Health Effects/Levels for Chemical Warfare Agents

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Documents Review

- Existing DoD/Army Regulations
- Historical Data
- Existing Protocols
- Newly Proposed Values

Objectives

- Look at Existing Exposure Values
- How Values were being applied/interpreted
- Determine if any Existing Values Could be Adapted for First Responder Scenarios
Results

- Health Effects Matrix for Nerve, Blister, Blood Agents
- Potential Breakthrough Concentration for Proposed Chemical Test Standards
**Current Chemical Agent Levels**

- [FM 3-9](#), *Potential Military Chemical/Biological Agents and Compounds*, December 1990
- Chemical Warfare Agent Standards and Criteria for Deployments, USACHPPM Position Paper, October 2000
**Terms & Definitions**

- **Airborne Exposure Limits (AEL)**
  - Allowable concentrations in the air for occupational exposures
  - 8-hour, time-weighted average for a 40-hour work week for unmasked workers
  - Can also be referred to as the Worker Population Limits (WPL)
Terms and Definitions

- **Short Term Exposure Limits (STEL)**
  - 15-minute time-weighted average
  - Should not be exceeded at any time during a workday

- **OSHA Permissible Exposure Limits (PEL)**
  - Time-weighted concentrations
  - Must not be exceeded during an 8-hour work shift of a 40-hour work week
Terms and Definitions

- **Acute Emergency Guideline Levels (AEGL)**
  - Established by the National Advisory Committee for Acute Exposure Guideline Levels for Hazardous Substances
  - Represents the threshold exposure values for the general public
  - Applicable to emergency exposure periods ranging from 10 minutes to 8 hours
    - Level One - No significant but possibly noticeable effects
    - Level Two - Could cause casualties
    - Level Three - Could cause fatalities
**Immediately Dangerous to Life & Health (IDLH)** – A condition that:

- Poses a threat of exposure to airborne contaminants
- Can cause death or permanent adverse health effects
- May prevent the worker from escaping a contaminated environment in the event of failure of the respiratory protection equipment
- Based on the effects that might occur as a consequence of a 30-minute exposure
**ICt50** – Concentration multiplied by time of exposure that will incapacitate 50% of the exposed population
Team Recommendations

- Recommended using the Worker Population Limits as Potential Breakthrough Concentrations

- Worker Population Limits (WPL)
  - Mirror the AELs found in the AR 385-61 and DA Pams 40-8 and 40-173 for nerve and blister agents
  - Numbers have been reaffirmed by the 30-member National Advisory Committee for Acute Exposure Guidelines Levels
  - Values are safe short-term exposure limits
Team also looked at the AEGL’s Level One as potential Breakthrough Concentrations

- AEGL are still under review
- Not all have been approved by the NAC/AEGL Committee
- SBCCOM/NIOSH will continue to monitor the approval of these limits
Conclusions

- AEL/WPL for Nerve Agents (mg/m³)
  - GA/GB – 0.0001
  - GD – 0.00003
  - VX – 0.00001

- AEL/WPL for Blister Agents (mg/m³)
  - H/HD/HT – 0.0004
  - Lewisite – 0.003

- AEGL Level 1 for Nerve Agents (mg/m³) – 8 Hour Exposure
  - GA/GB – 0.0010
  - VX – 0.000028

- AEGL Level 1 for Blister Agents (mg/m³) – 8 Hour Exposure
  - H/HD/HT – 0.0083
  - Lewisite – None

Established