

REPORT SUMMARY

PNNL-26317, Analysis of Respirator Cartridge Performance Testing on a

Hanford AN Tank Farm Exhauster Slipstream

Testing dates: September 30 – October 2, 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.

This is a summary of the results of Pacific Northwest National Laboratory's (PNNL) *Analysis of Respirator Cartridge Performance Testing on a Hanford AN Tank Farm Exhauster Slipstream* (PNNL-26317). PNNL tested the performance of two respirator cartridges: the 7422-SC1 multipurpose cartridge and the 7422-SD1 multipurpose/P100 particulate 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 30 – October 2, 2016, on a slipstream from the AN exhauster, 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 “ammonia breakthrough, above 10% of its OEL, occurred after 10 hours for both cartridges (SCOTT 7422-SD1 and SCOTT 7422-SC1). Inlet concentrations of ammonia remained relatively constant with an average of 118% of the OEL (29.5 ppm) up through the 10-hour sample period. This experimental result supports a 10-hour service life for the use of SCOTT 7422-SC1 and 7422-SD1 cartridges in APRs employed to protect workers at the Hanford AN tank farm under the same conditions as those tested. Additional respirator cartridge and respirator selection evaluations by Industrial Hygiene professionals are recommended to determine proper respiratory protection requirements” (pg.iii). View the full report at this link here. [Click here for the full report.](#)