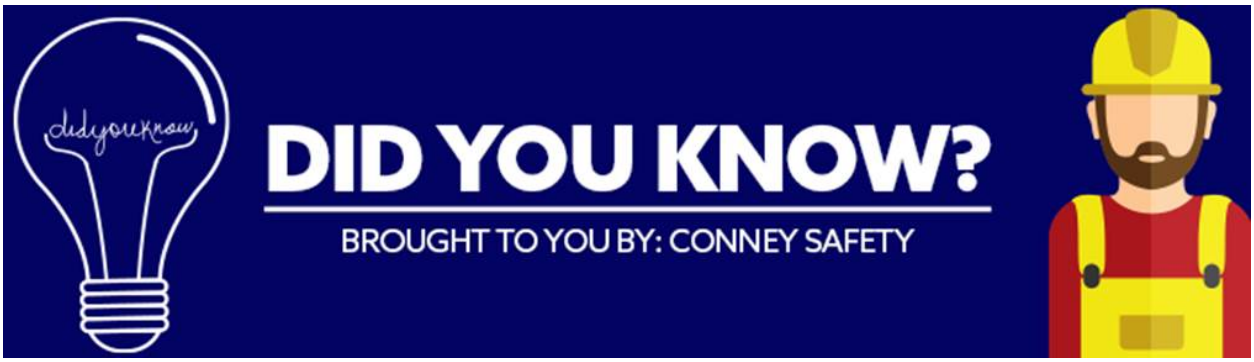

Emergency Readiness for Ammonia

Any cold storage facility or place that uses ammonia in large volume needs an Emergency Readiness Plan. There are serious potential dangers with ammonia which include fire, explosion, and chemical release. All of these threats can be deadly. It is important to note that even though fire and explosion are two possibilities with ammonia, the Emergency Readiness Plan for ammonia is different from a Fire Readiness Plan for a facility. This is mainly because of the complex distribution of the ammonia refrigerant throughout a facility, as well as the chemical release hazard potential.

Some key aspects of an Emergency Readiness Plan for ammonia will include:

- The identification of Hazard Zones, Isolation Zones, and Safe Zones at the facility.
- Creating a master map showing the entire facility with all zones identified. For use by all employees, but especially lead responders and first responders from local municipality.
- Training of Engine and Control Room personnel to monitor and control hazards. These personnel will be extensively trained, and will know how to initiate alerts and alarms, operate the fixed ammonia monitors, shutdown processes, ventilation, and disable sources of ignition.
- Training of personnel who will be the lead responders. These personnel will investigate, control, and possibly repair the hazard zone. Their training will also cover the wearing of proper PPE (personal protective equipment) that

will include hazmat suits, supplied breathing air, and the use of portable ammonia detectors.
- Making sure all plant personnel know where their nearest Safe Zones are located. These are predetermined areas where personnel will 'shelter in place' in the event of an airborne chemical hazard.

As an industrial safety supplier, Conney's focus of concern is with the PPE and ammonia detection instrumentation. This PPE will likely involve a Level A hazmat suit and a SCBA (self-contained breathing apparatus) for the lead responder personnel at the facility. Other PPE possibilities may include a full face respirator with ammonia cartridges, or an escape type mouthbit ammonia respirator and goggles. Either of these PPE options can be very effective in allowing personnel to escape a facility without being overcome by the effects of ammonia, and therefore greatly reducing the possibility of injury or death.

PPM (parts per million) levels of ammonia:

- 5-20ppm – detectable, odor threshold
- 25ppm – TWA (time weighted average) and PEL (permissible exposure limit in some states)
- 35ppm – STEL (short term exposure level)
- 50ppm – OSHA PEL
- 150-200ppm – general discomfort, eye tearing
- 250-300ppm – IDLH (Immediately Dangerous to Life and Health) for 30 minute exposure
- 500ppm – eye, nose, throat irritation – generally not serious if under 30 minute exposure
- 700ppm – permanent eye damage begins
- 1500-2500ppm – severe eye, nose, throat irritation
- 2500-5000ppm – asphyxia, skin sting, may be fatal in 10 to 30 minutes or less
- 10,000-30,000ppm – immediately fatal, skin damage blistering
- 15,000-40,000ppm – flammability concern, visible cloud depending on temperature and humidity

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