

2022
**CHEMICAL
SECURITY
SUMMIT**

August 23-25, 2022

#ChemicalSecurity





**GUIDELINE
FOUNDATION**

EMERGENCY RESPONSE PLANNING GUIDELINES

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Department of Homeland Security, Cybersecurity and Infrastructure Security Agency

Chemical Security Summit

August 25, 2022

EMERGENCY RESPONSE PLANNING GUIDELINES

HISTORY

- 1984 Bhopal, India Methyl isocyanate release
- 1986 SARA / EPCRA
- 1987 AIHA ERP Committee formed
- 1988 First ERPGs
- 1990 SARA Title III /Clean Air Act of 1990
- 1991 European Chemical Industry Ecology and Toxicology Centre Emergency Exposure Indices
- 1993 EPA / ATSDR Community Emergency Exposure Levels
- 1996 AIHA ERPC assisted EPA in NRC / AEGLs



<https://www.theatlantic.com/photo/2014/12/bhopal-the-worlds-worst-industrial-disaster-30-years-later/100864/>

EMERGENCY RESPONSE PLANNING GUIDELINES

GOALS



<https://www.insider.com/worst-modern-manmade-disasters-world-environment-day-2019-5>

- Useful for emergency planning and response
- Suitable for protection from health effects due to short-term exposures
- Not suitable for effects due to repeated exposures, nor as ambient air quality guidelines
- Not absolute levels distinguishing safe from hazardous
- Not triggers for specific actions
- One element in planning for protection of community
- Based on volatility, toxicity and releasable quantities

EMERGENCY RESPONSE PLANNING GUIDELINES

ERPG-3

The **maximum** airborne concentration below which nearly all individuals could be exposed for up to **one hour without experiencing or developing life-threatening health effects**.

- Worst-case planning level
- Will be lethal to some members of the community
- Used to determine maximum releasable quantity of a chemical should an accident occur



<https://www.dailymail.co.uk/news/article-2950648/Toxic-orange-cloud-created-nitric-acid-explosion-chemical-plant-spreads-FIVE-Spanish-towns-forcing-authorities-order-stay-inside.html>

EMERGENCY RESPONSE PLANNING GUIDELINES

ERPG-2

The **maximum** airborne concentration below which nearly all individuals could be exposed for up to **one hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action.**

- Some members of the community may experience significant adverse health effects
- Could impair a person's ability to take protective action
- Used by emergency planners and responders to model dispersion of a chemical cloud over a community



<https://www.click2houston.com/news/local/2021/08/05/no-threats-to-the-public-100-gallon-chemical-spill-reported-at-texmark-chemicals-facility-in-galena-park/>

EMERGENCY RESPONSE PLANNING GUIDELINES

ERPG-1

The **maximum** airborne concentration below which nearly all individuals could be exposed for up to **one hour** without experiencing other than **mild, transient adverse health effects or without perceiving a clearly defined objectionable odor**.

- Concentration that does not pose a health risk to the community but may be noticeable due to odor, discomfort or irritation.
- Not all chemicals have an ERPG-1 value.
 - Sensory perception levels are higher than ERPG-2, or
 - No valid sensory perception data are available for the chemical.

Odor Thresholds

for Chemicals with Established Occupational Health Standards

3rd edition

Provides important reference information for chemicals, focusing on odor perception and other factors.

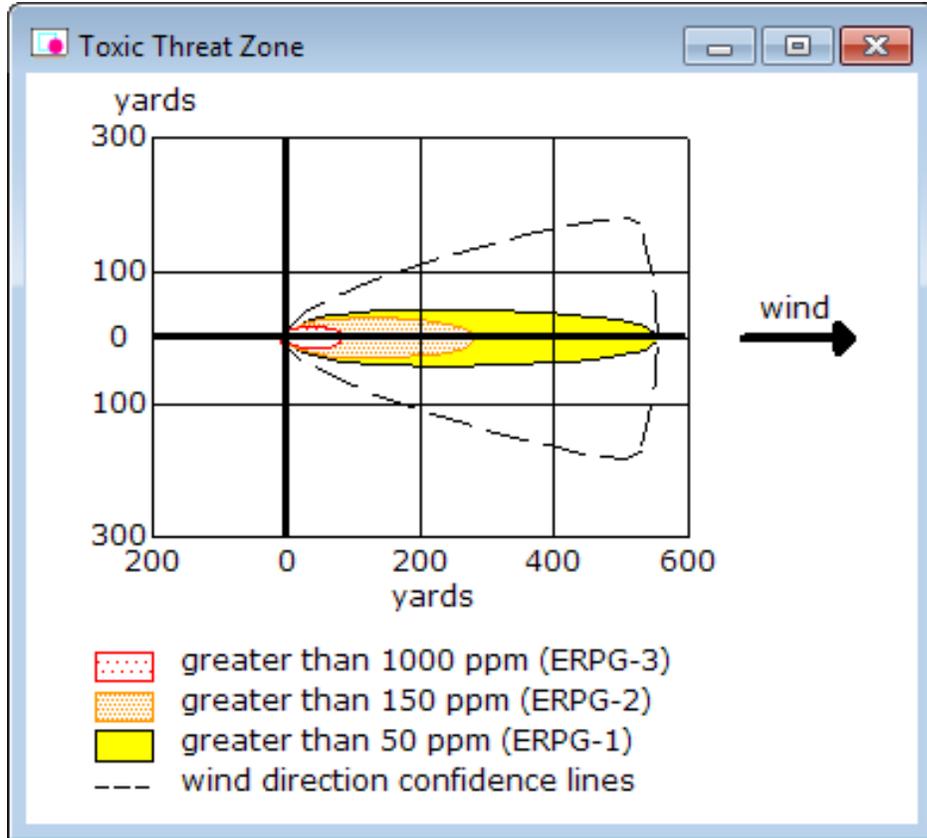
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 **AIHA**
HEALTHIER WORKPLACES | A HEALTHIER WORLD

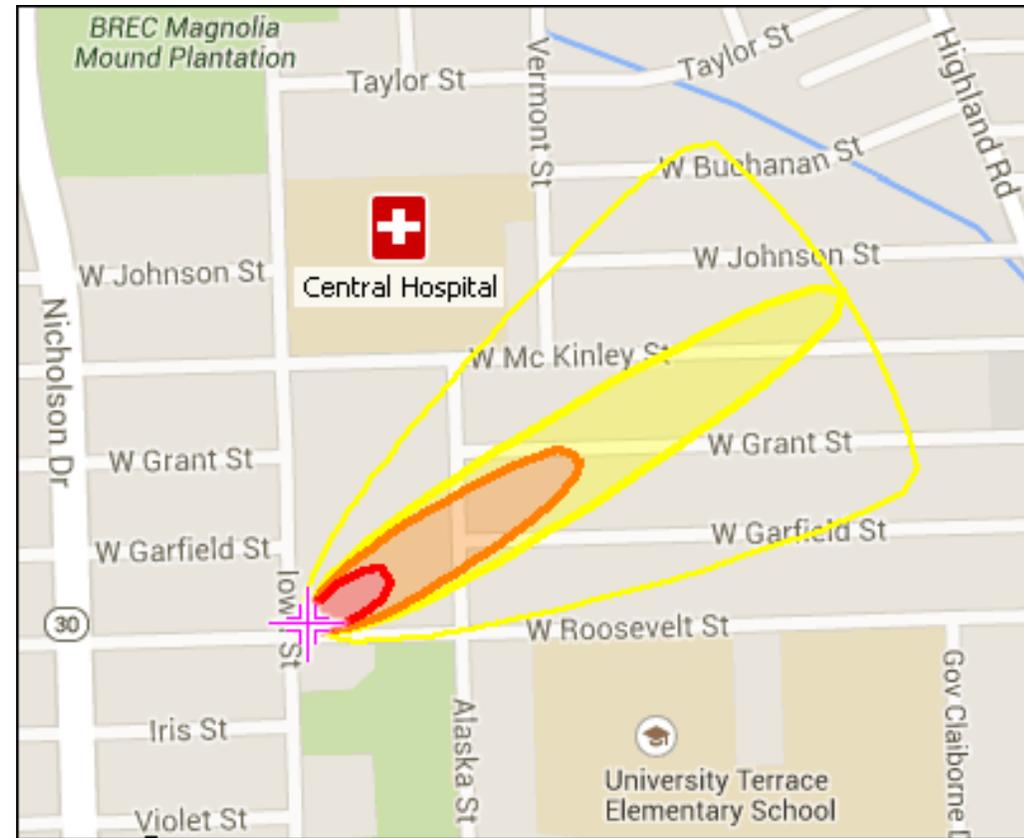
EMERGENCY RESPONSE PLANNING GUIDELINES

AREAL LOCATIONS OF HAZARDOUS ATMOSPHERES (ALOHA)

THREAT ZONE ESTIMATES



Available from <https://www.epa.gov/cameo/aloha-software>



Available from <https://www.epa.gov/cameo/marplot-software>

GUIDELINE FOUNDATION STRATEGIC PLAN

Strategic Objective: Assess and maintain the program for which a realistic number of new and updated ERPG chemical values are approved each year.

2022 Expected Document Updates:

- Beryllium
- Chloroacetyl Chloride – New Values Proposed
- Ethanol
- Fluorine



**GUIDELINE
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Falls Church, VA 22042

BUTYL ISOCYANATE

PROPOSED ERPG AND RATIONALE

ERPG-3: 2 ppm (8.1 mg/m³)

2 ppm of butyl isocyanate (BIC) is the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing life threatening health effects. This is based on acute inhalation experiments that showed BIC to be highly toxic in rats with one hour LC_{50s} of 98 ppm in males (Pauluhn 2015) and 105 ppm in combined male – female exposures (Bayer Chemical Corporation, 1976). A one-hour LC₀₁ was calculated to be 64 ppm (Pauluhn 2015).

ERPG-2: 0.2 ppm (0.81 mg/m³)

0.2 ppm of BIC is the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious adverse health effects or symptoms that could impair an individual's ability to take protective action. This value is well below the 10 ppm RD₅₀ concentration for rats exposed to BIC for 45 minutes (Pauluhn and Eben, 1992). Rats exposed for 6 hours a day for 5 days to 1.5 ppm of BIC showed minor reversible lung effects, while rats similarly exposed to 0.27 ppm showed no effects. Although 0.2 ppm of BIC could cause mild transient eye and upper respiratory tract irritation, industrial hygiene data in workers indicate that this level is not expected to impede escape (DuPont 1994) (DuPont 2008).

ERPG-1: 0.05 ppm (0.20 mg/m³)

0.05 ppm of BIC is the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing effects other than mild transient health effects or without perceiving a clearly defined objectionable odor. Eye irritation or other effects did not occur in most workers in a plant at concentrations up to 0.04 or 0.05 ppm for several hours (DuPont 1994) (DuPont 2008).

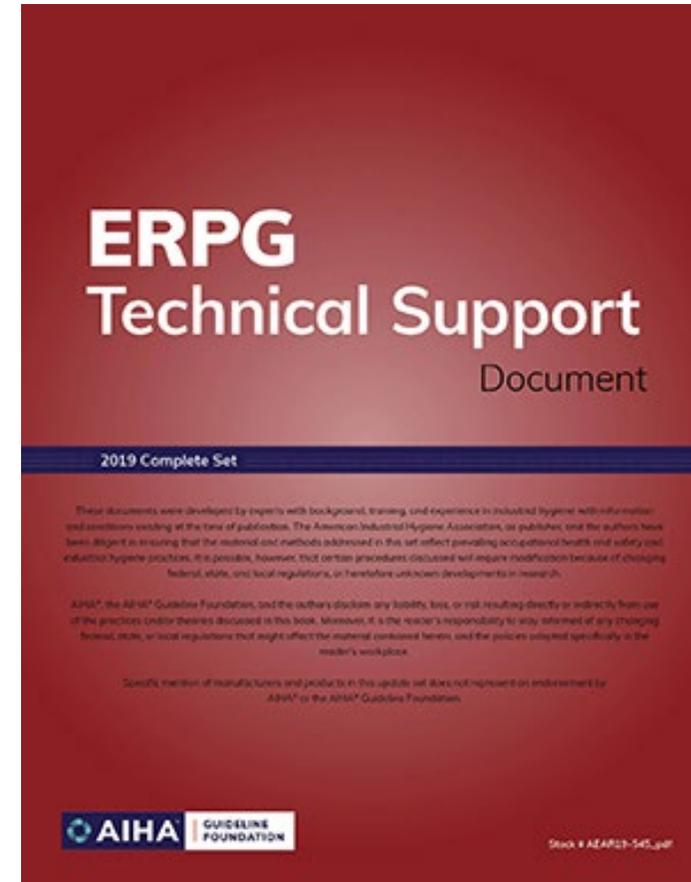


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EMERGENCY RESPONSE PLANNING GUIDELINES

2022 EXPECTED DOCUMENT UPDATES

- Gasoline
- Hydrogen Cyanide
- Hydrogen Peroxide – New Values Proposed
- Methylene Chloride
- 1-Octanol
- Styrene
- Sulfuric Acid (no change to values)
- Tetrachlorosilane
- Tetraethoxysilane
- Toluene (no change to values)
- Butyl isocyanate – New Values
- Ethanolamine – New Values
- Methyl bromide – New Values





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