

Management and Disposal Options for CCA-Treated Wood Waste

Submitted by
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in Collaboration With
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Background

Wood treated with chromated copper arsenate (CCA) contains high concentrations of toxic chemicals, most notably chromium and arsenic. Copper, the third metal contained within CCA, is not a regulated RCRA toxicant. Nevertheless there are concerns associated with the impacts of copper releases from CCA-treated wood in aquatic ecosystems.

Although the CCA chemical is clearly a hazardous waste, CCA-treated wood has been excluded from being classified as a hazardous waste under RCRA for one particular situation. This situation is when CCA-treated wood is disposed by the end-user (U.S. EPA, 2001, 40 C.F.R., 261.4(b)(9)). Specifically the exemption applies to the following, "Solid waste which consists of discarded arsenical-treated wood or wood products which fail 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." Although the treated wood product has been provided an exemption, this exemption does not apply for ash produced from CCA-treated wood nor for treated wood disposed by the manufacturers of the wood nor by possibly retail establishments that sell the wood. Thus, the disposal of CCA-treated wood is still covered through RCRA if disposal involves incineration or if the discarded material is disposed by a non-end-user.

The purpose of this study is to evaluate the various management and disposal scenarios for discarded CCA-treated wood. Disposal scenarios include those that have been practiced in Florida, such as incineration at cogeneration plants, recycling as mulch, and disposal in construction and demolition (C&D) landfills. Other possible options include disposal through pyrolysis, pyrogenesis, or other incineration process, and/or disposal through municipal solid waste landfills or other lined landfills. CCA-treated wood can also be potentially recycled. Recycling options include the extraction of the CCA chemical and incineration of the "clean" wood fiber, recycling of the discarded wood into wood-cement composites, or recycling into wood-based composite materials.

Research Methods

The document prepared through this proposal will prioritize feasible management and disposal options for CCA-treated wood. This evaluation will rely primarily on readily available data. The document will highlight data needs, in particular for management scenarios that are considered to be the most promising. Addressing these data needs can be the subject of future research efforts. Thus this proposal is considered to be the first phase of a multi-phase effort which identifies and implements the most feasible disposal and management plan for CCA-treated wood in Florida.

Management and disposal options for CCA-treated wood will be documented in this study in a format similar to an Environmental Impact Statement (EIS). An EIS describes the effects of a proposed activity on the environment. The environment includes land, water, air, structures, living organisms, people, and the social and economic aspects. An EIS also describes ways to “mitigate,” or lessen, negative impacts. Specifically an EIS contains the following components:

1. Description of the action, including its need and benefits
2. Description of the environmental setting and areas to be affected
3. An analysis of all environmental impacts related to the action
4. An analysis of reasonable alternatives to the action
5. Identification of ways to reduce or avoid adverse environmental impacts.

ITEM #1: Specifically the “action” listed under item #1 will correspond to the current management scenarios for CCA-treated wood in the State of Florida. Prior research has shown that current management scenarios include disposal of CCA-treated wood in C&D landfills, disposal of CCA-treated wood as mulch, and disposal through wood cogeneration. The current disposal scenario will be re-evaluated to provide updated values for the quantities of CCA-treated wood disposed within the State. The method of disposal will also be re-checked by contacting major wood cogeneration plants within the State to compile information concerning the type of wood currently accepted for co-generation. Computations will also be performed, given prior data documenting the composition of wood waste piles at C&D facilities, to determine the quantities of CCA-treated wood that are disposed through that particular route.

ITEM #2: Item #2 will provide background information concerning water, air, and soil quality within the State of Florida. It will describe the general hydrology and geology for the State and will focus on particular aspects that make the State’s environmental resources vulnerable to contamination. Item #2 will also include a brief description of the types and location of waste disposal facilities both within the State and out of State, which are relevant to the management of CCA-treated wood. Relevant out-of-state facilities include, for example, hazardous waste disposal facilities which represent a disposal option for CCA-treated wood ash generated in Florida.

ITEM #3: Item #3 will focus on estimating the environmental impacts associated with current disposal options for CCA-treated wood. Readily available data concerning

the leaching and toxicity of CCA-treated wood and CCA-treated wood ash will be evaluated to estimate potential impacts of CCA-treated wood during use as mulch, disposal within C&D landfills, and use in cogeneration facilities.

ITEM #4: Many potential alternatives for CCA-treated wood disposal exist (figure 1). These alternatives (item #4) will focus on options where CCA-treated wood is sorted and not sorted from the remainder of the C&D wood waste stream. Sorting options considered will include separation at the source or at the C&D recycling facilities. Another important pre-processing scenario for CCA-treated wood disposal includes volume reduction. Under this item, pyrolysis, pyrogenesis, and other incineration processes will be considered. Ultimate disposal options to be considered for unburned wood and ash include disposal within lined landfills and hazardous waste landfills. Potential recycling options will also be included within this item, as well as ultimate disposal of the discarded recycled material. More specific information concerning the activities to be considered for the EIS type of analysis are summarized in the appendix to this proposal.

ITEM #5: Ways to reduce or mitigate environmental damage (item #5) will be incorporated where appropriate within items #3 and #4. Mitigation will take the form of recommending appropriate pollution reduction technologies.

The ultimate intent of the current proposal is to provide the FDEP with a document that would support policy concerning the disposal and management of CCA-treated wood. This document will be based upon readily available scientific data. The document will prioritize the most feasible disposal option and thus identify future research needs in promising areas where data are lacking. The primary deliverable associated with this proposal is a well-written and thoroughly prepared document that prioritizes management options for CCA-treated wood, given data that has been generated to date. In essence, this proposal allows the research team to evaluate all available data in the context of identifying the best possible solution for CCA-treated wood disposal in the State of Florida.

Timeline/Deliverables: 12 months starting July 1, 2002 and ending June 30, 2003. Deliverables will include a presentation of the results to the FDEP in Tallahassee, participation in the RCRA meeting as specified by Mr. Kastury, and a final technical report with distribution of paper copies and copies accessible through the internet.

Separation of Work Between the Universities: U.Miami will be responsible for Item #1, and the portion of item #2 that focuses on the water, air, and soil quality within Florida and the general hydrology/geology of the State. U.Florida will be responsible for providing a description of the types and location of waste disposal facilities within the State and outside of the State which are relevant to the management of CCA-treated wood. U.Miami will be responsible for preparing the first draft for Item #3. This draft will then be provided to U.Florida for their input and then returned to U.Miami for editing within the final report. Item #4 will be split as follows: U.Miami will focus on sorting and recycling technologies, as well as providing a discussion on special types of

CCA-treated waste wood (e.g. sawdust, utility poles, and marine pilings). U. Florida will focus on disposal within landfills and through combustion processes.

Key Personnel: Dr. Timothy Townsend of the University of Florida will be responsible for items that are to be written by the U. Florida team and Dr. Helena Solo-Gabriele of the University of Miami will be responsible for items that are to be written by the U. Miami team. Each PI will be responsible for supervising the students assigned to the project at their respective Universities. Dr. Townsend will provide an internal report to Dr. Solo-Gabriele for inclusion within the final project report. Dr. Solo-Gabriele will prepare the first draft of the final report which will then be proof-read by Dr. Townsend. Dr. Solo-Gabriele will also coordinate presentations and will be responsible for disseminating the final report through regular mail and through the internet.

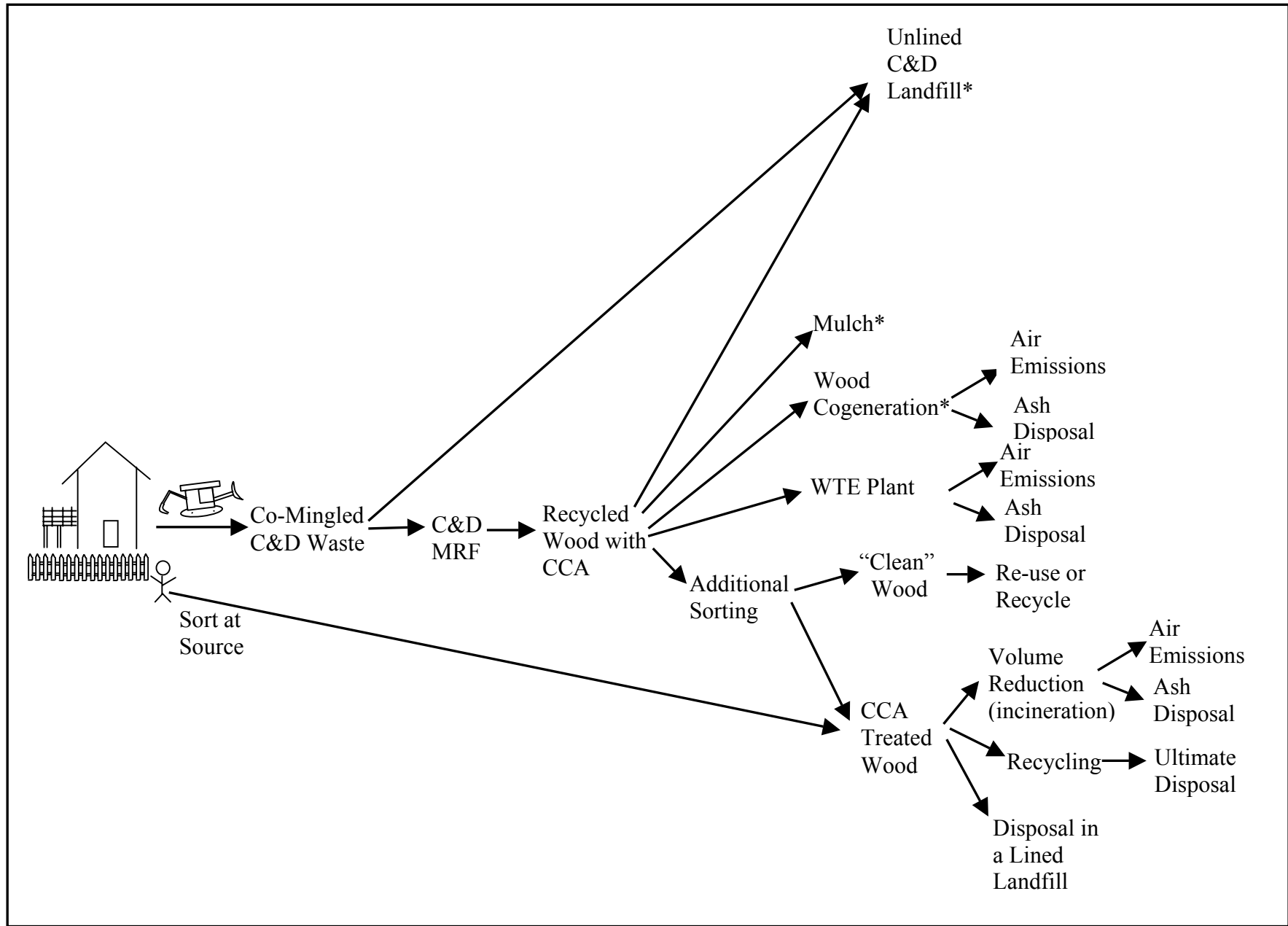


Figure 1: Management and Disposal Options for CCA-Treated Wood (Current Disposal Pathways Indicated with an “**”)

APPENDIX

Management and Disposal of Discarded CCA Treated Wood: Potential Research Questions

Draft: 3/14/02 WWH
With modifications by HSG on 3/29/02

CURRENT DISPOSAL OPTIONS

Disposal in unlined C&D landfills

- Is there any evidence from the C&D groundwater data of arsenic trends/concerns?
- Could we model potential GW impacts (as was done with Sub D liner rule development)?
- What if a C&D site has an insitu clay “liner”—is it as good as or better than a membrane?
- Could a “leaky” clay lined cells be built which bind arsenic but avoid leachate collection?
- If DEP mandates C&D landfills be lined, what would the existing facilities do?

Mulch

- How many mulch producers are there in Florida?
- How many of these have FDEP solid waste permits?
- Where do they get their wood from?
- Is the problem of CCA wood in mulch mainly a S. Florida issue?
- What is the best way to educate mulch producers to not use CCA wood?

Cogeneration with Ash Disposal in a Lined Landfill

- List the major wood co-generation facilities in Florida.
- Are major wood co-generation facilities accepting recycled C&D wood? What is their policy?
- If major wood co-generation facilities are accepting recycled C&D wood, what is the concentration of As, Cr, and Cu in their ash? What types of air pollution devices are installed at these facilities? Are air emissions monitored for As, Cr, and Cu? If so, what levels are observed?
- Where do the cogeneration plants dispose their ash? How much are they charged for ash disposal?

ALTERNATIVES TO CURRENT DISPOSAL OPTIONS

SORT AND HANDLE CCA SEPARATELY FROM OTHER WASTE

1. Sorting CCA wood at the source
 - What are the practical/economic issues with sorting CCA wood at construction sites?
 - What have we learned thus far from the Sumter County/Villages project?
 - What about sorting at demolition sites? Isn't CCA wood easily separable?
 - Should counties set up separate CCA wood collection boxes at landfills and MRFs?
 - How about curbside/bulk pickup?

2. Sorting CCA wood at a MRF
 - Can CCA wood be effectively sorted by its use (e.g. fences) vs. color?
 - Is the sorting technology tested in Sarasota ready for commercialization?

VOLUME REDUCTION

1. Combustion in WTEs
 - What is the effect of burning CCA wood in WTEs?
 - How much would they have to burn before the ash fails TCLP?
 - If WTEs begin to take large quantities of CCA, would they have to treat their ash?
 - How would they treat it? Is there any particular treatment especially effective for arsenic?

2. Dedicated Industrial Combustion Facility
 - Can CCA wood be collected and burned in a dedicated industrial combustor? If so, what technology would be used, e.g. pyrolysis, pyrogenesis, etc..
 - How would the collection system work?
 - What are the practical and economic obstacles to such a plan?
 - What kinds of air pollution controls would such a facility have to have?
 - Can a rotary kiln (e.g. old dirt burner) be converted to burn CCA?
 - Is the French pyrolysis concept a viable one for Florida?

- What has been the experience at Ridge Generating where they burn some CCA wood?
 - What are the operational issues with handling large pieces of wood in a WTE?
 - What are the air issues with burning large quantities of CCA wood?
3. Combustion in Air Curtain Incinerators
- Some CCA is likely being burned now (illegally) in ACIs. What are the impacts?

ULTIMATE DISPOSAL OPTIONS

1. Lined Landfill (MSW and C&D)
- Would it be better to dispose CCA-treated wood in a lined landfill with a synthetic liner or a clay liner?
 - Should CCA-treated wood be mixed with other wastes in a lined landfill or should it be disposed separately in a monofil? Should it be worked into the working face with the rest of the waste or separated?
 - How, practically, should CCA wood be handled at lined landfills? Should it be cut up/ground up before being put in the landfill? Should there be a separate disposal cell to better monitor leachate quality?
 - Do we have any way of predicting leachate quality with increasing CCA disposal?
 - What is the fate of the leachate? Doesn't most of it go to WWTPs?
 - Do the WWTPs currently taking leachate have dilution capacity for increased arsenic?
 - Do the WWTP residual land spreading areas have adequate arsenic capacity?
 - Does it make sense to take the arsenic from the leachate and land apply it at all?
 - Can CCA contaminated ash be disposed in a lined landfill? Would it be more feasible to encapsulate the ash and dispose in a regular MSW landfill? Are there additives that can be included during the incineration process that would minimize the TCLP toxicants from leaching and thus permit disposal in a regular MSW landfill?

2. Hazardous Waste Landfills

- Where are the most feasible hazardous waste landfills located?
- How much would it cost to dispose CCA-treated wood ash in a hazardous waste landfill?

RECYCLING OPTIONS

1. Is it feasible to incorporate CCA-treated wood waste into wood-cement composites?
2. Is it feasible to incorporate CCA-treated wood waste into wood-composite materials?
3. Is it feasible to extract the CCA chemical from CCA-treated wood and recycle the “clean” wood fiber?
4. Should the re-use of CCA-treated wood be encouraged? How should the wood be ultimately disposed after it has been discarded after re-use/recycling?

SPECIAL TYPES OF CCA-TREATED WASTE WOOD

Sawdust

- What kinds of businesses produce CCA wood sawdust?
- How much is produced and what do they do with it now?
- What is the best way to handle and dispose of sawdust?

Utility Poles and Marine Pilings

- What is best disposal practice for utility poles and marine pilings?
- What is currently done with them?
- Should we have lined “pole monofills” as they do in California and Washington?
- What about the practice of donation and reuse of retired utility poles?
- A WTE plant in Pennsylvania burns all kinds of treated poles. What has been their experience?