

# ***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

- ◆ [DA Pamphlet 40-8](#), *Occupational Guidelines for the Evaluation & Control of Occupational Exposure to Nerve Agents*, December 1990 (Under Revision)
- ◆ [DA Pamphlet 40-173](#), *Occupational Guidelines for the Evaluation & Control of Occupational Exposure to Mustard Agents*, August 1991 (Under Revision)
- ◆ [Army Regulation and DA Pamphlet 385-61](#), *The Army Chemical Agent Safety Program*, March 1997
- ◆ [FM 3-9](#), *Potential Military Chemical/Biological Agents and Compounds*, December 1990

- ◆ ***Dangerous Properties of Industrial Materials, 7th Edition, Vol III, Sax, Lewis***
- ◆ ***Hazardous Chemicals Data Book, 2nd Edition, Weiss***
- ◆ ***Short-Term Chemical Exposure Guidelines for Deployed Military Personnel, USACPPM TG 230A, May 1999 and USACPPM RD 230A, July 1999***
- ◆ ***Chemical Warfare Agent Standards and Criteria for Deployments, USACHPPM Position Paper, October 2000***

- ◆ 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)

- ◆ 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

- ◆ 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

- ◆ **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**

- ◆ **AEL/WPL for Nerve Agents (mg/m<sup>3</sup>)**
  - ◆ **GA/GB – 0.0001**
  - ◆ **GD - 0.00003**
  - ◆ **VX – 0.00001**
  
- ◆ **AEGL Level 1 for Nerve Agents (mg/m<sup>3</sup>) – 8 Hour Exposure**
  - ◆ **GA/GB – 0.0010**
  - ◆ **VX – 0.000028**
  
- ◆ **AEL/WPL for Blister Agents (mg/m<sup>3</sup>)**
  - ◆ **H/HD/HT – 0.0004**
  - ◆ **Lewisite – 0.003**
  
- ◆ **AEGL Level 1 for Blister Agents (mg/m<sup>3</sup>) – 8 Hour Exposure**
  - ◆ **H/HD/HT – 0.0083**
  - ◆ **Lewisite – None Established**

