonly used. The concentration of CCA remaining in the wood after treatment is rated in pounds of CCA per cubic foot of wood, defined as the standard retention value.

Typical CCA-treated wood applications include telephone poles, fence posts, decks, and components of home construction. At low retention values, CCA-

treated wood maintains a natural look and can easily be painted. CCA also produces no smell or vapor.

The AWPI estimates that CCA increases the life of wood products exposed to the environment approximately seven to 12 times to 20 to 50 years, preserving millions of trees annually. But for many wood product applications, appearance more than performance dictates the material's actual life-span.

CCA treated wood was not widely used until the early 1970s, at which time it represented less than 15 percent of the treated wood market. Today CCA-treated wood represents nearly 80 percent of the market, with more than 450 million cubic feet currently being sold in the United States, according to Florida research. Approximately 6.5 billion board feet are treated each year, says Scott Ramminger, AWPI president.

With the product's recent increase in use and long service life, most of the material is presumed to still be in service. The amount of CCA-treated wood entering the waste stream will not peak until 2015.

Regardless of when the wood reaches its maximum disposal point, the issue, at least in Florida, is causing concern. Particularly, CCA's status under U.S. federal hazardous waste regulations, current disposal practices, and future management and product options are being questioned.

Current U.S. hazardous waste regulations require certain solid wastes to be managed more stringently because of potential human health and environmental risks. These hazwastes must comply with more controlled regulations regarding storage, transport, treatment and disposal. Both elevated levels of arsenic and chromium can result in a solid waste being classified as a toxicity characteristic hazardous waste.

Toxicity characteristic leaching procedure (TCLP) results of newly CCA-treated wood at the lowest retention levels show that arsenic leaches at concentrations greater than the toxicity characteristic limit (5 milligrams per liter (mg/l), more than half the time, Florida research says. However, data on older, weathered wood appears to be less available. Research currently is being conducted on weathered wood, but data is not yet available, Townsend says.

However, discarded CCA-treated wood, among other materials, is exempt from the regulations. Part 261.4 of the Code of Federal regulations exempts: "Solid waste which consists of discarded arsenical-treated wood or wood products which fails the test for the Toxicity Characteristic for Hazardous Waste Codes D004 through D017 and which is not a hazardous waste for any other reason if the waste is generated by persons who utilize the arsenical-treated wood and wood product for these materials' intended end use." As a result, most states handle CCA-treated wood similarly to other discarded

wood products. However, one state, has not adopted this exemption in its state hazardous waste program.

Because of the hazwaste exemption, CCA-treated wood in Florida, and possibly in other states, is going into unlined C&D landfills; being burned at WTE facilities, which increases the ash's metal concentration; and is inadvertently being recycled into mulch.

"Are we properly disposing of this wood?" questions FDEP's"s Hinkley. "For the most part, according to the exemption, we are. And the CCA fraction right now isn't that much. But CCA-treated wood reaching disposal is projected to rise to 35 percent of the wood waste stream, and then all of a sudden this venerable wood is going into disposal – and fast. In 20 years, we'll have created a concentrated pile of CCA-treated wood that leaches arsenic."

In rainwater leaching tests – using the U.S. EPA's synthetic precipitation leaching procedure (SPLP) – CCA-treated wood leaches arsenic many times above the U.S. primary drinking water standard of 50 parts per billion (ppb). New CCA-treated wood exposed to rainwater leaches approximately the same amount of arsenic as that leached using the TCLP.

Additionally, C&D waste landfills simulated in the laboratory and field that contain CCA-treated wood have been found to leach arsenic. Arsenic concentrations in some leachates were greater than the arsenic drinking water standard, which serves as Florida's Class I groundwater standard.

Recycling presents its own set of challenges. Florida is home to a large number of C&D waste recycling facilities that accept mixed loads of C&D debris, then separate the components for reuse. Wood, the largest component by volume, is recovered for biomass fuel and landscape mulch.

Red mulch is very popular in "Florida, Hinkley says. To create the mulch, producers chop a 1-inch chip from a mixed wood stream, which includes C&D wood waste, untreated lumber, oriented strand board (OSB) and particle board, then dye it for decorative or commercial landscaping use. "The red mulch is taking the place of cypress mulch, which is great as a recycling issue because recovered wood is serving as a replacement for indigenous trees." However, CCA-treated wood sometimes is found in this mix.

When chipped into mulch, the arsenic leaching potential of CCA-treated wood increases dramatically because the material is spread around and the surface area-to-mass ratio increases, the research states. This widens the possibility of soil or groundwater contamination.

"I hasten to add that making mulch from treated or painted wood is not legal," Hinkley says. "It should not be occurring under the law." But when wood goes to a recycler, in some cases identifying the wood is difficult.

Samples collected from Florida C&D waste recycling facilities in 1997 found an average 6 percent CCA wood content in chipped wood piles. More recent field sorts of wood piles have found treated wood concentrations ranging from 9 percent to 30 percent.

Thus, CCA-treated wood presents recycling difficulties. Research indicates that the presence of 5 to 6 percent CCA wood in wood fuel can cause the ash to be a hazardous waste. An even smaller amount of CCA wood causes arsenic to leach from wood mulch at levels higher than allowable in landfills. And if the fraction of CCA is greater than 1 percent by weight in mulch, it will leach arsenic in concentrations that exceed the 50 parts per billion allowable under the safe water drinking act. Townsend says.

Additionally, The Connecticut Agricultural Experiment Station, New Haven, has researched CCA uptake by edible plants and found that romaine lettuce and the plant family that includes vegetables such as mustard and collard greens accumulate arsenic in their leafy parts. "The concern is that some people are using these decorative mulches in gardens," which could potentially affect human health, Hinkley says.

Florida researchers have conducted a simulation to determine the effects of combusting CCA-treated wood in Florida's WTE facilities. Assuming all discarded CCA-treated wood was disposed in Florida's WTE facilities starting in 2000, the simulation shows that the total mass of ash does not increase significantly, but the concentration of arsenic does. In 2000, the concentration increases five times from 35 milligrams of arsenic per kilogram of ash (mg/kg) to 177 mg/kg. The arsenic concentration in the ash then increases yearly. This pattern follows the same trend as the amount of CCA-treated wood being discarded. By 2016, the arsenic concentration in the WTE ash in the simulation reaches 940 mg/kg, an increase of 25 times.

"We're in a conundrum," Hinkley says. There are options to choose from – WTE, disposal, recycling or waste minimization – but each has its limitations.

Burning the wood concentrates the metals. Disposing of the wood in landfills where it could leach arsenic potentially contaminates groundwater or increases leachate management costs. Reuse is the most obvious recycling option. For example, a utility that uses CCA wood telephone poles could give the material to a farmer to build a barn or fence. However, utilities are beginning to become aware of the potential liability of giving these materials away, so fewer businesses want to do so, Hinkley says.

Additionally, there are limits to reuse because people frequently get rid of CCA-treated wood because it doesn't look good anymore. If the wood is not aesthetically pleasing, other people may not want to reuse it, Hinkley adds.

As another recycling option, the wood could be chipped then pressed into engineered wood products, such as OSB. But no one currently is producing

treated engineered wood products. The AWPI is sponsoring research at Louisiana State, Baton Rouge, to test the feasibility of recycling CCA wood into strand board. But businesses that create untreated engineered products have expressed reluctance to mix in CCA-treated wood because it has other properties than their typical wood mixture and presents a liability, Townsend says.

Florida research argues that CCA-treated wood could be difficult to separate out at the disposal site. New CCA-treated wood takes on a greenish tint that increases in intensity the greater the retention level, making the wood easy to distinguish from new, untreated wood. But when exposed to sun and rain, the treated wood surface often turns a similar color as weathered, untreated wood. This is especially true for species such as Southern Yellow Pine. Once treated and untreated wood commingle, they can be very difficult to distinguish from one another, say Solo-Gabriele and Townsend.

“Yes it’s true some wood is difficult to distinguish by color,” Hinkley says, “but there’s another way to approach this.” C&D recyclers could pull out CCA-treated wood based on its use.

Even given separation’s feasibility, sorting CCA wood from other C&D debris relies on education and compliance.

Fortunately, other products are available. There are arsenic- and chromium-free wood preservatives, such as alkaline copper quat (ACQ). One focus of the ongoing Florida research is what impact these other water-borne preservatives have. Obviously there are no benefits to switching if 30 years down the road the industry realizes that these chemicals pose a different problem, Townsend says.

An ever better choice, at least for the waste industry, is plastic lumber, which is comprised of recycled plastics such as drink bottles.

“The good news is that this is a fascinating issue and we’re moving in a good direction in terms of replacing CCA-treated wood,” Hinkley says. “On the disposal side, the industry is beginning to recognize the big picture of concerns, and steps will have to be taken, for example, keeping it out of mulch. Ash will have to be tested and monitored and possibly taken to a lined landfill, and we’ll have to look at the exemption to determine whether it should continue to go to an unlined C&D landfill.

“Unfortunately, this could cause considerable expense,” Hinkley continues. “But do we wait until it’s too late or handle it now? If we wait until we get hit in groundwater detection wells, it’ll be 20 years down the road, and we won’t have any choices. We know enough from other contaminated sites that if you’re forced into pump and treat remediation, cleanup is very costly. So we’re looking at this as an ounce of prevention is a pound of cure.”

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