

Leaching of Copper, Chromium and Arsenic from CCA Treated Wood in Sanitary Landfill Leachate

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ABSTRACT

Scrap treated wood from construction activities and demolished treated wood structures are typically disposed in landfills. To examine the potential mobility of metals from pressure treated wood disposed in landfills, wood samples preserved with chromated copper arsenate (CCA) were subjected to a solvent extraction experiment using leachate from lined landfills. The concentrations of arsenic, chromium and copper were measured in the leachates after extraction. Two types of wood samples were used in the experiment: weathered and non-weathered. The two non-weathered samples were southern yellow pine dimensional lumber purchased from a retail outlet and sent to two different treatment facilities for preservation. Eight weathered samples of CCA- treated wood were collected from a variety of demolition sites and waste disposal facilities. Each of the eight weathered CCA-treated wood samples used in this study represented a composite of seven individual CCA treated boards. Landfill leachate was collected and characterized from six lined municipal solid waste landfills in Florida. The solvent extraction study was conducted using each of these six leachates as the leaching fluid. The extraction was performed following methods outlined for the toxicity characteristic leaching procedure (TCLP). All samples were processed to meet the regulatory requirement of having a particle size no larger than 0.95 cm at its narrowest dimension. The leachates were filtered and digested prior to analysis on ICP-AES (inductively coupled plasma – atomic emission spectroscopy). The results were compared to those obtained using the toxicity characteristic leaching procedure (TCLP) and the synthetic precipitation leaching procedure (SPLP). The mean arsenic concentration in the non-weathered CCA treated wood leachate was 7.41 mg/L for TCLP and 7.17 mg/L for SPLP. The weathered wood leachates had As concentrations in the range of 3.0 to 6.6 mg/L for TCLP and 3.2 to 7.6 mg/L for SPLP. The arsenic concentrations in the extract using the landfill leachate was in the range of 1.49 to 5.91 mg/L for non-weathered samples and 1.97 to 6.57 mg/L for weathered treated wood samples. In general the arsenic and chromium concentrations leached using the landfill leachate samples varied somewhat among the sites, but tended to be similar or somewhat lower than the TCLP and SPLP concentrations. Copper leaching was greatest when extracted with the landfill leachate.