

Worker Exposures to Creosote at the Somerville Plant

A. Industrial Hygiene Sampling

OSHA is the Occupational Safety and Health Administration of the United States Department of Labor. OSHA's stated mission is to assure the safety and health of American workers. Among the ways that OSHA carries out its mission is by setting standards for worker exposure to various substances.

Because creosote is derived from coke oven coal tar, it is regulated as a Coal Tar Pitch Volatile (CTPV). The OSHA exposure standard for coal tar pitch volatiles is 0.20 mg/m³ (as the benzene soluble fraction of total particulate). OSHA worker exposure standards assume that the average worker can work his or her entire working career, defined to be 30 years, at the permissible exposure limit (0.2 mg/m³ in this case) without experiencing an increased risk of disease. There are also OSHA exposure standards for volatile organic substances, including naphthalene, toluene, xylene and benzene. There is even an OSHA standard for exposure to wood dust.

Worker exposures to hazardous substances are determined by sampling the air in the breathing zone of workers for a full shift and comparing the results to applicable permissible exposure limits. Typically, the tests are carried out by fitting employees with various sample collection media connected to portable pumps which draw air from the worker's breathing zone through the sampling media. At the end of the worker's shift, the sampling media is removed from the sampling train and preserved for chemical analysis. Analysis of the sampling media is performed by certified labs and interpreted by a certified professional to determine the amount of a given substance to which the worker could have been exposed during his or her shift. The analysis will indicate whether the worker was exposed at a level above or below OSHA's safety standard, known as a PEL, or "Personal Exposure Limit."

Industrial hygiene sampling events occurred at the Somerville plant in 1980, 1998, 2002, 2004 and 2007. Over the course of those events, hundreds of samples have been collected for coal tar pitch volatiles, PAHs, naphthalene, benzene, toluene, xylene and wood dust. No samples have exceeded the OSHA PEL for PAHs, naphthalene, benzene, toluene, xylene or wood dust. One sample slightly exceeded the OSHA PEL for coal tar pitch volatiles in 1998, but that sample was for a locomotive engineer, who was not directly involved in the treating process. No exceedances of any PELs have been observed since 1998.

B. The Bookbinder Study

In 2001, Mark G. Bookbinder, Ph.D., completed and submitted to EPA a report on the dermal and inhalation exposures of creosote-exposed workers. Dr. Bookbinder studied four wood-treating plants in the U.S. and Canada. The Somerville plant was one of the plants in the study. He followed twenty-five workers for four or five days each. The test subjects all worked directly in the wood-treating process.

The test subjects' exposures were measured in two ways. First, each wore a whole body dosimeter, which is essentially a cotton suit worn under the employee's work clothing as well as cotton gloves worn under the employee's regular work gloves. The purpose of the whole body dosimeter was to measure the workers' potential for skin contact with creosote. The whole body dosimeter was carefully removed from each test subject each day, cut into sections, and preserved for analysis.

The second type of exposure monitoring was an air sampler that each test subject wore in his or her breathing zone. The sampling media was connected to a pump which pulled air through a filter, simulating the worker's breathing. The purpose of this test was to determine the quantities of creosote constituents in the worker's breathing zone. Dr. Bookbinder collected both sets of samples so that he could evaluate both the test subjects' skin exposure and their inhalation exposure potentials.

The Somerville plant applied more creosote during the test period than any of the other plants in the study. Dr. Bookbinder noted that the Somerville employee with the highest dermal exposure level was the one who unloaded tank cars filled with creosote. The dermal exposure levels of the Somerville employees varied depending on how often they handled treated wood or equipment used in the treating process.

The results for inhalation exposures were significant. The inhalation exposures at Somerville were lower than at some other plants, despite the fact that Somerville used more creosote than the other plants. All of the inhalation exposures were many times below the OSHA standards, and benzo(a)pyrene (one of the carcinogenic PAHs found at trace levels in creosote) was not detected in any of the air samples.

Dr. Bookbinder concluded his report by recommending that workers be more diligent about following label instructions for creosote and that they wear protective gloves. He did not find that any worker at any site was over-exposed to creosote.