

# SANDIA REPORT

SAND2015-0398

Unlimited Release

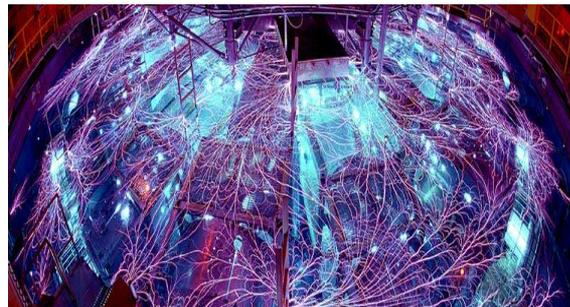
Printed September 2015

SAND2015-8296R

# Toxic Endpoint Analysis

Madison M. Snell  
Courtney J. Pruitt  
Kelsey L. F. Curran

*Exceptional service  
in the national interest*



Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.  
SAND No. 2015-0398P.



# Purpose

- Compare the ERPG-2, ERPG-3, AEGL-2, AEGL-3, PAC-2, and PAC-3 at 15-minute and 60-minute release times to the current classification criteria (i.e., ERPG-3 at 15 minutes)
- Present the potential impacts of the updated protocol on the facility hazard classification.
- Provide a report for further analysis by a qualified analyst.



# Toxic Endpoints

- AEGs – Environmental Protection Agency (EPA)
  1. Include susceptible individuals.
  2. Level “above which” exposed individuals could experience certain health effects.
- ERPGs – American Industrial Hygiene Association (AIHA)
  1. Exclude “sensitive” individuals.
  2. Level “below which” exposed individuals are not expected to experience certain health effects.
- \*PAC Dataset – published in SCAPA



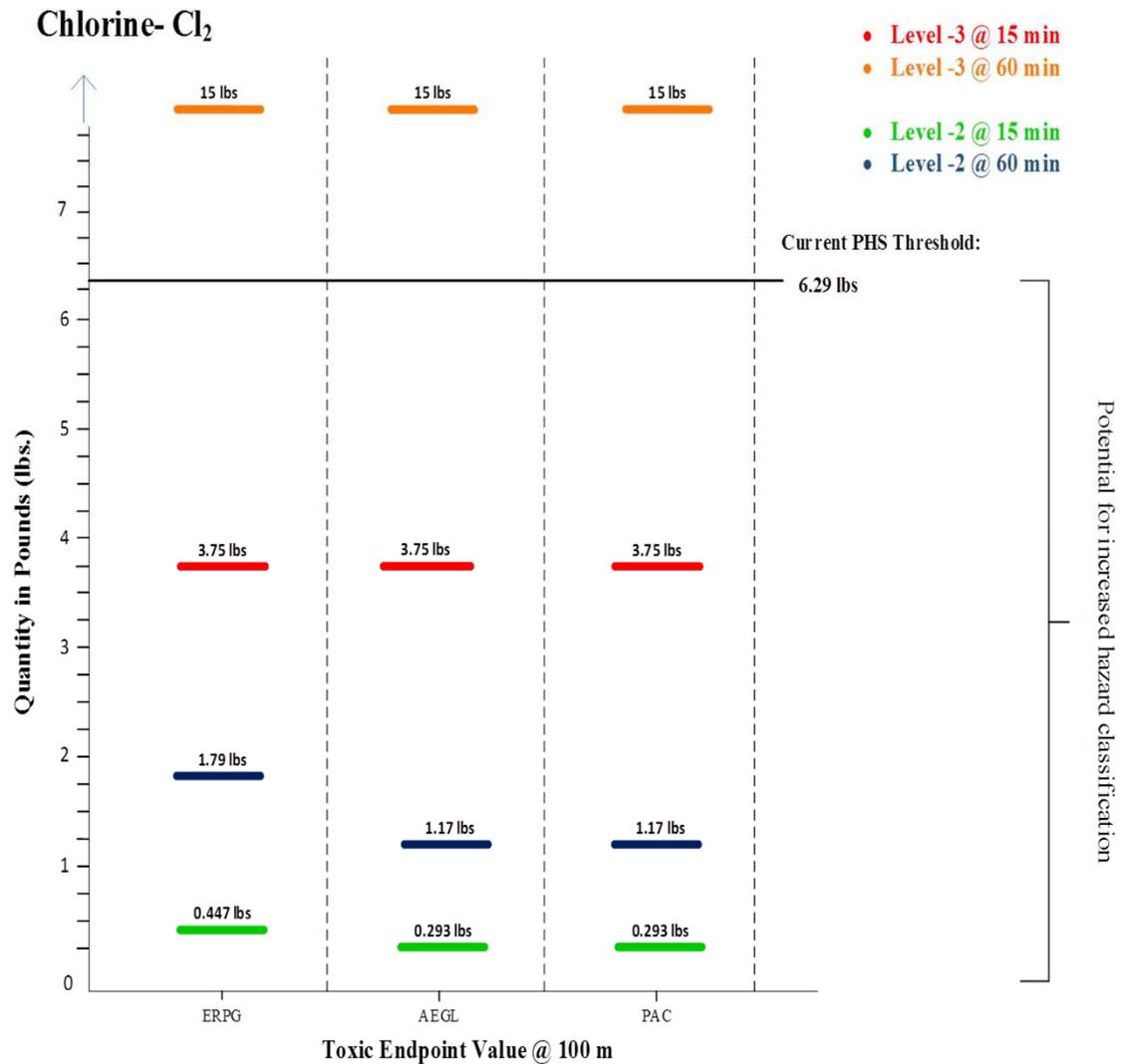
# Results

- Currently use ERPG-3 at 15 minutes for the screening threshold.
- PAC-3 at 60 minutes results in no/limited significant change to threshold values.
- Acceptable to use PAC-3 at 60 minutes
  - More accurate per SCAPA
  - Includes the general population, including susceptible receptors.
  - Readily available values



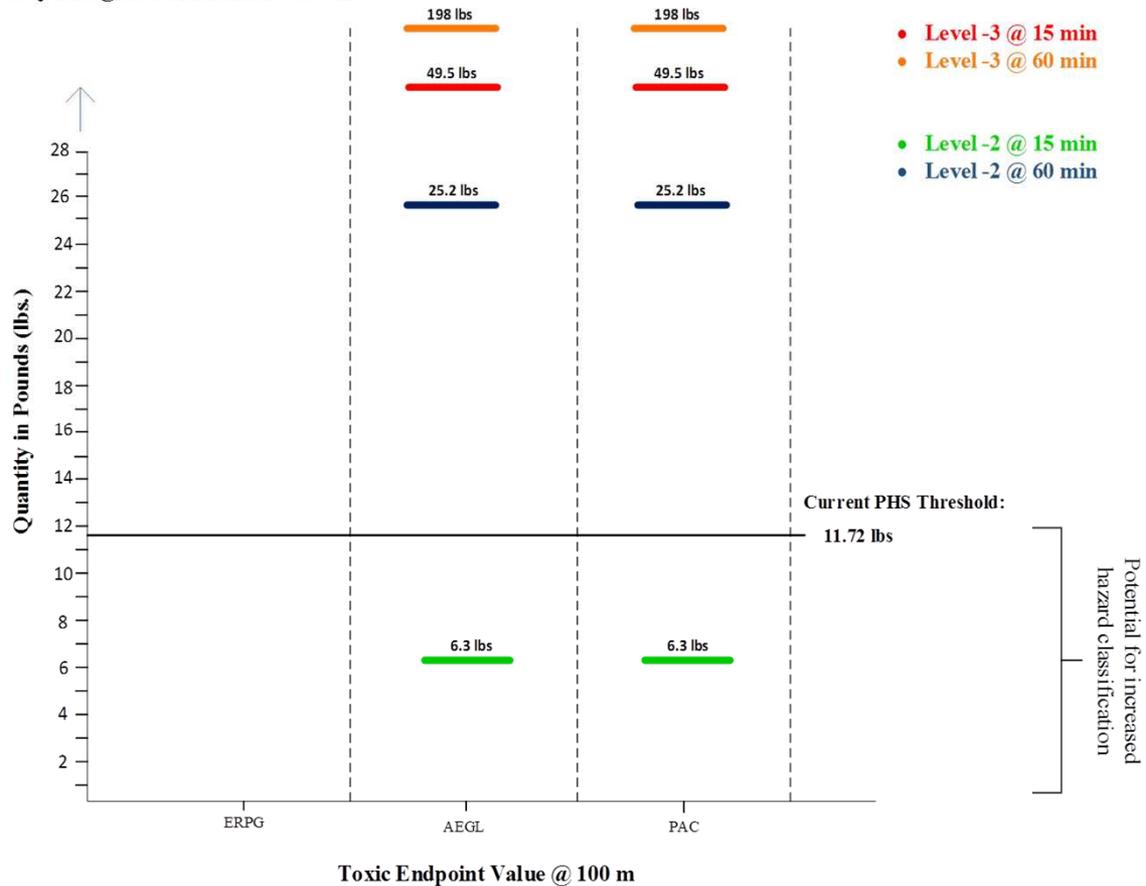
# Toxic Endpoint Values for Selected Materials

# Figure 1. Chlorine



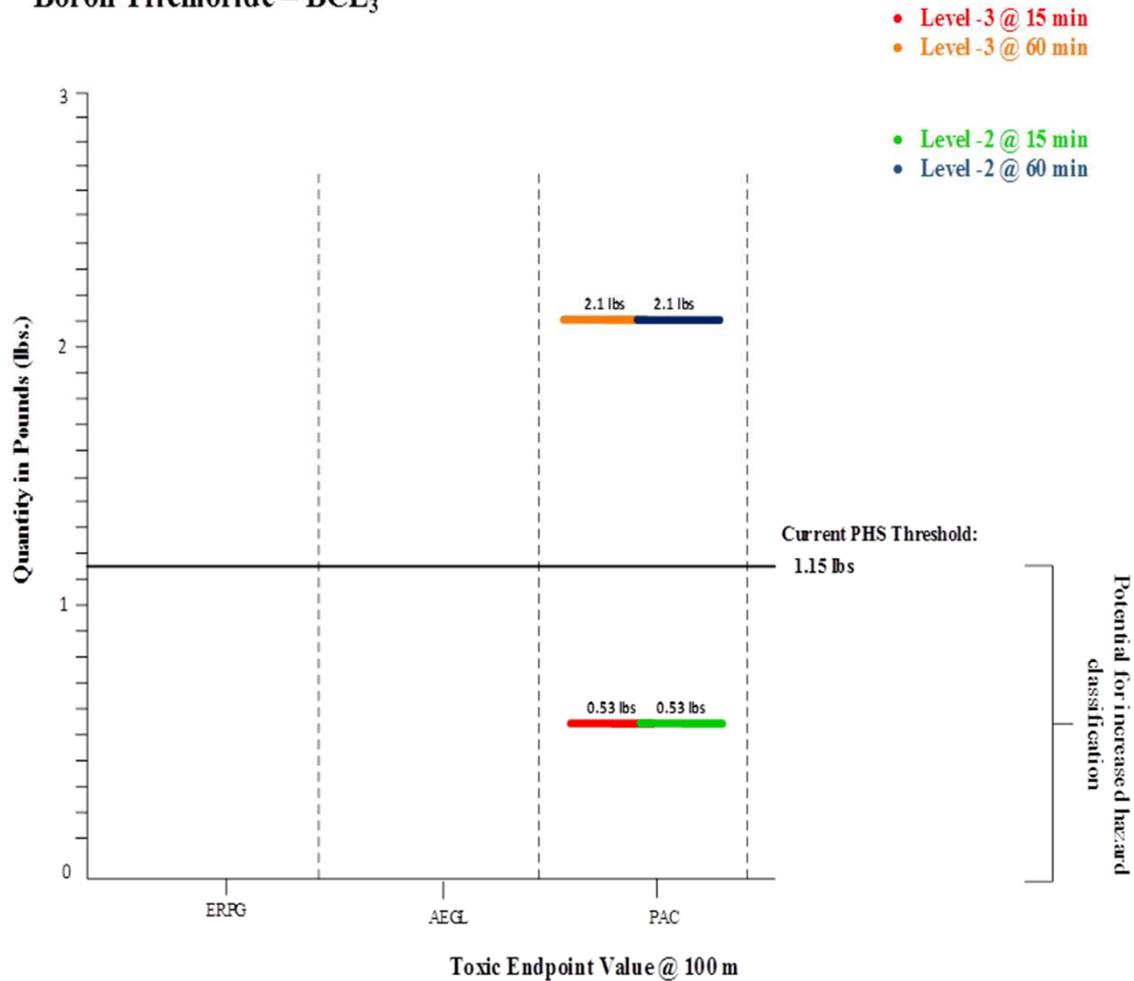
# Figure 2. Hydrogen Bromide

## Hydrogen Bromide - HBr



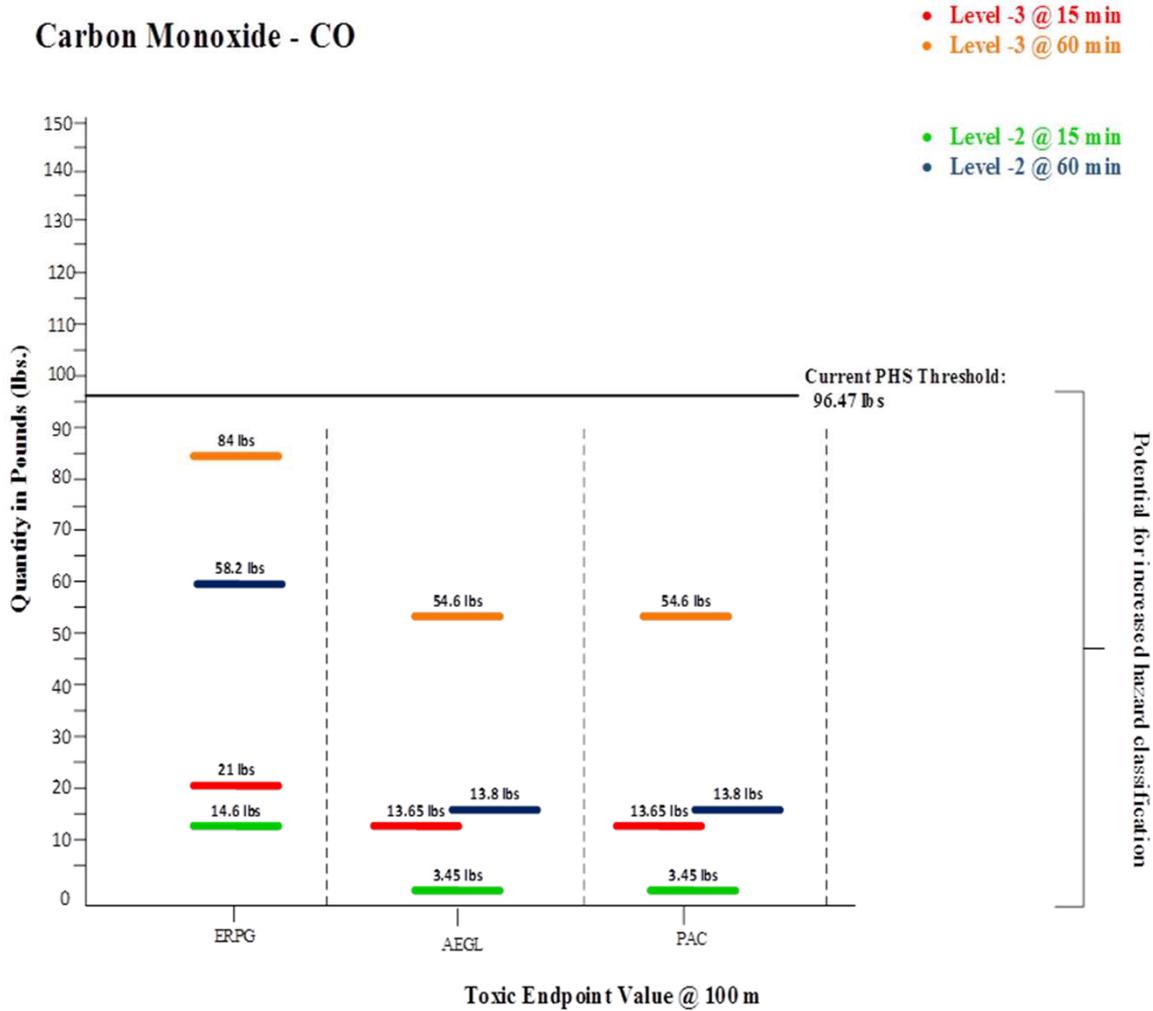
# Figure 3. Boron Trichloride

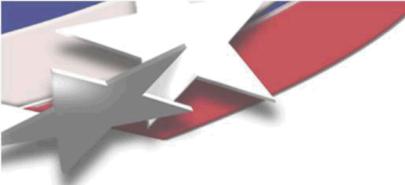
Boron Trichloride – BCL<sub>3</sub>



# Figure 4. Carbon Monoxide

Carbon Monoxide - CO





# Recommendations

- Use PAC-3 at 60 minutes.
- Evaluate all listed toxics at PAC-3, 60 minutes.
- Run CIS toxic endpoint reports using the new threshold values.
- Complete the hazard classification analysis based on CIS data, and using the new threshold values.
- Engage a qualified analyst to make the final decision.



# Follow-up Questions

- F-stability class
- Importance of inversion height
- Co-located worker < 100 m



# Distribution

1	MS0794	Madison M. Snell	04126
1	MS0794	Courtney J. Pruitt	04126
1	MS0794	Timothy S. Stirrup	04126
1	MS0794	Kelsey L. F. Curran	04126
1	MS0794	4126 Library	04126
1	MS0899	Technical Library (electronic copy)	09536