NOSB NATIONAL LIST
FILE CHECKLIST

CROPS

MATERIAL NAME: **#17 Pressure Treated Lumber**

✓ **NOSB Database Form**

✓ **References**

✓ **MSDS (or equivalent)**

✓ **TAP Reviews from:** **Chris Milne, Eric Sideman, and Sam Cotner**

NOSB/NATIONAL LIST
COMMENT FORM
CROPS

Material Name: #17 Pressure Treated Lumber

Please use this page to write down comments, questions, and your anticipated vote(s).

COMMENTS/QUESTIONS:

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1. In my opinion, this material is:
_____ Synthetic _____ Non-synthetic.

2. This material should be placed on the proposed National List as:
_____Prohibited Natural _____Allowed Synthetic.

TAP REVIEWER COMMENT FORM for USDA/NOSB

Use this page or an equivalent to write down comments and summarize your evaluation regarding the data presented in the file of this potential National List material. Complete both sides of page. Attach additional sheets if you wish.

This file is due back to us by: August 29, 1995

Name of Material: Pressure Treated Lumber

Reviewer Name: CHRIS MILNE

Is this substance Synthetic or non-synthetic? Explain (if appropriate)

SYNTHETIC

If synthetic, how is the material made? (please answer here if our database form is blank)

This material should be added to the National List as:

X **Synthetic Allowed** ___ **Prohibited Natural**

or, ___ **Non-synthetic (This material does not belong on National List)**

Are there any use restrictions or limitations that should be placed on this material on the National List?

No new use of CCA-treated wood for replacement or new structures should be allowed (See Attachment OFPA criteria #7)

Please comment on the accuracy of the information in the file:

OK

Any additional comments? (attachments welcomed)

See Attachment

Do you have a commercial interest in this material? ___ **Yes;** X **No**

Signature Christopher Milne **Date** 8/23/95

CHRIS MILNE

Please address the *7* criteria in the Organic Foods Production Act:
(comment in those areas you feel are applicable)

(1) the potential of such substances for detrimental chemical interactions with other materials used in organic farming systems;

N/A

(2) the toxicity and mode of action of the substance and of its breakdown products or any contaminants, and their persistence and areas of concentration in the environment;

N/A

(3) the probability of environmental contamination during manufacture, use, misuse or disposal of such substance;

N/A

(4) the effect of the substance on human health;

See Attachment

(5) the effects of the substance on biological and chemical interactions in the agroecosystem, including the physiological effects of the substance on soil organisms (including the salt index and solubility of the soil), crops and livestock;

N/A

(6) the alternatives to using the substance in terms of practices or other available materials; and

N/A

(7) its compatibility with a system of sustainable agriculture.

See Attachment

COPPER CHROMIC ARSENATE

OFPA CRITERIA
(4) Arsenic: long-term ingestion of arsenic can result in decreased production of red blood cells and white blood cells, abnormal heart function, blood vessel damage, liver and kidney damage, impaired nerve function, and precancerous skin abnormalities. Epidemiological studies indicate that a dose-response relationship exists between the levels of arsenic in drinking water and the prevalence of skin cancers in exposed populations. Excessive mortality rates due to arsenic-induced skin cancer have also been observed in vineyard workers with dermal and inhalation exposures. Chromium: exposure to hexavalent chromium can cause chronic ulceration and perforation of the nasal septum and skin surfaces. Allergic skin reactions to chromated compounds have occurred independent of dose. Chromates are also carcinogens at occupational exposure levels.

(7) Allowing continued current use would be incompatible with principles of sustainable agriculture. The industry most burdened economically by such an action is also the one whose workers would benefit most from lessening of exposure. It would seem inconsistent with the principles of organic farming and hence sustainable agriculture to knowingly continue to expose farm workers to a severe toxicant while adding to the overall environmental burden of these carcinogens for the general population as well. I would suggest that all renovations and new structures use materials other than CCA pressure-treated wood.

REFERENCES

ATSDR CASE STUDIES IN ENVIRONMENTAL MEDICINE: ARSENIC TOXICITY, U.S.Department of Health & Human Services, Public Health Service, Agency for Toxic Substances & Disease Registry, June 1990.

Manahan, Stanley E., TOXICOLOGICAL CHEMISTRY: A GUIDE TO TOXIC SUBSTANCES IN CHEMISTRY, 1989, Lewis Publishers, Inc.

Klaassen, Curtis D. et al, editors, CASARETT AND DOULL'S TOXICOLOGY, 3rd Edition, 1986, Macmillan Publishing Co.

TAP REVIEWER COMMENT FORM for USDA/NOSB

Use this page or an equivalent to write down comments and summarize your evaluation regarding the data presented in the file of this potential National List material. Complete both sides of page. Attach additional sheets if you wish.

This file is due back to us by: Sept 2, 1995

Name of Material: Pressure Treated Lumber

Reviewer Name: Eric Sideman

Is this substance Synthetic or non-synthetic? Explain (if appropriate) Synthetic

If synthetic, how is the material made? (please answer here if our database form is blank)

This material should be added to the National List as:

____ **Synthetic Allowed** ____ **Prohibited Natural**

or, ____ **Non-synthetic (This material does not belong on National List)**

Should not be permitted

Are there any use restrictions or limitations that should be placed on this material on the National List?

CCA treated Lumber should not be permitted in the vicinity of organic crops

Please comment on the accuracy of the information in the file: Good

Any additional comments? (attachments welcomed)

A 1992 paper* confirms that the metals leach from CCA wood, are taken up by plants, and are toxic to snails. The work was done in an aquatic environment but the extrapolation is not unreasonable. Metals from CCA Lumber will enter the environment and will be taken up by crops.

Do you have a commercial interest in this material? ____ **Yes;** ✓ **No**

Signature _____ **Date** _____

Please address the 7 criteria in the Organic Foods Production Act:
(comment in those areas you feel are applicable)

(1) the potential of such substances for detrimental chemical interactions with other materials used in organic farming systems;

(2) the toxicity and mode of action of the substance and of its breakdown products or any contaminants, and their persistence and areas of concentration in the environment;

the Metals that leach from CCA lumber are persistant. Plant uptake is minimal, but, as the attached paper illustrates, can be enough to kill certain organisms.

(3) the probability of environmental contamination during manufacture, use, misuse or disposal of such substance;

the sawdust is very dangerous

(4) the effect of the substance on human health; A discussion of this continues, but there is certainly no conclusion that it is safe. Even if it were, which it is likely to not be, the CCA lumber should not be permitted because of its potential risks to the soil biota.

(5) the effects of the substance on biological and chemical interactions in the agroecosystem, including the physiological effects of the substance on soil organisms (including the salt index and solubility of the soil), crops and livestock;

the attached article, although not from an agronomic system, clearly shows that plants can pick up leachates and invertebrates feeding on the plants are killed. This does not sound like something that should be part of an organic system

(6) the alternatives to using the substance in terms of practices or other available materials; and

using naturally resistant wood such as cedar or locust is perfectly reasonable.

(7) its compatibility with a system of sustainable agriculture.

No compatibility

J. Exp. Mar. Biol. Ecol., 161 (1992) 189–199

JEMBE 01812

Transfer of contaminants from CCA-treated lumber to aquatic biota

Judith S. Weis [a] and Peddrick Weis [b]

[a] *Department of Biological Sciences, Rutgers University, Newark, New Jersey, USA;* [b] *Department of Anatomy, New Jersey Medical School, University of Medicine and Dentistry of New Jersey, Newark, New Jersey, USA*

(Received 16 December 1991; revision received 27 January 1992; accepted 3 March 1992)

Abstract: Green algae, *Ulva lactuca* (L.) and *Enteromorpha intestinalis* (L.), were collected from bulkheads made of wood treated with chromated copper arsenate (CCA). Control algae were collected from nearby rocks. Metal levels in the *Ulva* and *Enteromorpha* from the CCA dock were elevated substantially over control levels. Snails, *Nassarius obsoletus* (Say), collected from an area distant from CCA-wood, were placed with control or experimental *Ulva* or *Enteromorpha*. Snails feeding on experimental *Ulva* retracted into their shells and lay inactive on the bottom of the containers, a process that preceded death. Snails eating *Enteromorpha* followed. By 4 wk, all the experimental snails were retracted or dead, while all control snails remained active. Thus, metals in the treated wood are taken up by attached algae, and can be toxic to grazing herbivores. Oysters, *Crassostrea virginica* (Gmelin), were collected from a CCA dock, a bulkhead in a canal lined with CCA wood, and rocks (reference site). Animals from the single dock had elevated Cu, and those from the bulkhead had 12 times the reference levels of Cu, and significantly elevated As. Fiddler crabs, *Uca pugilator* (Bosc) and *U. panacea* (Salmon), were collected from burrows close to or distant from CCA-treated wood structures and were analysed for metal content. Those living near CCA wood had elevated metal content, as did the sediments in which they resided. This indicates that sediments, which can adsorb contaminants leached from CCA wood, are a route of exposure of benthic biota to these contaminants.

Key words: Alga; As; Cr; Crab; Cu; Oyster; Snail; Wood

Introduction

To prevent rot, wooden structures placed into the marine environment are often preserved with chemicals. A very common wood preservative for bulkheads and docks is chromated copper arsenate, or CCA, which is pressurized into the wood, giving it a green color. The process of preserving wood with these elements is called "Wolmanizing", and generally uses oxides (CrO_3, CuO, and As_2O_5). While wood designed to be placed on land generally receives 0.4 lb/ft^3, wood designed for marine use receives 1.5 lbs/ft^3, or, in some areas, 2.5 lbs/ft^3. While each of the three elements are known to be toxic to aquatic biota, there has been little work on effects of treated wood in the estuaries into which it is so often placed. While the Environmental Protection Agency has jurisdiction over pressure-treated wood products under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), it has done little to regulate

Correspondence address: J.S. Weis, Department of Biological Sciences, Rutgers University, Newark, NJ 07102, USA.

TAP REVIEWER COMMENT FORM for USDA/NOSB

Use this page or an equivalent to write down comments and summarize your evaluation regarding the data presented in the file of this potential National List material. Complete both sides of page. Attach additional sheets if you wish.

This file is due back to us by: September 11, 1995

Name of Material: Pressure Treated Lumber

Reviewer Name: Sam Cotner

Is this substance Synthetic or non-synthetic? Explain (if appropriate)

If synthetic, how is the material made? (please answer here if our database form is blank)

This material should be added to the National List as:

✓ **Synthetic Allowed** ____ **Prohibited Natural**

or, ____ **Non-synthetic (This material does not belong on National List)**

Are there any use restrictions or limitations that should be placed on this material on the National List?

No

Please comment on the accuracy of the information in the file:

Any additional comments? (attachments welcomed)

Do you have a commercial interest in this material? ____ **Yes;** ✓ **No**

Signature Sam Cotner **Date** 9/6/95

NOSB Materials Database

Identification

Common Name **Pressure Treated Lumber** **Chemical Name** Copper Chromic Arsenate

Other Names Chromated Copper Arsenate (CCA), acid cupric chromate

Code #: CAS **Code #: Other**

N. L. Category Synthetic Allowed

Chemistry

Composition $Cu_3(AsO_4)_2$ (Copper Arsenate) **Family**

Properties Arsenates can be reduced by concentrated hydrochloric acid or sulfur dioxide.

How Made Ore containing arsenic is mined and smelted to refine the arsenic into arsenic trioxide. This is treated with concentrated nitric acid to form arsenic acid (7778-39-4). Arsenates are created from the acid and are reacted with chromium and copper to form the stable wood preservative products. The compounds are applied to wood under pressure for penetration and durability.

Use/Action

Type of Use Crops

Use(s) Wood preservative for existing installations of trellises and raised beds.

Action Oxidizing agent which prevents fungi and bacteria from acting on wood.

Combinations

Status

OFPA

N. L. Restriction Lumber treated with arsenic (copper chromic arsenate) is allowed for existing installations, but prohibited for new plantings.

EPA, FDA, etc

Registration

Directions

Safety Guidelines Signal word: DANGER.. Toxicity class 1.

State Differences

Historical status has been allowed without question until recent evidence caused concern.

Internationl status not addressed.

OFPA Criteria

:119(m)1:chem. inter.

2119(m)2: toxicity Ranges from low to very high depending on the state of the arsenic. An association has been shown between relatively high and lengthy exposure to inorganic arsenic compounds and cancer. Nearly all poisonings are the result of ingestion. OSHA's permanent standard for employee exposure as of Aug. 1978 is 10 ug/m^3

2119(m)3:manufacture Arsenic trioxide is readily volatilized during smelting and may be concentrated in the flue dust. This is usually captured and processed to refine the compound.

2119(m)4:humans Arsenic and chromium are both toxic to humans. See above under 2119(m)2: toxicity.

2119(m)5: biology There is evidence that arsenic, copper and chromium are all leached out of the wood and into the soil. Organic acids found in soil may cause greater metal leaching than mineral acids. All of these metals are toxic to soil microbes, earthworms and plants. It is unclear however, how much may be taken up by plants and end up in the edible portions.

2119(m)6:alternatives metal or plastic trellis posts. Redwood and cedar resist decay without treatment. Boron, iron sulfate, and zinc products being explored.

2119(m)7:compatible The issue to be determined is how to deal with existing installations which represent a huge investment in the grape industry, if the material is banned from future use.

References

"Toxicological profile for arsenic", Agency for Toxic Substances and Disease Registry, U.S. Dept. of Health and Human Services; Final Update, 1993

"Arsenic in drinking water," Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, April 1992.

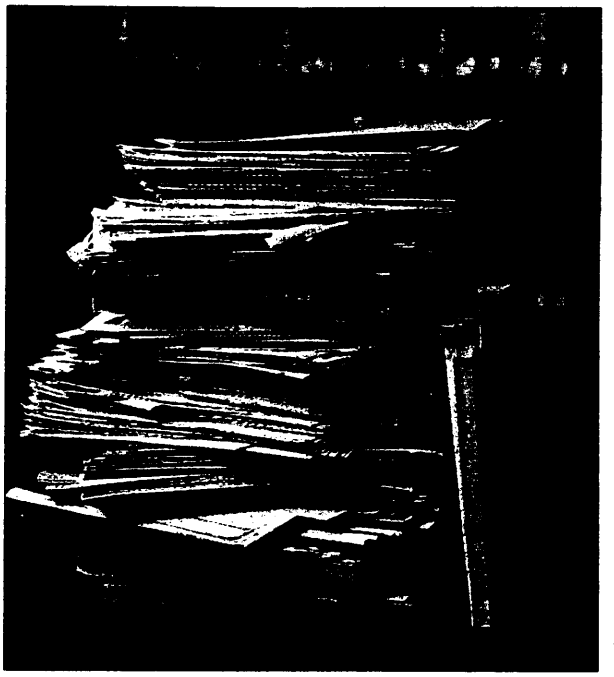
"Residues of arsenic, chromium and copper on and near outdoor structures built of wood treated with CCA type preservatives," D. Galarneau, et.al., Health and Welfare Canada; August 1990.

"The chemistry and phytotoxicity of arsenic in soils: I. Contaminated field soils," E.A. Woolson, et.al., Soil Science of America Proceedings, Vol. 35, 1971

TREATED WOOD

YES, IT'S *STILL* TOXIC!

Don't be confused by a decidedly unscientific *report.*



ROB CARDILLO

The science we sifted through: 17 inches of published research and government reports; one copy each.

Recently, a Texas county extension agent pronounced pressure-treated wood safe to use in raised bed gardens. Newspapers, industry magazines such as *Nursery News*, and even another major American gardening magazine all reported this finding not only as truth, but as the absolute final word on the subject.

Another magazine, *Family Handyman*, also pronounced treated wood absolutely safe in an Oct. '92 question-and-answer column in which no studies or experts were cited; the editors just said, "Oh sure, you can use it." When later challenged by readers—some aware of our report on the subject earlier that year—the editors responded in the Jan. '93 edition of the same Q&A feature by saying that they "couldn't find any unbiased studies that proved using treated wood around vegetables is harmful." We wrote to the magazine asking for the source of the original "Oh, it's safe" answer, but we got no response.

Naturally, many of our readers were confused by these reports. In the July/Aug. '92 issue of ORGANIC GARDENING, we had devoted two full pages of our "Letters" section to a lengthy response—which cited 11 published scientific studies, official government reports, EPA fact sheets and correspondence from several treated wood manufacturers—detailing the considerable toxicity of treated wood and its proven tendency to leach its toxic chemicals into soil and water. Many readers have written since to ask if we have changed our opinion on treated wood and/or to comment on this new report from Texas.

No, we haven't changed our opinion and that Texas report was not a true scientific study. It was a half thought-out experiment conducted by a local extension agent and an extension vegetable specialist after gardeners in their region became concerned following our reports about the dangers of using "pressure-treated" wood (which is actually made with two heavy metals and arsenic, not "pressure" as the companies that produce this stuff would like you to think).

Anyway, these two guys took 15 soil samples from raised bed gardens framed with CCA (chromated copper arsenic) treated wood and had them tested. Despite the fact that two different labs found measurable amounts of arsenic in every instance, these two rocket scientists still concluded that the tests had somehow "confirmed that arsenic was not leaching from the timbers."

Then this report reveals where it's coming from with the statement that "this demonstration may reduce the economic disruption caused by the ORGANIC GARDENING magazine article questioning the safety of CCA-treated landscape timbers," and *then* the two guys thanked us for our "cooperation" and for "allowing the tests to be conducted!"

Not only did OG in no way cooperate with this "demonstration," the first we heard of it (and our alleged involvement) was when we saw the press-release-like report of this so-called study. We *had* received a request from the Texas extension agent (amid dozens of other such requests) for information on our sources for our report on CCA wood, and we sent the requested materials to him, as we

BY CHERYL LONG AND MIKE McGRATH

did to all who asked. At no time were we notified about any plans to run any tests, nor did we in any way offer our cooperation, advice or endorsement of those tests.

And their report is by no stretch of the imagination anything like a reliable scientific study. It has not been published in a scientific journal where it would have to pass muster to *be* published in the first place and then stand up to the scrutiny of the scientific community after publication. There is good reason for this lack of publication, namely that it is unpublishable. In a *real* study, the arsenic levels found in the treated-wood soil would have been compared to the amount (if any) of arsenic found in similar soil that wasn't surrounded by treated wood. All they *can* say for sure from their limited testing is that there was definitely arsenic in every soil sample taken near treated wood. How they determined that the arsenic did not come from the treated wood is beyond us. (Maybe they figure the treated wood fairy put it there.)

But as so many of you know, this little piece of non-science was widely reported by the media as having "proved that CCA wood is safe." How could garden magazine editors and veteran journalists repeat the unsubstantiated conclusions of such an obviously unscientific and seriously flawed "study?" Simple—nobody ever taught them how to read a *real* study (although we wish that *somebody* out there in the media had noticed that these guys found arsenic in every single soil sample they tested and asked them where it had come from). The sad truth is that everyone involved just repeated the headline and first paragraph of the report and didn't bother to actually read it. (Note to our fourth estate peers out there: If you can't [or won't] read science correctly, will you ***please*** stay out of the kitchen?)

We, on the other hand, have continued our research on "pressure-treated" wood and are even *more* convinced than ever that this stuff should not be used in organic gardens. Here are excerpts from some of the additional scientific studies we've reviewed recently:

• "This study suggests that leaching of metals from treated wood in acidic waters (natural or resulting from acidic precipitation) *[Editor's Note: acid rain]* may present an unacceptable environmental risk...Leaching of metals from weathered wood was found to be very similar to that from new wood...Results from this study suggest that organic acids may cause greater metal leaching from CCA-treated wood than mineral acids...Organic acids are present in...soils, bogs and wetland areas.". —Warner and Solomon, *Environmental Toxicology and Chemistry*, 1990

• "It has been shown that organic acids may cause significant leaching of all components of CCA...CCA-treated jack pine blocks exposed to vegetable compost had greater leaching losses after 12 months of exposure (12 to 13 percent CCA leached) than matched samples in distilled water (4 to 6 percent leached), exterior weathering (2 to 8 percent) or exterior soil burial (1 to 6 percent.)"—Cooper and Ung, *Forest Products Journal*, Sept. 1992

That last study, by the way, has something in common with our cowboy "researchers" from Texas: despite finding that an astonishing 12 percent of the "CCA" (the poisonous chromium, copper and arsenic that had been injected into the wood) leached out in compost in just one year, Cooper and Ung conclude that using treated wood for compost bins would "not result in unacceptable...contamination of compost with arsenic or chromium." They don't explain how those toxins could leach out and *not* contaminate the compost (maybe the treated wood fairy does take-out, too).

• "Even after two years of exposure to rain and snow, the leaching of chromium, copper and arsenic from CCA-treated wood roofing is too high to allow collected water from such roofing to be used as drinking water according to the Norwegian requirements." —Evans, International Working Group on Wood Preservation, 1987

• "The amount of arsenic alone that leached from a 2-by-2-inch piece of wood in one week in our studies is enough...to kill a mouse...Just think how much is being leached from piers and bulkheads." —Sanders, Academy of Natural Sciences of Philadelphia, 1991

• "In some spots neither copper nor arsenic could be detected (in CCA treated wood), indicating complete removal of the two elements." —Chou, et.al., *Wood Science and Technology*, 1973.

Once again: The simple truth is that *there is no question that chromium, copper and arsenic all leach from treated wood—even the treated wood industry itself admits that much.*

As you may recall from our original report back in '92, none of the treated-wood manufacturers who wrote us defending their product claimed that the toxins did not leach out of their wood. One (The Hickson Corp.) wrote that "*virtually* no preservative leaches into soil, water or air," while another company (Osmose) admitted in their letter chiding us that, "this is not to say that a small amount may not leach out of the wood." Thanks for the limited honesty guys, but the valid scientific studies that have been conducted indicate that your "small amounts" are more than enough to kill soil life.

And there is also a wealth of studies in the *true* scientific literature showing that arsenic, chromium and copper are all toxic to soil microbes, earthworms, plants and humans.

Garn Wallace, Ph.D., a biochemist at Wallace Laboratories in El Segundo, Calif., who with his father has been studying the effects of heavy metals on soils and plants for over 20 years, explains that the scientific literature indicates that "levels as low as *1 part per million* soluble arsenic (which is equal to about 20 ppm "total arsenic") have been reported to be toxic to some plants. How much of the total arsenic in a piece of treated wood is soluble depends on several different factors—including the pH of the soil and the amount of compost used." Unfortunately, he explains, "the organic acids in compost greatly increase the solubility of arsenic."

When we asked Dr. Wallace his opinion of the Texas "CCA is Safe" report, he stated that some of the arsenic levels they reported finding could be toxic to plants and added

that "if these levels were found in my garden, I would definitely be concerned *and* I would certainly avoid eating root vegetables grown in those soils." (Arsenic accumulation in plants occurs mainly in the roots.)

New data also shows that even *very* low levels of arsenic in drinking water can cause several kinds of cancer; and so the EPA is currently deciding how much to *lower* the current limit of 50 parts per *billion* for arsenic in drinking water. (That's right—the "harmless" levels found in soil by the Texas guys were hundreds of times higher than the levels that the EPA is now saying are too high for water.)

So what's Dr. Wallace's advice to gardeners who are concerned about possible arsenic uptake in vegetables grown in raised beds framed with treated wood? "Given the overwhelming evidence that chromium, copper and arsenic *do* leach from the lumber, and that very low levels of all three of these heavy metals can be harmful, the best advice I can give is to not use treated lumber in your garden."

His point about all three of these heavy metals being dangerous is important. Our stories thus far have focused on arsenic, but CCA leaching also involves copper and chromium, both of which can harm soil life at very low levels. So our warnings—which have taken *only* the arsenic into account—represent about a third of the *actual* dangers.

Advice? If you have treated wood in your garden, remove it or seal it somehow with paint or one of those waterproof wood treatments. If you have treated wood playground equipment *please seal it*—the children who play on it are ingesting arsenic every time they put their fingers in their mouth after touching the wood or the soil underneath it. (How nice that the parasites who make this poison supply *free plans* for the making of this equipment—thus ensuring that your children get lots of arsenic as they grow and develop.) And remove the soil underneath that equipment—especially if any kids who play on it eat dirt every once in a while; that soil is probably *heavily* contaminated with poisons.

Some readers wrote to say that they had worked treated wood sawdust into their soil or made compost bins out of treated wood, are now very concerned and want to know what we think they should do. *We* sure wouldn't use compost made in a treated wood bin or eat anything that came out of that contaminated garden. Our strong advice is that both be abandoned. (The reader who used the sawdust told us that all his plants died, which kind of makes the point moot; he *has* to garden elsewhere.)

And *please*—don't *ever* burn scrap lumber (outside or indoors in a stove or fireplace) unless you are *absolutely* certain that none of the scraps are from CCA lumber. Both the smoke and the ashes from CCA wood are *extremely* toxic.

Why don't more people know of these dangers? The treated wood industry is ***huge***, and it has spent a fortune trying to convey an image of pressure-treated wood being some sort of super-strong pressurized material instead of the toxic chemical soaked wood it truly is.

We have now cited two dozen scientific studies and government reports that document the dangers of arsenic and the leaching of all three toxins from treated wood. Send us a stamped, self-addressed envelope and we'll send you a list if you want to look them up yourself.

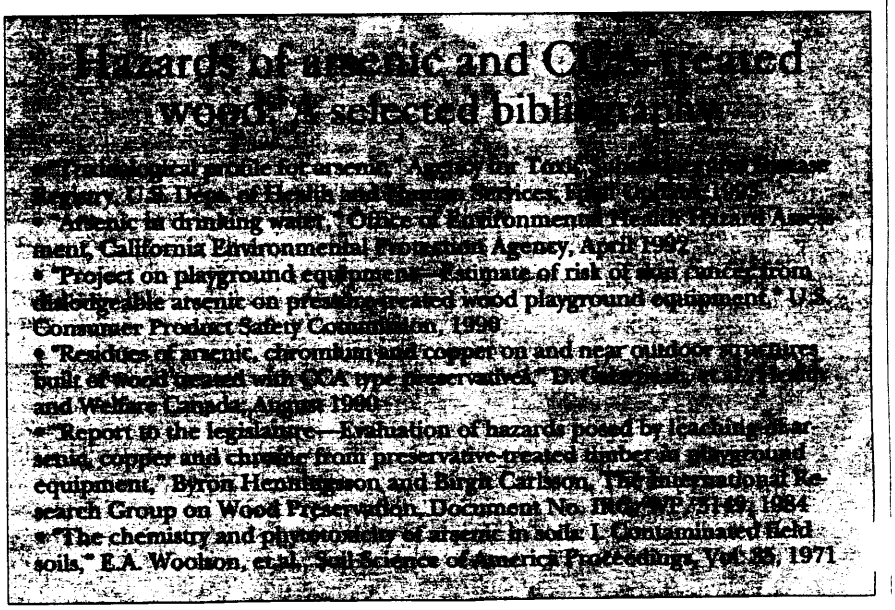
And what science does the other side offer? An item in a question-and-answer column that didn't cite a single study or quote anyone in the scientific community; it just says "treated wood is safe." And, o course, our Texas extension agents playing weekend scientist—testing soil from raised beds surrounded by treated wood, finding arsenic every time and then concluding that the treated wood didn't leach. And reporters and editors just eat it up.

There is no law against reporting what you don't understand, or of reporting it with absolute certainty.

We *did* our homework. We went and found the published studies and the official government reports. *And* we read them—*all* of them, not just the headlines.

So what should <u>you</u> do next time somebody tells you treated wood is safe? Take a simple cotton cloth—say their handkerchief—and rub it over a piece of treated wood; a raised bed timber or a piece of playground equipment that a child may touch a hundred times in an hour.

Show the person that cloth and explain that it now has detectable levels of arsenic on it. Who says? Both American (U.S. Consumer Products Safety Commission) an Canadian (Health and Welfare Canada and Geological Survey of Canada) government researchers who performed this simple "wipe test" themselves on treated-wood playground equipment of varying ages. They never failed to find arsenic on the cloth afterwards. ❧



Hazards of arsenic and C[illegible]-treated wood: A selected bibli[illegible]

[illegible] toxicological profile for arsenic," Agency for Toxic [illegible] Registry, U.S. Dept. of Health and Human Services, [illegible]

• "Arsenic in drinking water," Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, April 1997.

• "Project on playground equipment: Estimate of risk of skin cancer from dislodgeable arsenic on pressure-treated wood playground equipment," U.S. Consumer Product Safety Commission, 1998.

• "Residues of arsenic, chromium and copper on and near outdoor structures built of wood treated with CCA type preservatives," Dr. [illegible], Health and Welfare Canada, August 1990.

• "Report to the legislature—Evaluation of hazards posed by leaching of [illegible] arsenic, copper and chromium from preservative-treated lumber in playground equipment," Byron Henningson and Birgit Carlson, The International Research Group on Wood Preservation, Document No. IRG/WP/3149, 1984.

• "The chemistry and phytotoxicity of arsenic in soils: I. Contaminated field soils," E.A. Woolson, et al., Soil Science of America Proceedings, Vol. 35, 1971.

MATERIAL SAFETY DATA SHEET
ARSENIC

SECTION I - Product Identification

PRODUCT NAME: ARSENIC
FORMULA: AS
FORMULA WT: 74.92
CAS NO.:
COMMON SYNONYMS: N/A

Precautionary Labeling

N/A

SECTION II - Hazardous Components

ARSENIC

SECTION III - Physical Data

BOILING POINT: N/A VAPOR PRESSURE @ 20C (MM HG): N/A
MELTING POINT: >615C VAPOR DENSITY (AIR=1): N/A
SPECIFIC GRAVITY: 5.73 EVAPORATION RATE: N/A
(H2O=1) (BUTYL ACETATE=1)
SOLUBILITY(H2O): INSOLUBLE PERCENT VOLATILES BY VOLUME: N/A
APPEARANCE & ODOR: SILVER GRAY CRYSTALS SOLID, LUMPS, POWDER

SECTION IV - Fire and Explosion Hazard Data

FLASH POINT: FLAMMABLE
FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %
FIRE EXTINGUISHING MEDIA
SPECIAL FIRE-FIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS
UNUSUAL FIRE AND EXPLOSION HAZARDS
WHITE FUMES ON SUBLIMATION, IGNITION

SECTION V - Health Hazard Data

THRESHOLD LIMIT VALUE (TLV/TWA): NONE ESTABLISHED
TOXICITY: MUS-RAT LDLO: 25MG/KG 0.5MG/M
EFFECTS OF OVEREXPOSURE
IRRITANT TO SKIN AND MUCOUS MEMBRANE. ACUTE TOXIC EFFECTS DEVELOP 1/2 TO 4 HRS. FOLLOWING INGESTION: CONSTRICTION OF THROAT, VOMITING, DIARRHEA, MOTOR PARALYSES, DEATH.
EMERGENCY AND FIRST AID PROCEDURES
SKIN: WASH WITH SOAP/WATER, GET MEDICAL ASSISTANCE.
EYES: WASH WITH WATER, GET MEDICAL ASSISTANCE.
INHALATION: REMOVE TO FRESH AIR, GET MEDICAL ASSISTANCE.
INGESTION: GET MEDICAL ATTENTION.

SECTION VI - Reactivity Data

STABILITY: STABLE

CONDITIONS TO AVOID: AIR AND OTHER OXIDIZERS
INCOMPATIBILES: OXIDIZERS, ALKALI METALS, ORGANIC MATERIALS
DECOMPOSITION PRODUCTS: [7mARSENIC [m COMPOUNDS

SECTION VII - Spill and Disposal Procedures

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
SWEEP UP THOROUGHLY. PLACE IN CLOSED CONTAINER.

SECTION VIII - Protective Equipment

WORK IN WELL VENTILATED AREA.
WEAR PROTECTIVE CLOTHES, GLOVES AND FACE MASK.

SECTION IX - Storage and Handling Precautions

STORE IN TIGHTLY CLOSED CONTAINER IN A COOL AREA.

SECTION X - Transportation Data and Additional Information

WORKERS CONTINUOUSLY EXPOSED TO ARSENIC SHOULD BE SUBJECTED TO PERIODIC MEDICAL SURVEILANCE, URINE AND HAIR ANALYSIS.

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