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Comment on “Evaluating landfill disposal of chromated copper arsenate (CCA) treated wood and potential effects on groundwater: Evidence from Florida” by Jennifer K. Saxe, Eric J. Wannamaker, Scott W. Conklin, Todd F. Shupe and Barbara D. Beck [Chemosphere 66/3 (2007) 496–504]

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Dear Editor,

This comment is in response to an article written by Saxe et al. titled: “Evaluating landfill disposal of chromated copper arsenate (CCA) treated wood and potential effects on groundwater: Evidence from Florida.” We were compelled to write this comment as Saxe et al. were misleading in their references of the work conducted by our group. Of particular concern is their misinterpretation of the groundwater data compiled by the Florida Department of Environmental Protection. Below are some details of their errors and misrepresentations.

Reference to Solo-Gabriele and Townsend et al. 1999

The forecast published in 1999 was developed prior to knowledge of the U.S. EPA phase-out announced in 2002. We firmly believe that the disposal forecast published in 1999 was based upon the most up-to-date information available at that time. It is misleading to judge the 1999

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model based upon policy changes and information that has been gathered since that time. A more refined forecast has since been published by our research group (Khan et al. 2006a,b) and Saxe et al. were aware of this more recent forecast during the publication of their paper and yet they chose to reference the older 1999 forecast.

Reference to Khan et al. 2006a,b

Saxe et al. were aware of the work published in Khan et al., during the publication of the paper in question. However, they fail to recognize that the Khan et al. model estimates that of the 28,000 metric tons of arsenic imported to the state in the form of arsenic, 4,600 metric tons were lost during in-service use. Within the disposal sector we estimate that a relatively small fraction (20 to 50 metric tons of arsenic) would have been released in landfills by 2000. Given the total quantities already imported into the state for in-service use and the amount that yet remains to be disposed and ultimately leached during disposal, the impacts to groundwater in the vicinity of C&D landfills will take some time. The extent of the impact of these future releases will be a function of disposal management practices today as much of the CCA-treated wood is still in service.

Reference to Jambeck et al. 2006

Saxe et al. incorrectly reference the work of Jambeck et al. to evaluate the behavior of CCA-treated wood within C&D waste. The lysimeters described by Jambeck et al. contained treated wood only and were intended to simulate monofill landfill conditions (a landfill containing only treated wood) and not C&D landfill conditions (a landfill containing wood, concrete, cardboard, and other components of C&D waste). Saxe et al. incorrectly equate the monofill scenario to a C&D scenario.

Misrepresentation of FDEP Groundwater Data

Saxe et al. conveniently aggregate all of the groundwater monitoring data collected by the FDEP together. As a result of this aggregation the authors artificially increase the variability in the raw data set so that statistically the variations in the raw data set overwhelm any observable trends for individual landfills. Groundwater impacts should be more appropriately evaluated on a case-by-case basis, as groundwater hydrology and aquifer characteristics vary throughout the state and from landfill to landfill. When evaluating the data on a case-by-case basis, results suggest that roughly 10% of the C&D landfills in Florida have exceeded regulatory guidelines for arsenic. This is recognized by Saxe et al. (6 of 62 landfills) and in Khan et al. 2006b (1 to 3 of 21 landfills). Ten percent is a significant fraction, in particular as cumulative disposal of CCA-treated wood is continuing to increase and given the time needed for transport of the arsenic through the landfill and ultimately to the aquifer.

Even with the aggregate lumping of data, which makes it difficult to discern trends, the authors believe that Saxe et al.'s figure 2 provides evidence that some impacts may have already been observed as the data show that *on average* the concentrations in groundwater at C&D landfills increases as one proceeds from background wells to detection/compliance wells. Within the detection/compliance wells the average arsenic concentrations in groundwater was between 3 to 9 µg/L as opposed to background wells which show average concentrations between 2 and 6.5 µg/L. The average concentrations observed in these wells are of particular concern as the background arsenic concentration for groundwater within Florida has been measured at 2 µg/L (Focazio et al., 1999).

Recommendation for Ultimate Disposal

C&D landfills in Florida are unlined. One alternative for the disposal of arsenic-treated wood is within lined MSW (municipal solid waste) landfills, the same landfills that accept regular household trash. As acknowledged by Saxe et al. several countries within the European Union are considering disposal within hazardous waste landfills, which are characterized by more sophisticated containment systems. In the U.S.A., CCA-treated wood is exempt from classification as a hazardous waste at the federal level (U.S. EPA, 2003), even though arsenic-treated wood fails toxicity limits when subjected to standardized leaching tests. In the case of Florida, our research group recommends, as a minimum, to dispose of arsenic-treated wood within lined MSW landfills. The bottom liners at MSW landfills could provide some protection against groundwater contamination from the leachates generated by arsenic-treated wood, although disposal to hazardous waste landfills would provide additional protection. Unfortunately, in Florida, CCA-treated wood continues to be disposed within unlined C&D landfills.

Summary

Saxe et al. failed to recognize that there is a time lag with respect to disposal of treated wood and its impact on the environment. They were misleading in the references to our work and have chosen to evaluate the FDEP data set in a manner that makes it exceedingly difficult to evaluate trends. Saxe et al. also confused the issue with respect to proposed ultimate disposal recommendations within Florida. Currently the State is considering regulations that would require the disposal of arsenic-treated wood within lined landfills (FDEP, 2006) and the authors of this comment believe that such proposed regulations would help to minimize future impacts associated with the disposal of arsenic-treated wood.

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