Compressed Gas ER PPE and Decontaimnation
May 2013

Proper Procedure and PPE is Critical

Leak check hole on DISS or VCR connection can release a significant amount of gas

TMAI Release Through VCR Leak Check Hole
At a system pressure of 0.7 barg (10 psig) TMAI flowed out at 10.7 gms/sec
In open air this sprayed a distance of 170 cm. This atomized the liquid TMAI creating an intense flame

PPE for Silane ER
Full body protection primarily for thermal/radiant heat exposure.
Silane burned through Nomex in a 1 sec flame exposure
Turnout gear held up to 1 sec flame exposure (Intel Test)
Turnout gear completely destroyed in 10 sec flame (Intel Test)
Nomex Hood
Firegloves
SCBA

Pyrophoric Liquid
For emergency responses where the responder can be splashed with a pyrophoric liquid it will soak into the Nomex which is a woven material. The pyrophoric liquid will burn and char the Nomex. Aluminized material however will resist liquid absorption. Flashover protection is provided with an underlayer of Nomex. Heavy leather had equal protection.

Dupont Thermopro offers good chemical and thermal protection.

PPE for Multiple Hazards
PPE for a compressed gas with multiple hazards can represent a similar challenge. Ammonia which is corrosive and can reach flammable concentrations in an indoor area requires a chemical resistant suit (level B or higher) and a flashover material.

Shrevesport 1984
Two firefighters made entry into a refrigerated warehouse with an ammonia leak in Level A. It ignited and the flashover melted and ignited the suit. One died and the second was permanently disabled.

Proper donning of PPE is critical
In one incident the responder did not properly seal his glove to the level B suit. A drip of silicon tetrachloride onto his shoulder flowed right into his glove which was pulled over the sleeve. Despite getting under a safety shower in 10 seconds, he was badly burned.

Decontamination
Gases will typically not deposit on PPE surfaces or skin.
Can absorb in clothing.
Simple aeration will desorb the gas.
As a precaution some HazMat units will use a water wash.

Water Reactive
Some gases are very water reactive and the hydrolysis byproducts will deposit on PPE or will react with the moisture on the skin, eyes or respiratory system.
Some react to a water soluble chemical like Hydrochloric acid (Dichlorosilane, Monchlorosilane).
Some react to inert compounds like Boric Oxide (B₂O₃) (Trimethylboron, Diborane).