

QUARTERLY PROGRESS REPORT  
January 1, 2004 to March 31, 2004

PROJECT TITLE: Extent of CCA-Treated Wood Used for Commercial Mulch

PRINCIPAL INVESTIGATOR: Dr. Helena Solo-Gabriele, Ph.D., P.E.

AFFILIATION: University of Miami, Dept. of Civil, Arch., and Environ. Engrg.

ASSOCIATE INVESTIGATOR: Dr. Timothy Townsend, Ph.D., P.E.

AFFILIATION: University of Florida, Dept. of Environ. Engrg. Sci., Solid & Haz. Wst. Prog.

COMPLETION DATE: June 30, 2004

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“YEAR 6” Research

Title: Environmental Impacts of CCA-Treated Wood  
(September 1, 2001 to May 31, 2003)

Project Administration

1. The final report for this project has been drafted. The title of the report is, “Arsenic and Chromium Speciation in Leachates from CCA-Treated Wood.” This report has been posted on the web and has been sent to the TAG. A paper copy has been sent to the Center. The deadline for comments on this report was extended to February 22, 2004 which is shortly after the date of our last TAG meeting. Comments have since been received. We plan focusing on addressing these comments during the next reporting period.

RCRA Sponsored Project

Title: Management and Disposal Options for CCA-Treated Wood Waste  
(July 1, 2003 to June 30, 2003)

Project Administration

1. The final report for this project has been drafted. The title of the report is, “Management and Disposal Options for CCA-Treated Wood Waste.” This report will be revised shortly and will include information obtained from the FCES conference held February 2004.

“YEAR 7” Research

Title: Extent of CCA-Treated Wood Used for Commercial Mulch  
(July 1, 2002 to June 30, 2004)

Project Administration

1. A subcontract in the amount of \$3,000 has been executed for U.Florida for Dr. Townsend’s contribution associated with the education program for the stains.
2. A TAG meeting was held on February 11, 2004 in Orlando, Florida. The minutes of the meeting have been drafted and they are currently being proof-read. The minutes along with the Powerpoint presentations will be posted shortly under “project administration” link at [www.ccaresearch.org](http://www.ccaresearch.org).

### Research Activities

1. Sample collection for this project has been completed with over 35 mulch samples collected from the South Florida area. All samples have been ashed. All have been analyzed for particle size distribution and SPLP. With the exception of two samples, all have also been analyzed for total metals content. An initial visual identification was conducted on all samples. The plan is to “redo” the visual identification in a consistent manner as conducted for the “Year 8” mulch project. Besides the “redo” on the visual identification, the only pending laboratory work focuses on the digestion and analysis of the remaining 2 ashed samples. These ash samples will be included within the next batch for analysis.
2. To date laboratory results for 33 samples have been completed, 30 of these samples were mulch samples. One of the non-mulch samples was composed of refuse derived fuel (RDF). The other two non-mulch samples were soil blends made from RDF or from a combination of wood and soil. Of the 30 mulch samples, 13 were non-colored and 13 were red colored, 2 were gold colored, and 2 were control samples made from CCA- and untreated wood. Of the 13 non-colored samples, three contained CCA (between 0.1 and 4%, by weight). Of the 15 red- or gold- colored samples, 7 contained CCA (between 0.1% and 12%). The arsenic concentrations of these red- and gold- colored mulch samples ranged from 1 to 200 mg/kg. All of the red mulches that had CCA also contained plywood. The 1 gold colored mulch that tested positive for arsenic was considered borderline for containing CCA and did not contain plywood.
3. Questionnaires have been sent out to 100 cogeneration facilities and 300 wood processing/C&D facilities to inquire about sorting practices for wood waste. To date a total of 39 questionnaires (3 cogen and 36 C&D) have been returned
4. A total of 38 stain packages have been distributed to date. Since the last reporting period 8 additional stain packages were distributed at the FCES conference. An additional 5 requests have been received (in addition to the original 38 stain packages distributed). These 5 kits will be mailed out shortly.

### “YEAR 8” Research

Title: Environmental Impacts of CCA Contaminated Mulch  
(July 1, 2003 to October 31, 2004)

### Research Activities

1. Mulch sample collection for phase I has been completed. An additional 57 samples have been collected (beyond the samples collected for the year 7 project). These samples have been collected from throughout Florida (Pensacola, Jacksonville, Gainesville, Tallahassee, Orlando, West Palm Beach and the Florida Keys). All samples have been visually characterized, analyzed for particle size distribution, and analyzed using the SPLP. Fourteen samples from the “year 8” batch have been ashed to date.
2. A new larger muffle furnace was purchased for the project in an effort to process samples at a faster rate. This furnace has since been received, installed, and is currently in use. The research team is now running two furnaces at the same time in an effort to expedite the ashing process.

3. A set of 6 mulch leachate collection vessels have been built for phase II of the project. The red colorant for phase II has been received and tested on wood chips. Samples of untreated and CCA-treated wood waste from a local wood waste recycling facility were collected on September 30, 2003. These samples were separated into CCA-treated and non-CCA treated piles using the PAN indicator stains. The samples have since been mulched, thoroughly mixed and samples have been analyzed for arsenic from each batch. The untreated wood pile measured at less than 1 mg/kg arsenic whereas the CCA-treated pile measured at less than 2300 mg/kg. The testing method involved ashing the samples, digestion, followed by analysis using a flame AA. The colorant has been added to the appropriate set of wood chips and they have been placed into the mulch leachate-collection vessels. These vessels were placed outside in January 2004. So far, leachates have been collected from 5 different storm events. The goal is to sample 10 different storms and then collect samples on a weekly basis during the wet season. The wet season will begin in the May to June time frame.

#### Project Administration

1. The primary contract has been executed.
2. A subcontract for Dr. Townsend's portion of the work has been executed.
3. Three UM students and one UF student have been assigned to this project. The UM students include Gary Jacobi who is responsible for ashing the samples, Laura Lugo who is responsible for describing the samples in terms of plywood content and size distribution, and Tomoyuki "Shiba" Shibata who is responsible for the mulch leaching studies. Brajesh Dubey is the UF conducts the analysis on the ash samples and is responsible for the SPLP results.
4. A full proposal was submitted to the FCSHWM on March 22, 2004. The title of the pre-proposal was, "Arsenic-Specific Stain for Identifying CCA-Treated Wood."

#### Information Dissemination

1. The web site: [www.ccaresearch.org](http://www.ccaresearch.org) continues to be updated.
2. The research team participated in a high school outreach program called "Envirothon." As part of the Envirothon activities, high school students from throughout Miami-Dade County were provided information concerning treated wood and were asked to use the PAN stain to identify the presence of copper in treated wood. They were then "quizzed" on issues associated with CCA. Approximately 150 high school students participated at the "treated wood" booth. Participation in Envirothon was facilitated through an outreach program led by Lora Fleming and Lisa Pitman of the University of Miami Marine School through their high school teacher training program called "AMBIENT."
3. Two awards were received by research group members during the past reporting period. These awards include:
  - Dr. Tim Townsend received the "Iraj Zandi Award" given annually to the researcher who has significantly contributed to the field of Solid Waste Management. The award was presented at the International Conference on Solid Waste Technology & Management held in Philadelphia, PA.
  - Brajesh Dubey received the Ron Cockcroft Award from the International Research Group (IRG) on Wood Presentation. This award provides funding for Brajesh to present a paper during the upcoming IRG conference in Slovenia.

4. This last reporting period was especially busy with respect to presentations. These presentations included:

- Brajesh Dubey provided a presentation titled, "Comparing Arsenic Leachability in Landfill Leachates and in the TCLP" during March 2004 during the Nineteenth International Conference on Solid Waste Technology and Management held in Philadelphia, PA.
- Helena Solo-Gabriele provided a presentation called, "Collaborative Environmental Health Research Projects" on March 5<sup>th</sup>, 2004 during the Rosenstiel School of Marine and Atmospheric Science, Marine Biology and Fisheries Seminar Series located on Virginia Key, FL. Her presentation was a dual presentation with Dr. Lora Fleming of the U.Miami Medical School.
- Helena Solo-Gabriele provided a presentation called, "History of Research Projects Focusing on CCA-Treated Wood" on January 9, 2004 before the Florida Center for Solid and Hazardous Waste Management Advisory Board Meeting held in Tampa, FL.
- "Assessing Potential Waste Disposal Impact from Preservative Treated Wood Products." (February 2004). Environmental Impacts of Preservative Treated Wood Conference Sponsored by the Florida Center for Environmental Solutions. Orlando, FL . Presented by T. Townsend.
- "Environmental Impacts of CCA-Treated Wood Within Florida, USA." (February 2004). Environmental Impacts of Preservative Treated Wood Conference Sponsored by the Florida Center for Environmental Solutions. Orlando, FL . Presented by H. Solo-Gabriele
- "Quantification and Speciation of Arsenic Leaching from an In-Service CCA-Treated Wood Deck and Disposed CCA-treated wood to Lysimeters Simulating Different Landfill Conditions." (February 2004). Environmental Impacts of Preservative Treated Wood Conference Sponsored by the Florida Center for Environmental Solutions. Orlando, FL. Poster presented by B.I. Khan, H. Solo-Gabriele, T. Townsend, B. Dubey, and Y. Cai. This poster was also presented at the NIEHS-MFBS Center/Arch Program Science Symposium held in Miami, FL on March 18, 2004.
- "Extent of CCA-Treated Wood in Consumer Mulches." (February 2004). Environmental Impacts of Preservative Treated Wood Conference Sponsored by the Florida Center for Environmental Solutions. Orlando, FL. Poster presented by G. Jacobi, H. Solo-Gabriele, T. Townsend, B. Dubey, and L. Lugo. This poster was also presented at the NIEHS-MFBS Center/Arch Program Science Symposium held in Miami, FL on March 18, 2004.
- "Leachable and Dislodgeable Arsenic and Chromium from In-Service CCA-Treated Wood." (February 2004). Environmental Impacts of Preservative Treated Wood Conference Sponsored by the Florida Center for Environmental Solutions. Orlando, FL. Poster presented by T. Shibata, H. Solo-Gabriele, L. Fleming, S. Shalat, T. Townsend, and Y. Cai. This poster was also presented at the NIEHS-MFBS Center/Arch Program Science Symposium held in Miami, FL on March 18, 2004.

- “Wood Preservative 101: Frequently Asked Question (FAQ).” (February 2004). Environmental Impacts of Preservative Treated Wood Conference Sponsored by the Florida Center for Environmental Solutions. Orlando, FL. Poster presented by Y. Sotome, A. Muniz, T. Shibata, and H. Solo-Gabriele. This poster was also presented at the NIEHS-MFBS Center/Arch Program Science Symposium held in Miami, FL on March 18, 2004.
  - “Leaching of Copper, Chromium and Arsenic from CCA Treated Wood in Sanitary Landfill Leachate.” (February 2004). Environmental Impacts of Preservative Treated Wood Conference Sponsored by the Florida Center for Environmental Solutions. Orlando, FL. Poster presented by B. Dubey, T. Townsend, and H. Solo-Gabriele.
  - “Arsenic Speciation in Soils and CCA-treated Wood Leachate.” (February 2004). Environmental Impacts of Preservative Treated Wood Conference Sponsored by the Florida Center for Environmental Solutions. Orlando, FL. Poster presented by M. Georgiadis, Y. Cai, and H. Solo-Gabriele. This poster was also presented at the NIEHS-MFBS Center/Arch Program Science Symposium held in Miami, FL on March 18, 2004.
  - “Binding of Arsenic to Dissolved Colloidal Material.” (March 2004). NIEHS-MFBS Center/Arch Program Science Symposium. Miami, FL. Poster presented by Z. Chen, S.P. Szuri, Y. Cai, and H. Solo-Gabriele.
  - “Impact of Arsenic from CCA-Treated Wood: A Speciation Approach.” (March 2004) NIEHS-MFBS Center/Arch Program Science Symposium. Miami, FL. Speaker Presentation with H. Solo-Gabriele and Y. Cai.
5. The last reporting period was also exceptionally busy with respect to publications. These publications included:
- Hemond, H. F., and Solo-Gabriele, H.M., 2004. Children’s Exposure to Arsenic from CCA-Treated Wooden Decks and Playground Structures. *Risk Analysis*, 24(1): 51-64.
  - Dubey, B., Townsend, T., and Solo-Gabriele, H., 2004. Comparing Arsenic Leachability in Landfill Leachates and in the TCLP. Proceedings of the Nineteenth International Conference on Solid Waste Technology and Management held in Philadelphia, PA. P. 567-576.
  - Townsend, T.G., Dubey, B., and Solo-Gabriele, H., 2004. Assessing Potential Waste Disposal Impact from Preservative Treated Wood Products. *Proceedings of the Environmental Impacts of Preservative Treated Wood Conference, held in Orlando, FL*. Conference Sponsored by the Florida Center for Environmental Solutions located in Gainesville, FL.
  - Solo-Gabriele, H.M., Townsend, T.G., and Cai, Y., 2004. Environmental Impacts of CCA-Treated Wood Within Florida, USA. *Proceedings of the Environmental Impacts of Preservative Treated Wood Conference, held in Orlando, FL*. Conference Sponsored by the Florida Center for Environmental Solutions located in Gainesville, FL.
  - Khan, B.I., Solo-Gabriele, H., Townsend, T., and Cai, Y., 2004. Quantification and Speciation of Arsenic Leaching from an In-Service CCA-Treated Wood Deck and Disposed CCA-treated wood to Lysimeters Simulating Different Landfill

- Conditions (Abstract). *Proceedings of the Environmental Impacts of Preservative Treated Wood Conference, held in Orlando, Fl.* Conference Sponsored by the Florida Center for Environmental Solutions located in Gainesville, FL.
- Jacobi, G., Solo-Gabriele, H., Townsend, T., Dubey, B., Lugo, L., 2004. Extent of CCA-Treated Wood in Consumer Mulches (Abstract). *Proceedings of the Environmental Impacts of Preservative Treated Wood Conference, held in Orlando, Fl.* Conference Sponsored by the Florida Center for Environmental Solutions located in Gainesville, FL.
  - Jambeck, J.R., Townsend, T., and Solo-Gabriele, H., 2004. Leachate Quality from Simulated Landfills Containing CCA-Treated Wood. *Proceedings of the Environmental Impacts of Preservative Treated Wood Conference, held in Orlando, Fl.* Conference Sponsored by the Florida Center for Environmental Solutions located in Gainesville, FL.
  - Shibata, T., Solo-Gabriele, H.M., Fleming, L., Shalat, S., Cai, Y., and Townsend, T., 2004. Leachable and Dislodgeable Arsenic and Chromium from In-Service CCA-Treated Wood. *Proceedings of the Environmental Impacts of Preservative Treated Wood Conference, held in Orlando, Fl.* Conference Sponsored by the Florida Center for Environmental Solutions located in Gainesville, FL.
  - Sotome, Y., Muniz, A.M., Shibata, T., Solo-Gabriele, H.M., 2004. Wood Preservative 101: Frequently Asked Question (FAQ), (Abstract). *Proceedings of the Environmental Impacts of Preservative Treated Wood Conference, held in Orlando, Fl.* Conference Sponsored by the Florida Center for Environmental Solutions located in Gainesville, FL.
  - Dubey, B., Townsend, T., and Solo-Gabriele, H., 2004. Leaching of Copper, Chromium and Arsenic from CCA Treated Wood in Sanitary Landfill Leachate (Abstract). *Proceedings of the Environmental Impacts of Preservative Treated Wood Conference, held in Orlando, Fl.* Conference Sponsored by the Florida Center for Environmental Solutions located in Gainesville, FL.
  - Georgiadis, M., Cai, Y., and Solo-Gabriele, H.M., 2004. Arsenic Speciation in Soils and CCA-treated Wood Leachate (Abstract). *Proceedings of the Environmental Impacts of Preservative Treated Wood Conference, held in Orlando, Fl.* Conference Sponsored by the Florida Center for Environmental Solutions located in Gainesville, FL.

COURTESY REPORT  
For Complimentary Studies

Project Administration

1. Dr. Solo-Gabriele continues to work on the project funded by Florida International University (FIU) and the National Institutes of Environmental Health Sciences (NIEHS). The title of the project is, “Impacts of arsenic from CCA-treated wood within marine and terrestrial environments.” The “sand boxes” have been completed and rainfall, runoff, and infiltration samples have been collected for a period of 1.5 years. A marine organism sampling study was also performed.
2. Dr. Solo-Gabriele is currently collaborating with Dr. Stuart Shalat of Rutgers University and Dr. Lora Fleming of the University of Miami Medical School on an epidemiologic study evaluating the impacts of CCA-treated playgrounds on children. Sampling of

playgrounds and children has been initiated. Eight children have participated in the study to date.

3. Drs. Solo-Gabriele and Townsend assisted with the planning of a conference titled, "Environmental Impacts of Preservative-Treated Wood." This conference was held February 8-10, 2004 and was sponsored by the Florida Center for Environmental Solutions. Tim Townsend is currently finishing up the post-conference proceedings and Helena Solo-Gabriele is currently finishing the documents that resulted from the conference workshop.
4. A proposal was submitted in collaboration with the Town of Medley to the FDEP Innovative Recycling Grants Program. The title of the proposal is, "Augmented Sorting of Recovered Wood Waste Using Stain and X-ray Technologies." This proposal is currently ranked first. Funding will depend upon whether the Florida legislature and the Governor appropriates funding towards the Innovative Recycling Grants Program.