Development and Application of Unventilated Monitoring to Recovery following a Chemical Release

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During operations to dispose of the U.S. stockpile of chemical munitions, various monitoring methods are used to ensure workers are dressed in appropriate personal protective equipment (PPE) and to ensure that decontamination of areas and equipment has been adequately performed. One monitoring technique that has been successfully employed is unventilated monitoring testing (UMT). In UMT, areas or equipment are tented or enclosed such that there is no air exchange with adjacent volumes. The tented volume is then monitored to measure the agent vapor concentration. To ensure adequate mixing in large volumes, fans are used to circulate the air in the volume being monitored. UMT methods have been developed that ensure that the volume is uniformly mixed and that the monitoring hold time is sufficiently long to ensure a steady concentration has been reached. UMT could be a useful monitoring method to augment wipe samples following a chemical attack or an accidental chemical release. For example, it could be used to quickly identify “hot spots” (i.e., more contaminated areas) in order to reduce the number of wipe samples that are needed. It could also be used to determine the effectiveness of decontamination.

The paper will describe the technical basis for the UMT concepts employed in the Army’s chemical weapon disposal program and will provide examples of how it has been used in the past and could be used in the event of a future chemical attack or accidental release. Specifically, it will describe the requirements for ensuring adequate mixing in the volume and for the monitoring hold time. It will also describe the relationship between the limits of detection and quantitation of the monitoring equipment, and the level of agent contamination that can be reliably measured by this technique.