

## REPORT SUMMARY

### ***PNNL-26180, Analysis of Respirator Cartridge Performance Testing on***

### ***Hanford Tank BY-108***

***Testing dates: July 15-17, 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 Tank BY-108* (PNNL-26180). 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 over a period from July 15–17, 2016, using headspace vapors from Hanford tank BY-108 under static conditions fed to a respirator cartridge test stand developed by WRPS in collaboration with HiLine Engineering" (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 "[b]ased on the measurements taken for this study, breakthrough occurred early in the test sequence for ammonia and 1,3-butadiene. The ammonia breakthrough alone was less than 2 hours for both cartridges tested (SCOTT 7422-SD1 and SCOTT 7422-SC1). Because outlet measurements from laboratory analysis are unavailable between time zero and 2 hours, and inlet ammonia concentrations exceed Centers for Disease Control and Prevention-National Institute for Occupational Safety and Health recommendations for APR use identification of an acceptable change-out frequency is not possible or recommended for the use of these cartridges in similar concentration environments" (pg.iv). [Follow this link to view the full report.](#)