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Toxic Endpoint Analysis PowerPoint Presentation

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Abstract

This presentation, developed in Microsoft PowerPoint©, communicates the results of a Toxic Endpoint Analysis undertaken by the Safety Basis Department (01426) at Sandia National Laboratories/New Mexico.

The purpose of the analysis is to compare the toxic endpoints (e.g., ERPG-2, ERPG-3, AEGL-2 AEGL-3, PAC-2, and PAC-3) at both the 15-minute and the 60-minute release periods against the existing Industrial Facilities Safety Basis (IFSB) Guidance Protocol for classifying facilities at Sandia National Laboratories (SNL). In this analysis, specific toxic chemicals are modeled with exposure limits at 100 meters (m) to understand the impacts on facility hazard classification.

NOMENCLATURE

AEGL	Acute Emergency Guideline Levels
AIHA	American Industrial Hygiene Association
˚C	degrees Celsius (temperature)
DOE	Department of Energy
EPA	Environmental Protection Agency
ERPG	Emergency Response Planning Guideline
IFSB	Industrial Facility Safety Basis
min	minutes
NNSA	National Nuclear Security Administration
PAC	Protective Action Criteria
PHS	Primary Hazard Screening
SCAPA	Subcommittee on Consequence Assessment and Protective Action
SNL	Sandia National Laboratories
SNL/NM	Sandia National Laboratories/ New Mexico

Contents

FIGURES

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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

AEGLs – 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 <u>not</u> expected to experience certain health effects.

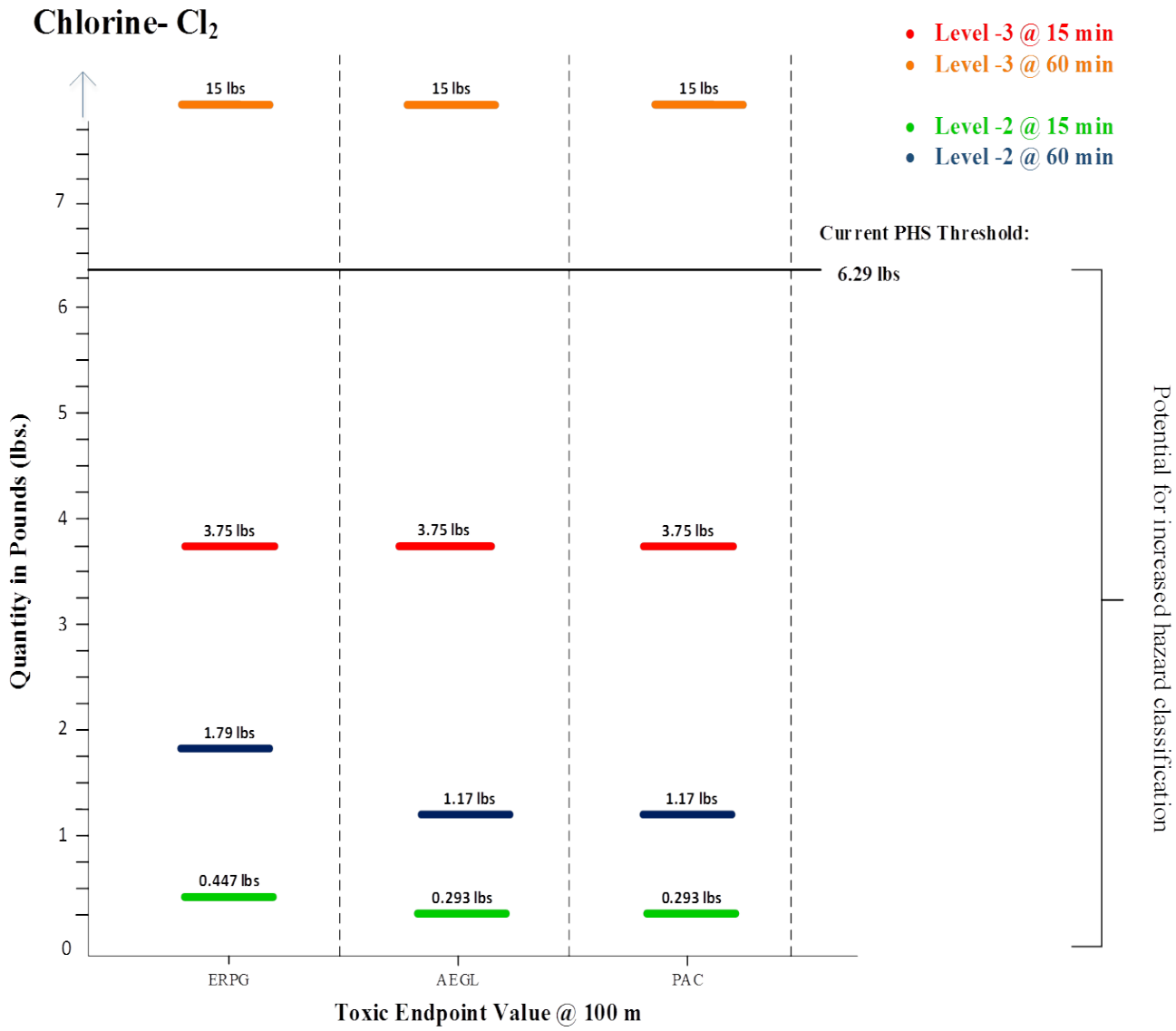
*PAC Dataset – published in SCAPA

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



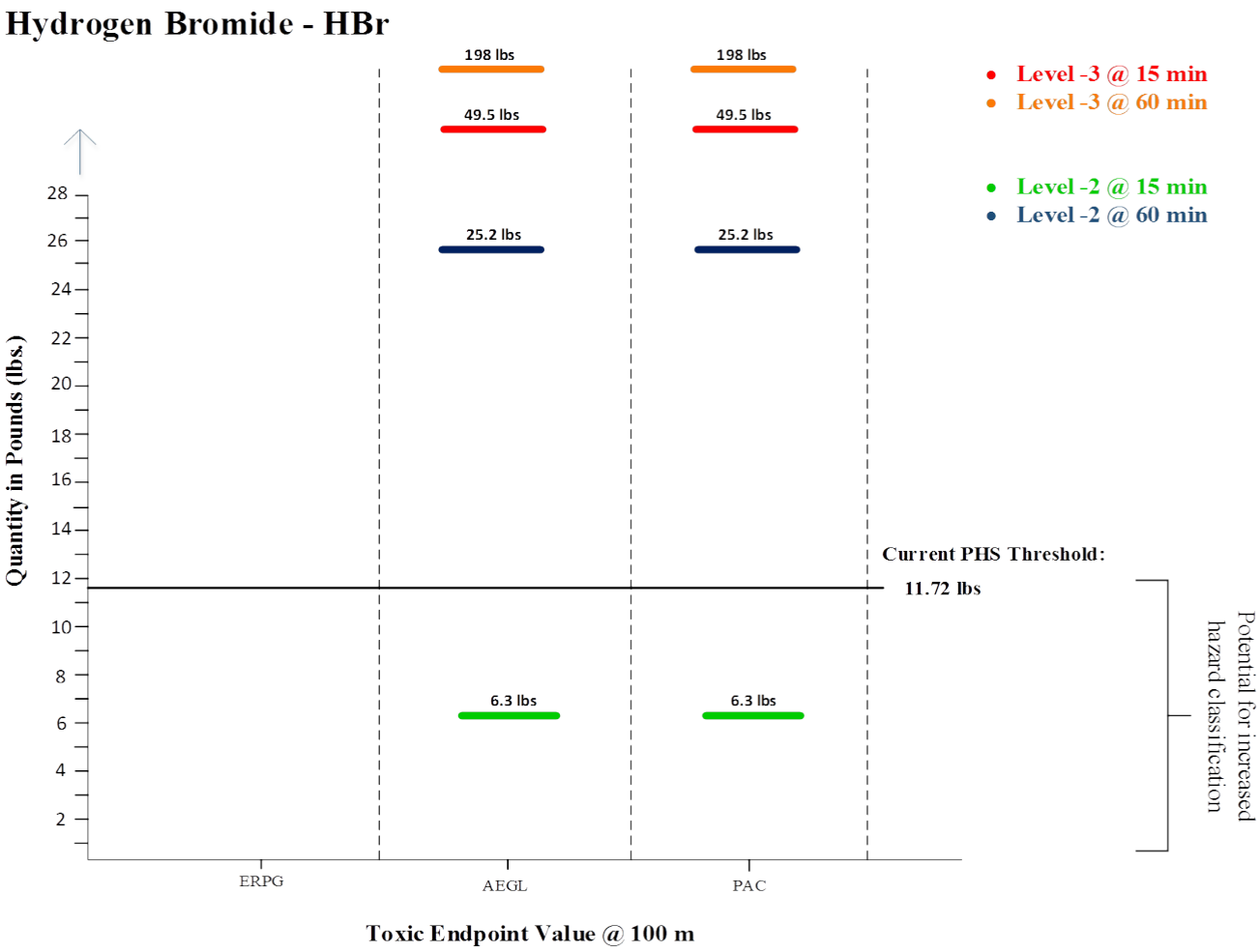


Figure 2. Hydrogen Bromide

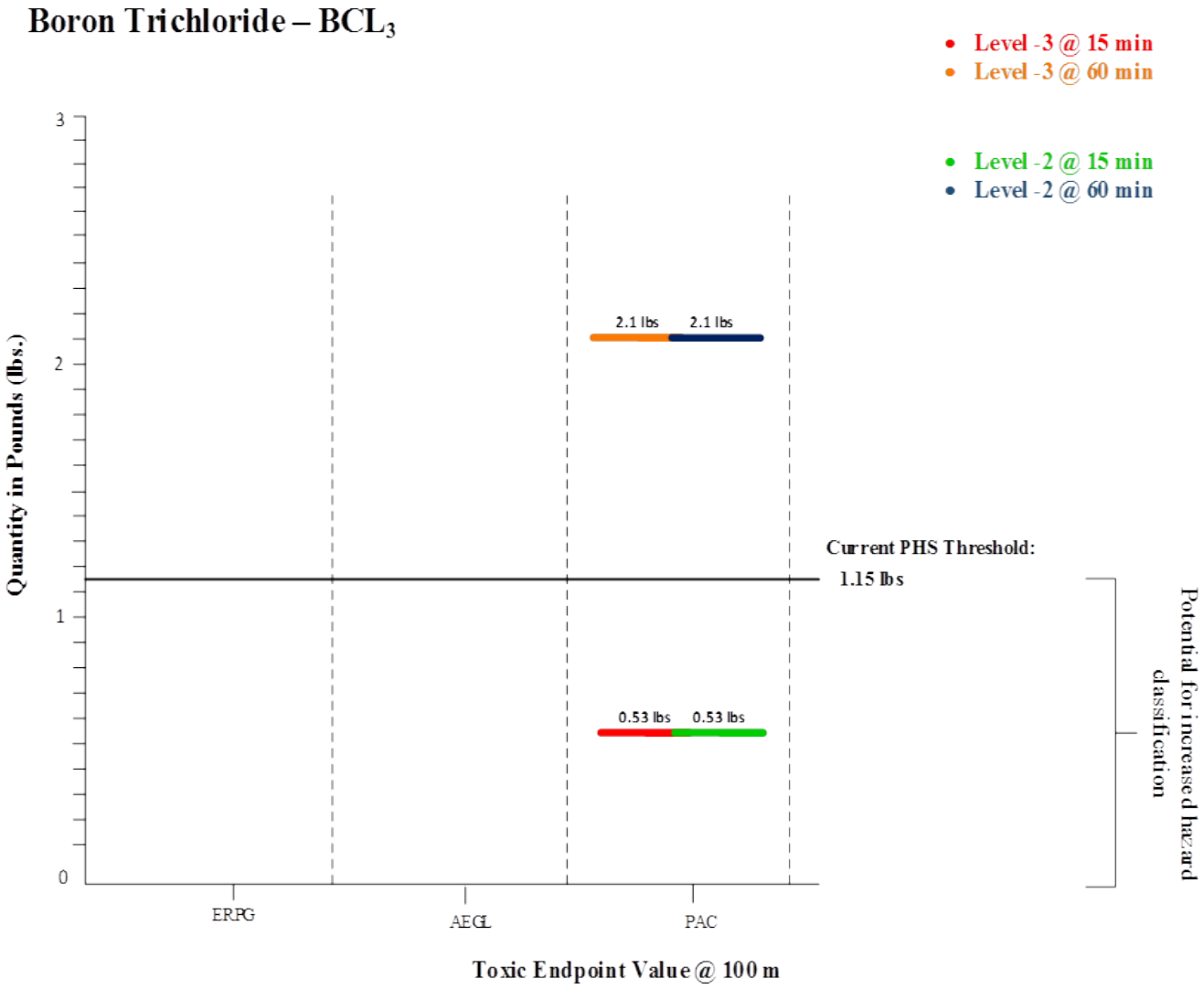


Figure 3. Boron Trichloride

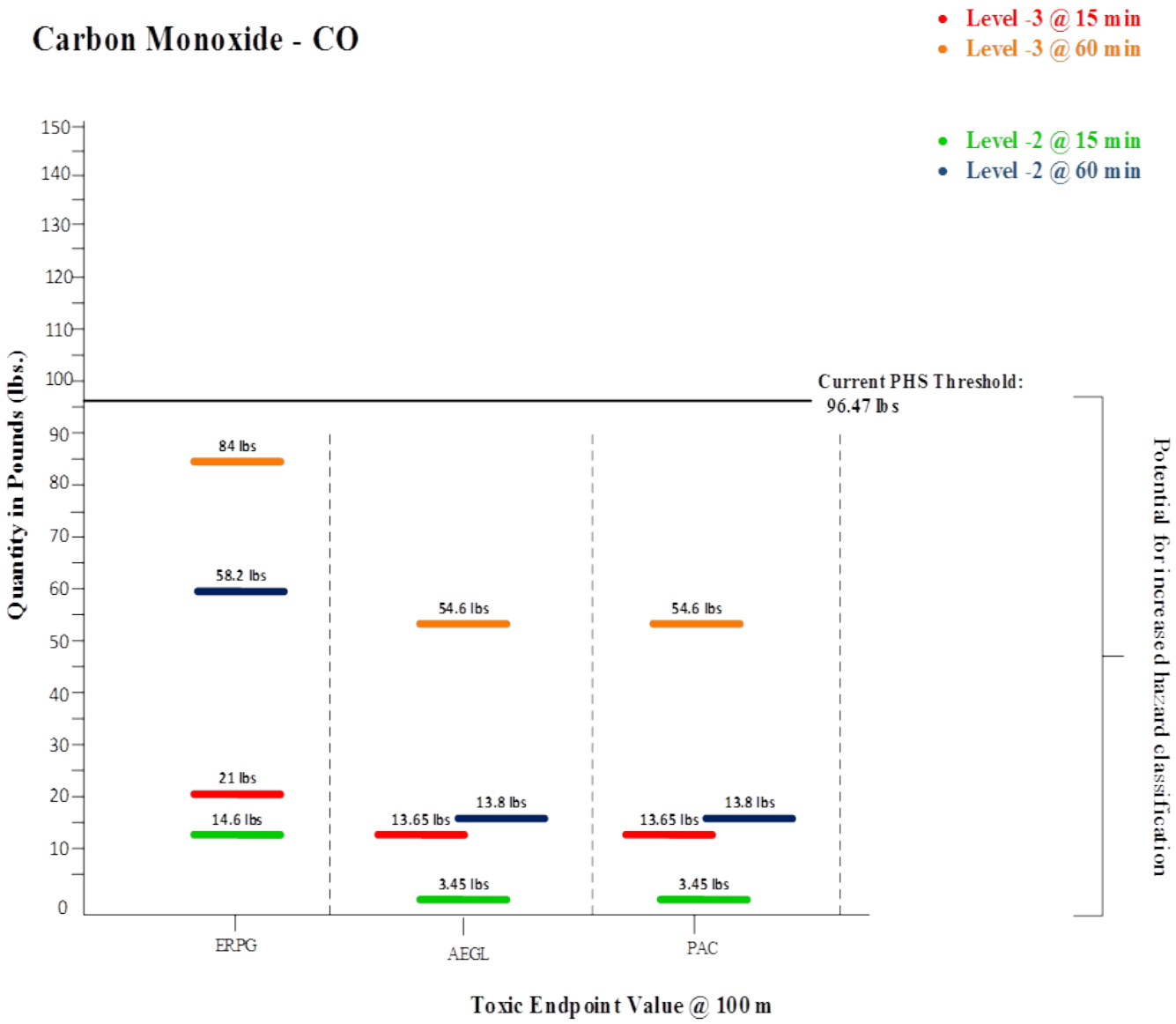


Figure 4. Carbon Monoxide

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

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