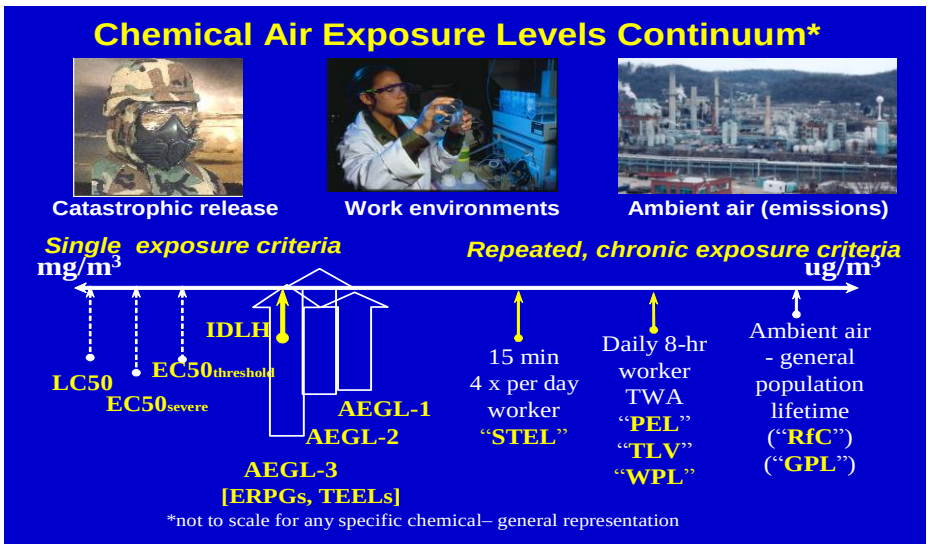
Basic Facts Regarding
Chemical Exposure Standards and Guidelines

FACT SHEET 64-015-0711

Chemicals do not have a single 'safe level.' Every chemical has multiple health-based exposure standards, limits, and guidelines—these criteria are usually represented as a specific concentration level. The exposure levels can vary depending on the duration and frequency which people may be exposed, as well as the degree of what is considered acceptable risk, which will depend on the type of situation and population. In addition, different standards and guidelines are designed for air, water, soil, and even other sources, such as food.

Health organizations (such as the USEPA, CDC, OSHA/NIOSH, FDA, as well as military health organizations) develop specific exposure concentration levels for a variety of applications. When assessing or preventing health risks associated with chemicals, it is important that the most appropriate health-based chemicals standards/guidelines are used for comparison. Figure 1 shows a generic example of the range of the types of airborne exposure standards and guidelines developed by various organizations for different applications:

Figure 1. Airborne Exposure Standards and Guidelines



Use of trademark names(s) does not imply endorsement by the U.S. Army but is intended only to assist in the identification of a specific product.

U.S. Army Public Health Command
MCHB-IP-MEM/Environmental Medicine Program
Commercial 410-436-2714, DSN 584-2714, Fax 410-436-4117

ACRONYMS and ABBREVIATIONS:

USEPA	United States Environmental Protection Agency
AIHA	American Industrial Hygiene Association
ACGIH®	American Conference of Governmental Industrial Hygienists (ACGIH® is a registered trademark of the American Conference of Governmental Industrial Hygienists.)
CDC	Centers for Disease Control and Prevention
OSHA	Occupational Safety and Health Agency
NIOSH	National Institute for Occupational Safety and Health
FDA	Food and Drug Administration
WHO	World Health Organization
NRC	National Research Council
mg/m^3	milligram chemical per cubic meter of air
ug/m^3	microgram chemical per cubic meter of air
LC_{50}	or military casualty prediction, lethal concentration-50% = concentration at which 1/2 of an exposed group are expected to die
LC_{01}	for military casualty prediction Lethal Concentration-1% = concentration at which 1% of an exposed group are expected to die
EC_{50}	for military casualty prediction, Effective Concentration-50% for (Severe) or (Mild/Threshold) effects = concentration at which 1/2 of an exposed group would be expected to have symptoms of designated severity
IDLH	Immediately Dangerous to Life and Health = occupational use, 30 minute standard used as criteria for donning full protective gear
AEGL	Acute Exposure Guidelines Levels - for civilian emergencies; multiple durations 10 min, 30 min, 1 hr, 4 hr, 8 hr; published by NRC AEGL 1 - initial level above which of discomfort (minor transient effects) may begin to be noted AEGL 2 – level above which effects may begin to be more significant, begin to impair normal activities AEGL-3 - level above which effects may begin to be very severe
ERPGs	Emergency Response Planning Guidelines –developed by AIHA. AEGLs to supersede; also Levels 1, 2, 3, for civilian emergencies; only for 1 hr
PACs	Protective Action Criteria—for emergencies—when AEGLs/ERPGs not available; sponsored by DOE Office of Emergency Management and Policy, only for 1 hr.
PALs	Provisional Advisory Levels – to assist in emergency planning and decision-making for exposure durations of 24hr, 30 days, 90 days, and 2 years: temporary values that will not be promulgated nor issued as regulatory guidance by USEPA National Homeland Security Research Center; Levels 1, 2, 3
TEELs	Temporary Emergency Exposure Levels—for emergencies—when AEGLs/ERPGs not available; sponsored by the Department of Energy Office of Emergency Management and Policy; only for 1 hr
STEL	Short-Term Exposure Limit—occupational use; a 15 min 'ceiling' level to ensure peak exposures maintain safe conditions
WPL	Worker Population Limit—a military term used for chemical warfare agents; represents standards similar to a TLV (see below)
TLV®	Threshold Limit Value—an 8-hr time weighted average developed by the ACGIH used in occupational settings to ensure. (TLV® is a registered trademark of the American Conference of Governmental Industrial Hygienists. continuous safe conditions; NIOSH and OSHA use these or have values called "Permissible Exposure Limits" (PELs)
GPL	General Population Limit—a term used for chronic protection levels developed by CDC for Army for chemical warfare agents; represents criteria similar to adjusted RfC (see below)
RfC	Reference concentration—estimated concentration that could be breathed in continuously every day for a lifetime without adverse effects (primarily used in environmental health risk assessments, developed by U.S. EPA (many found in IRIS website/database)

For additional information, contact Environmental Medicine Program, 410-436-2714