

**SUPPORTING INFORMATION AVAILABLE ELECTRONICALLY FOR**

**Release of Arsenic to the Environment from CCA-Treated Wood:  
Part II – Leaching and Speciation during Disposal**

**by**

Bernine I. Khan<sup>1,§</sup>, Jenna Jambeck<sup>2</sup>, Helena M. Solo-Gabriele<sup>1,\*</sup>,  
Timothy G. Townsend<sup>2</sup>, Yong Cai<sup>3</sup>

**This electronic appendix (total 7 pages) includes:**

- a) Supplemental Table and Figures (Table A, and Figures A to C)**
- b) Additional references relevant to the manuscript**

<sup>1</sup>University of Miami, Department of Civil, Architectural, and Environmental Engineering. P.O. Box, 248294, Coral Gables, Florida 33124-0630.

<sup>2</sup>University of Florida, Department of Environmental Engineering Sciences, Gainesville, FL 32611-6450

<sup>3</sup>Florida International University, Department of Chemistry & Biochemistry and Southeast Environmental Research Center (SERC), Miami, Florida 33199

\*Corresponding Author. Tel.305-284-3489; fax: 305-284-3492, Email address: hmsolo@miami.edu

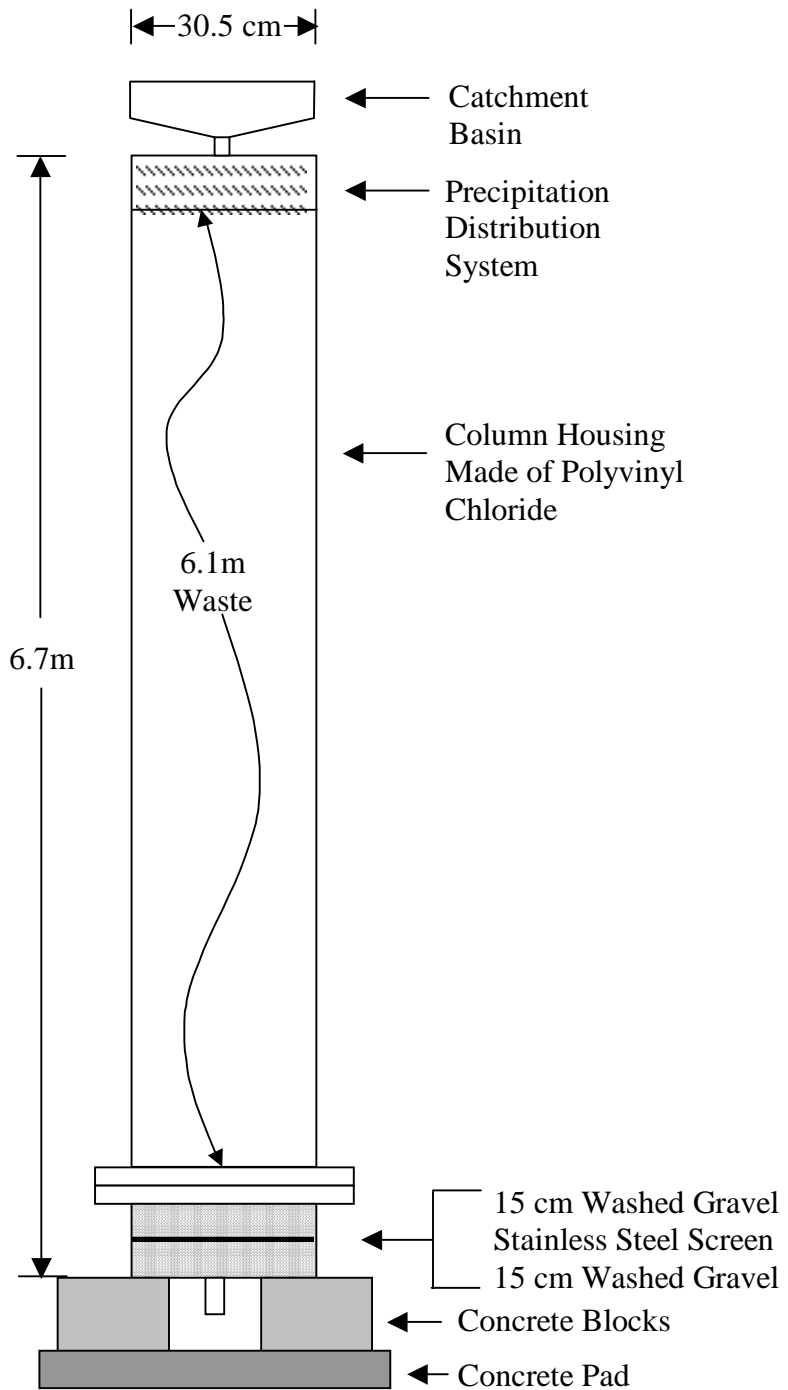
§ Present address: U.S. Environmental Protection Agency, Office of Water/Office of Science and Technology Health and Ecological Criteria Division, Washington D.C. 20460

**Table A. Summary of Physico-Chemical Parameter Measurements of Leachates  
from each Lysimeter**

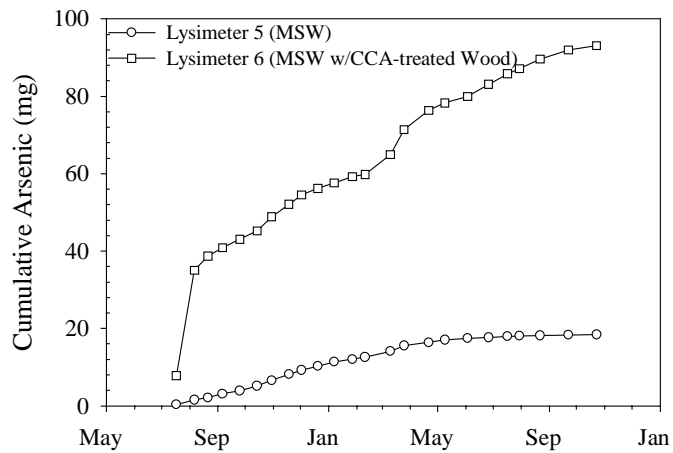
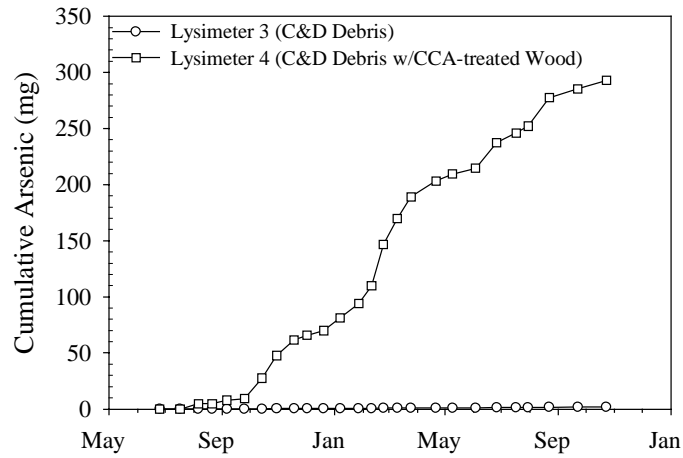
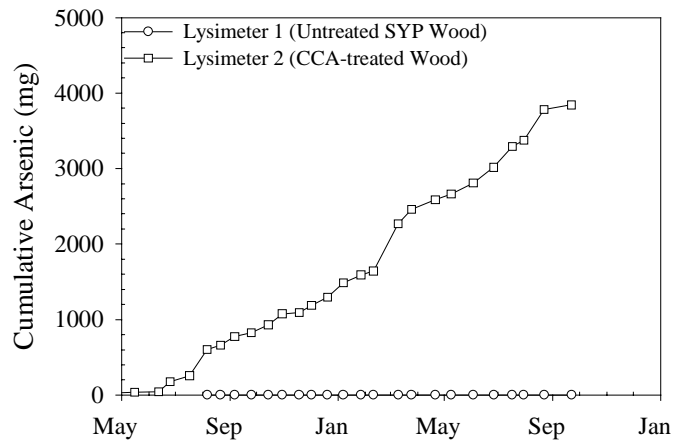
Lysimeter No.	Waste Type	Added CCA	pH	ORP <sup>a</sup> (mV)	DO <sup>b</sup> (mg/L)	Temperature (°C)		Conductivity (µS/cm)
						Summer	Winter	
1	Monofill	No	5.1 to 6.6	+ 154 to -514	0.49 to 5.4	26	14	174 to 685
2	Monofill	Yes	5.0 to 6.7	+ 135 to -516	0.61 to 4.2	26	14	280 to 1001
3	C&D	No	6.5 to 7.5	-238 to -644	0.04 to 5.2	26	13	2.0 to 4.5
4	C&D	Yes	6.5 to 7.3	-244 to -672	0.03 to 2.5	27	13	2.3 to 5.5
5	MSW	No	4.8 to 7.8	-126 to -656	0.12 to 3.2	26	15	6.5 to 39
6	MSW	Yes	4.4 to 7.5	-77 to -670	0.1 to 1.6	26	14	7.6 to 40

<sup>a</sup> Oxidation-reduction potential (ORP) was measured using an Accumet Portable pH/mV Meter, Model AP62.

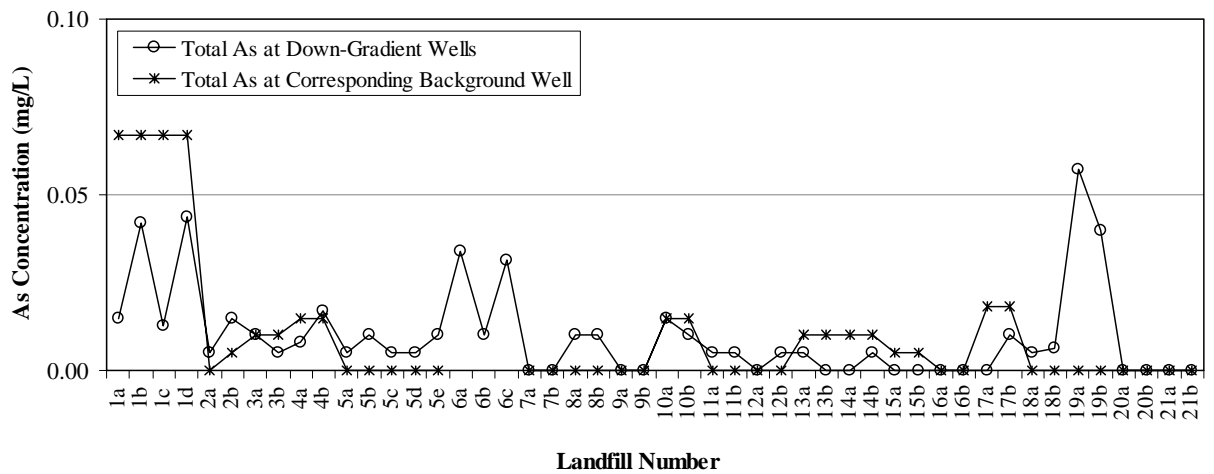
<sup>b</sup> Dissolved oxygen (DO) was measured using a YSI, Inc. DO Meter Model 55/12 FT.



**Figure A. Lysimeter Construction (from Jambeck, 2004)**



**Figure B. Comparison of the cumulative mass of total arsenic leached from each set of lysimeters.**



**Figure C. Total arsenic concentration measured from detection and corresponding background wells located at C&D debris facilities. Each number corresponds to a different landfill facility. No background sample available for landfill 6.**

## Supplemental References By Category

### Ph.D. Studies Supporting this Work

Khan, B.I. **2004**. Quantification, Speciation, and Impact of Arsenic Leaching From In-Service and Disposed CCA-Treated Wood on the Environment. Ph.D Dissertation, University of Miami, Coral Gables, Florida.

### References Further Supporting Release of Arsenic from CCA-Treated Wood during Disposal

Gifford, J.S., Marvin, N.A.; Dare, P.H. **1993**. Proceedings - Annual Meeting of the American Wood-Preservers' Association 95, 53-64.

### References Focusing on the Speciation of Arsenic in the Environment

Cullen, W.R. and Reimer, K.J. **1989**. Arsenic Speciation in the Environment. Chemical Review, **89**, 713-764.

Woolson, E.A. **1977**. Fate of Arsenicals in Different Environmental Substrates. Environmental Health Perspective, 19, 73-81.

McBride, B.C. and Wolfe, R.S. **1971**. Biosynthesis of Dimethylarsine by Methanobacterium. Biochemistry, 10, 4312-4317.

Cullen, W.R , McBride, B.C. and Pickett, A.W. **1979**. The Transformation of Arsenicals by *Candida humicola*. Canadian Journal of Microbiology, 25, 1201-1205.

Nies, D.H. **1999**. Microbial Heavy Metal Resistance. Applied Microbiology and Biotechnology, 51, 730-750.

Silver, S., Ji, G., Broer, S., Dey, S., Dou, D., and Rosen, B.P. **1993**. Orphan Enzyme or Patriarch of a New Tribe: The Arsenic Resistance ATPase of Bacterial Plasmids. Molecular Microbiology, 8, pp. 637–642.

Frostegård, Å., Tunlid, A., and Bååth, E. **1993**. Phospholipid Fatty Acid Composition, Biomass, and Activity of Microbial Communities from Two Soil Types Experimentally Exposed to Different Heavy Metals. Applied Environmental Microbiology, 11, 3605-3617.

Fliessbach, A., Martens, R., and Reber, H.H. **1994**. Soil Microbial Biomass and Microbial Activity in Soil Treated with Heavy Metal Contaminated Sewage Sludge. Soil Biology and Biochemistry, 26, 1201- 1205.

Doelman, P. and Haanstra, L. **1984**. Long-Term and Short-Term Effects of Cadmium, Chromium and Zinc on Soil Microbial Respiration in Relation to Abiotic Factors. *Plant and Soil*, 79, 317-327.

#### Treated Wood Standards

American Wood-Preservers' Association, **2003**. *Standards*. American Wood-Preservers' Association, Selma, AL.

#### Toxicity of Treated Wood

Stook, K., Dubey, B., Ward, M., Townsend, T., Bitton, G., Solo-Gabriele, H. **2004**. An Evaluation of the Heavy Metal Toxicity of Pressure Treated Wood Leachates with MetPLATE. *Bulletin of Environmental Contamination and Toxicology*, 73(6): 987-994.