

Report Summary

PNNL-26254, Analysis of Respirator Cartridge Performance Testing on

Hanford Tank AX-101

Test Dates: September 9-11, 2016

The use of self-contained breathing apparatus (SCBA) has been implemented for workers in the tank farms. SCBA weighs about 30 lbs. and increases the ergonomic risk. Switching from SCBA to respirator cartridge masks could protect workers from tank vapors and gases while reducing ergonomic risk. Until air-purifying respiratory protective equipment has been tested, the results reviewed, and APR use is approved by a third party, workers will rely on SCBA.

The purpose of this report is to summarize the results of Pacific Northwest National Laboratory's (PNNL) *Analysis of Respirator Cartridge Performance Testing on Hanford Tank AX-101* (PNNL-26254). PNNL tested the performance of two respirator cartridges: the 7422-SC1 multipurpose cartridge and the 7422-SD1 multipurpose cartridge. Both cartridges are manufactured by Scott.

The cartridges were tested following the experimental method as defined by OSHA ([OSHA Link](#)) PNNL detailed the testing which “was conducted from September 9–11, 2016, using headspace vapors from Hanford tank AX-101 under static conditions fed to a respirator cartridge test stand developed by WRPS in collaboration with HiLine Engineering (Richland, Washington)” (pg.iii). The cartridges were tested on separate days. Sorbent tubes, the most widely used collection media for sampling hazardous gases and vapors in air, were used to collect samples of the vapor stream entering and exiting the respirator cartridge. The samples were analyzed for chemicals of potential concern (COPC) concentrations.

PNNL reported that “breakthrough occurred early in the test sequence for ammonia” (pg.iv). Both the SCOTT 7422-SD1 cartridge and the SCOTT 7422-SC1 cartridge experienced breakthrough of ammonia after 2 hours. PNNL wrote, “[t]his experimental result supports a 2-hour service life for the use of SCOTT 7422-SC1 and 7422-SD1 cartridges in APRs employed to protect workers at Hanford tank AX-101” (pg. iv). Furthermore, “additional respirator cartridge evaluations” should be performed in order to “determine proper respiratory protection requirements” (pg. iv). View the full report at this link here.

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