EXECUTIVE SUMMARY

A cradle-to-grave life cycle assessment (LCA) entitled "Life Cycle Assessment Procedures and Findings for ACQ-Treated Lumber" (AquAeTer, Bolin and Smith 2011), was recently completed for the Treated Wood Council (TWC) for alkaline copper quaternary (ACQ) treated lumber used in decking. As part of the LCA project, comparative LCA data also were compiled for wood plastic composite (WPC) decking. The findings of the ACQ-treated lumber LCA were summarized in a journal article published in the Journal of Cleaner Production (Bolin and Smith 2011).

Arch Treatment Technologies, Inc. (Arch) offers two preservative formulations, copper azole type C (CA-C) and micronized copper azole type C (μCA-C), which have copper as the primary fungicide and termiticide, that are water-borne preservatives. Arch commissioned AquAeTer to complete a limited LCA of their two copper azole (CA) treated wood decking products. The CA LCAs rely heavily on data collected for the LCA of ACQ-treated lumber. As such, use of this Life Cycle Assessment of CA-treated lumber decking should be done in conjunction with the ACQ Procedures and Findings report (AquAeTer, Bolin and Smith 2011) or the published journal article (Bolin and Smith 2011). In this report, modifications to the ACQ LCA model are made only where CA differs from ACQ. The LCA results provide data for Arch's use to educate consumers regarding the energy and environmental aspects of their products.

This LCA has been done for CA-C and μCA-C-treated southern pine dimensional lumber. The lumber is modeled as if treated with CA preservative prepared in accordance with AWPA Standard P5-09, for above-ground exterior exposure, with retentions according to International Code Council Evaluation Service (ICC-ES) evaluation report ESR-1721, and intended for outdoor residential decks. The LCA has determined the cradle-to-grave environmental impacts resulting from seedling production, growth, harvest, manufacture, use, and final disposal of CA-treated lumber; the opportunities to reduce the environmental burdens associated with CA-treated lumber; and comparison of the CA-treated lumber product to an alternative product in the market, WPC decking.

Lumber treated with CA-C and μCA-C preservatives for above ground, exterior exposure have, on a life cycle cradle-to-grave basis, lower environmental impact indicators than wood plastic composite (WPC) decking.

Compared to CA-C-treated lumber, WPC requires approximately 15 times more fossil fuel and 2.4 times more water, and results in emissions with potential to cause 2.9 times more GHG, five times more acid rain, 2.6 times more smog, 1.7 times more ecological toxicity, and 1.5 times more eutrophication impact, than CA-C-treated lumber. In addition, 8.8 times more total energy is required during the life of WPC compared to CA-C-treated lumber.

Compared to μCA-C-treated lumber, WPC requires approximately 17 times more fossil fuel and 2.4 times more water, and results in emissions with potential to cause three times more GHG, 6.5 times more acid rain, 2.6 times more smog, 1.7 times more ecological toxicity, and 3.3 times more eutrophication impact, than μCA-C-treated lumber. In addition, 9.3 times more total energy is required during the life of WPC compared to μCA-C-treated lumber.

The impact indicator "footprint" of adding a typical deck to a residence for a family of three compared to a typical U.S. family's total footprint is less than 0.1% for each of the impact indicators assessed for either the CA-C-treated or μCA-C-treated lumber decks. The comparable WPC deck's "footprint" is greater than 0.1% for the total energy, GHG, fossil fuel use, acid rain, and ecotoxicity impact indicators.

The differences between CA-C and μCA-C preservative treated wood products are minor. Where differences exist, μCA-C impact values are slightly lower due to the absence of monoethanolamine (MEA) in the treating solution.