

Dioxins and Furans in Hog Fuel Boiler Grate and Fly Ash

FOREST INDUSTRY HEALTH RESEARCH PROGRAM

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FIHRP FOREST INDUSTRY HEALTH RESEARCH PROGRAM has published a report titled “Dioxins and Furans in Hog Fuel Boiler Grate and Fly Ash”. The report is available to FIHRP members on the Pulp and Paper Employee Relations Services website at www.paperforum.com or contact Scott MacLean by phone (604) 532-0642, by fax (604) 532-0639, or by e-mail at smaclean@paperforum.com. Non-members of FIHRP may be charged for the report.

Studies have demonstrated worker exposure to hog fuel boiler ash during maintenance activities and that chlorinated dibenzo-*p*-dioxins (dioxins) and chlorodibenzofurans (furans) are present in boiler ash. In addition, concerns regarding the potential health implications of exposures to dioxins and furans have been expressed in the literature.

This study evaluates the potential for worker exposure to dioxins and furans in hog fuel boiler ash. The overall objective of this project was to determine whether workers are potentially exposed to dioxins and furans when working with hog fuel boiler ash, and the factors that influence the concentration of these compounds in boiler ash.

As part of this study, grate ash and fly ash samples from four mills were collected and analyzed for select dioxins and furans. A literature review was also conducted to determine: 1) the health effects associated with dioxin and furan exposure, 2) normal background exposures to dioxins and furans through all routes of exposure, and 3) factors influencing the formation of dioxins and furans in boilers.

Based on the literature review, the boiler ash analysis results, and information on the type of boiler and fuel used at participating mills, the following conclusions were made: 1) Significant concentrations of dioxins and furans are not formed in the combustion zone of the hog fuel boiler as the temperatures are too hot. 2) The type of pollution prevention device utilized in conjunction with a hog fuel boiler can contribute to the formation of dioxins and furans. Pollution prevention devices that operate between 200°C and 400°C generate higher concentrations of dioxins and furans compared with pollution prevention devices that operate at lower temperatures. 3) The type of fuel used in the hog boiler can potentially influence the concentrations of dioxins and furans generated. The presence of chloride salts and the use of effluent sludge can influence the concentrations of dioxins and furans. 4) Exposure to dioxins and furans via inhalation during hog fuel boiler maintenance and routine cleaning activities are insignificant compared to other exposure routes and are highly unlikely to result in adverse effects through this pathway. 5) Dermal and incidental ingestive exposures may be important routes of exposure for workers, however, further evaluation is required to assess the significance of these routes. 6) Before undertaking further studies of worker exposures, biological monitoring of workers is advised to verify whether boiler maintenance workers have elevated body burdens of dioxins and furans compared to the background population.