

SANDIA REPORT

SAND2016-7333

Unlimited Release

Printed August 2015

Toxic Endpoint Analysis PowerPoint Presentation

Madison Michelle Snell, Courtney Jean Pruitt, Kelsey Leigh Forde Curran

Prepared by
Sandia National Laboratories
Albuquerque, New Mexico 87185 and Livermore, California 94550

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.

Approved for public release; further dissemination unlimited.



Sandia National Laboratories

Issued by Sandia National Laboratories, operated for the United States Department of Energy by Sandia Corporation.

NOTICE: This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government, nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, make any warranty, express or implied, or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represent that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government, any agency thereof, or any of their contractors or subcontractors. The views and opinions expressed herein do not necessarily state or reflect those of the United States Government, any agency thereof, or any of their contractors.

Printed in the United States of America. This report has been reproduced directly from the best available copy.

Available to DOE and DOE contractors from
U.S. Department of Energy
Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, TN 37831

Telephone: (865) 576-8401
Facsimile: (865) 576-5728
E-Mail: reports@adonis.osti.gov
Online ordering: <http://www.osti.gov/bridge>

Available to the public from
U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Rd.
Springfield, VA 22161

Telephone: (800) 553-6847
Facsimile: (703) 605-6900
E-Mail: orders@ntis.fedworld.gov
Online order: <http://www.ntis.gov/help/ordermethods.asp?loc=7-4-0#online>





SAND2016-7333
Unlimited Release
Printed August 2015

Toxic Endpoint Analysis Presentation

Madison Michelle Snell
Courtney Jean Pruitt
Kelsey Leigh Forde Curran
Safety Basis Department (04126)
Sandia National Laboratories
P.O. Box 5800
Albuquerque, New Mexico 87185-MS0794

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

<u>PURPOSE</u>	7
<u>TOXIC ENDPOINTS</u>	8
<u>RESULTS</u>	9
<u>TOXIC ENDPOINT VALUES FOR SELECTED MATERIALS</u>	10
<u>RECOMMENDATIONS</u>	15
<u>FOLLOW-UP QUESTIONS</u>	16
<u>DISTRIBUTION</u>	17

FIGURES

Figure 1. Chlorine.....	11
Figure 2. Hydrogen Bromide.....	12
Figure 3. Boron Trichloride.....	13
Figure 4. Carbon Monoxide	14



This page intentionally left blank.

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 not expected to experience certain health effects.

*PAC Dataset – published in SCAPA

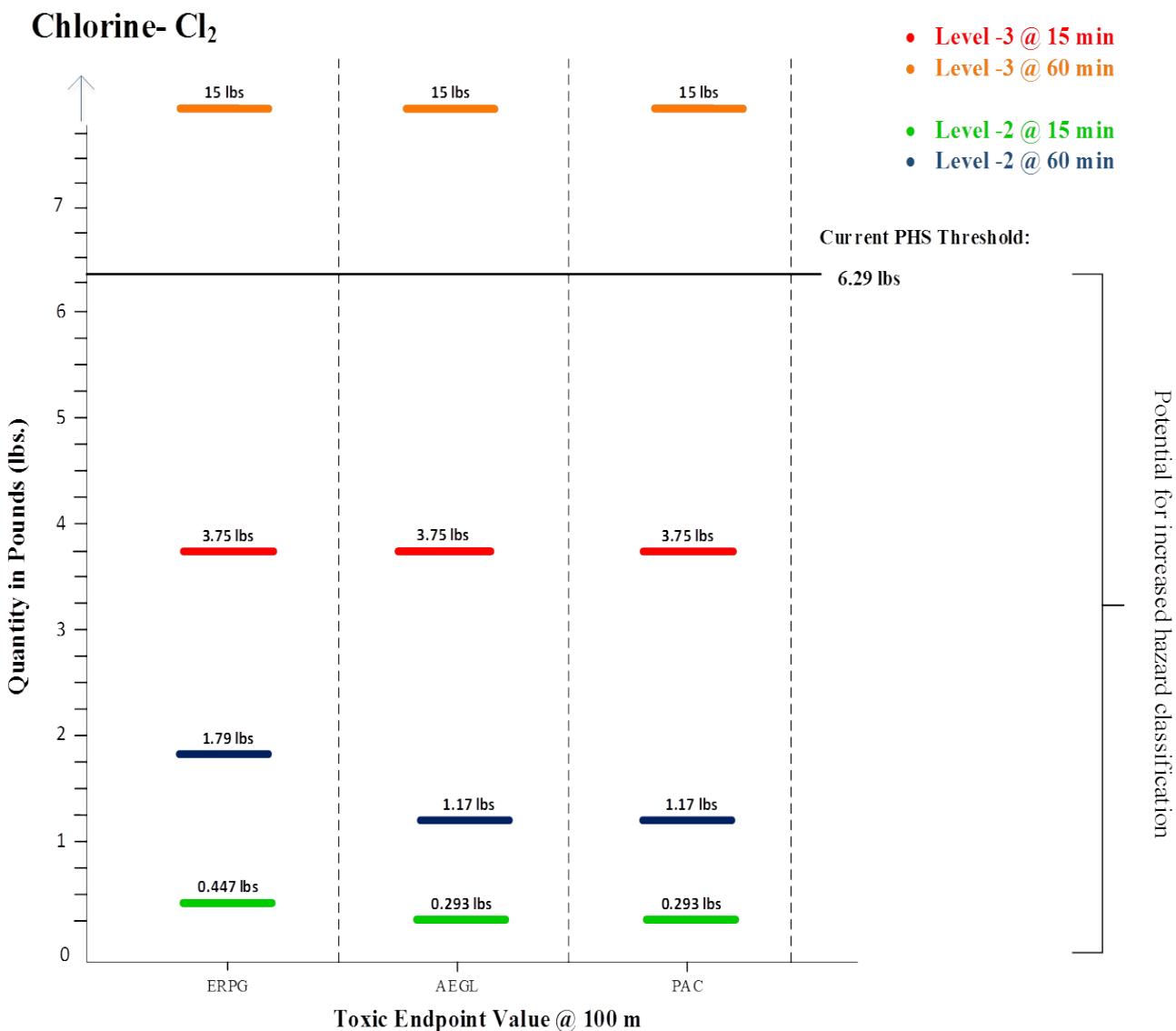
Results

- 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



Hydrogen Bromide - HBr

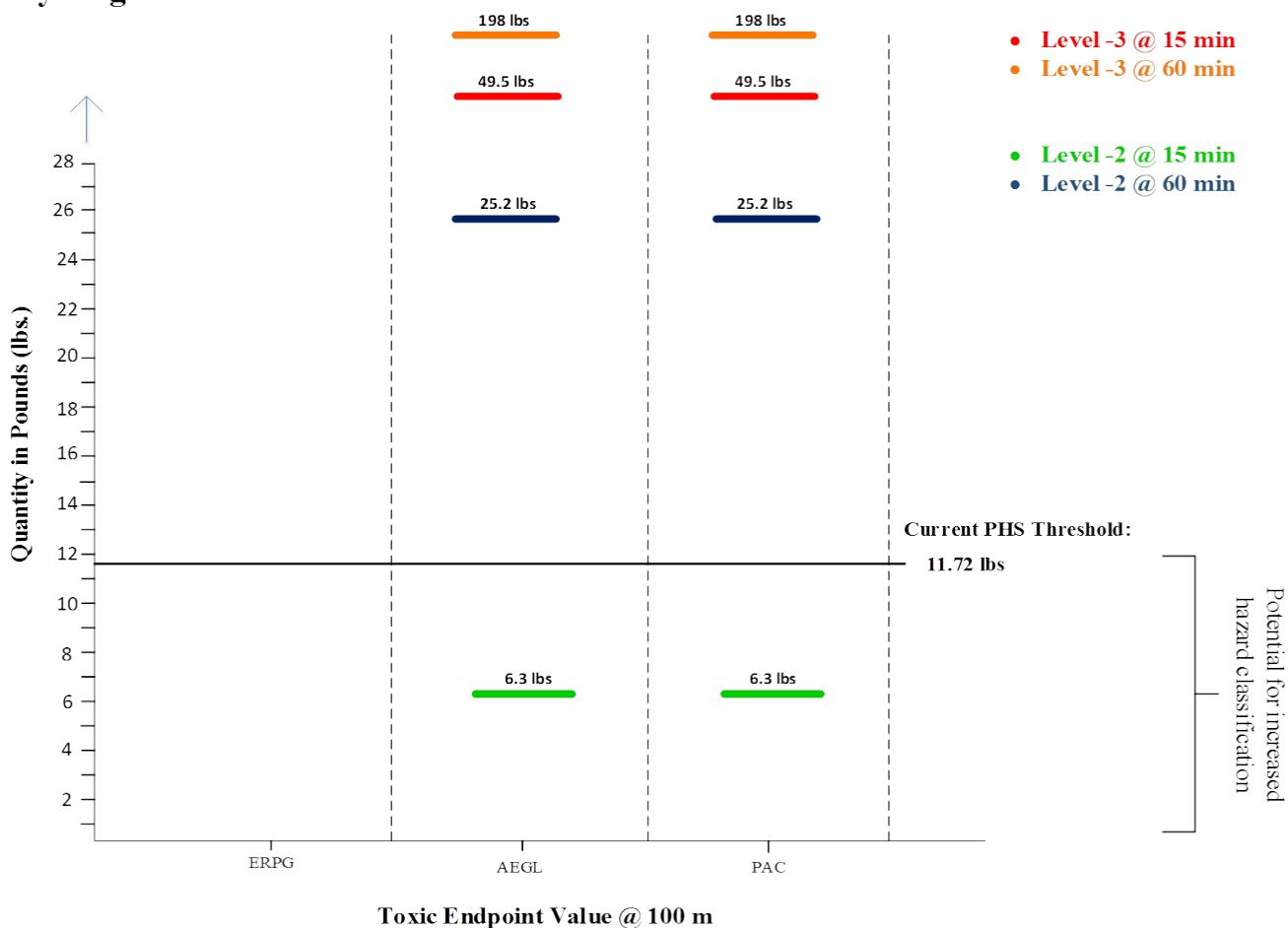


Figure 2. Hydrogen Bromide

Boron Trichloride – BCL₃

- Level -3 @ 15 min
- Level -3 @ 60 min

- Level -2 @ 15 min
- Level -2 @ 60 min

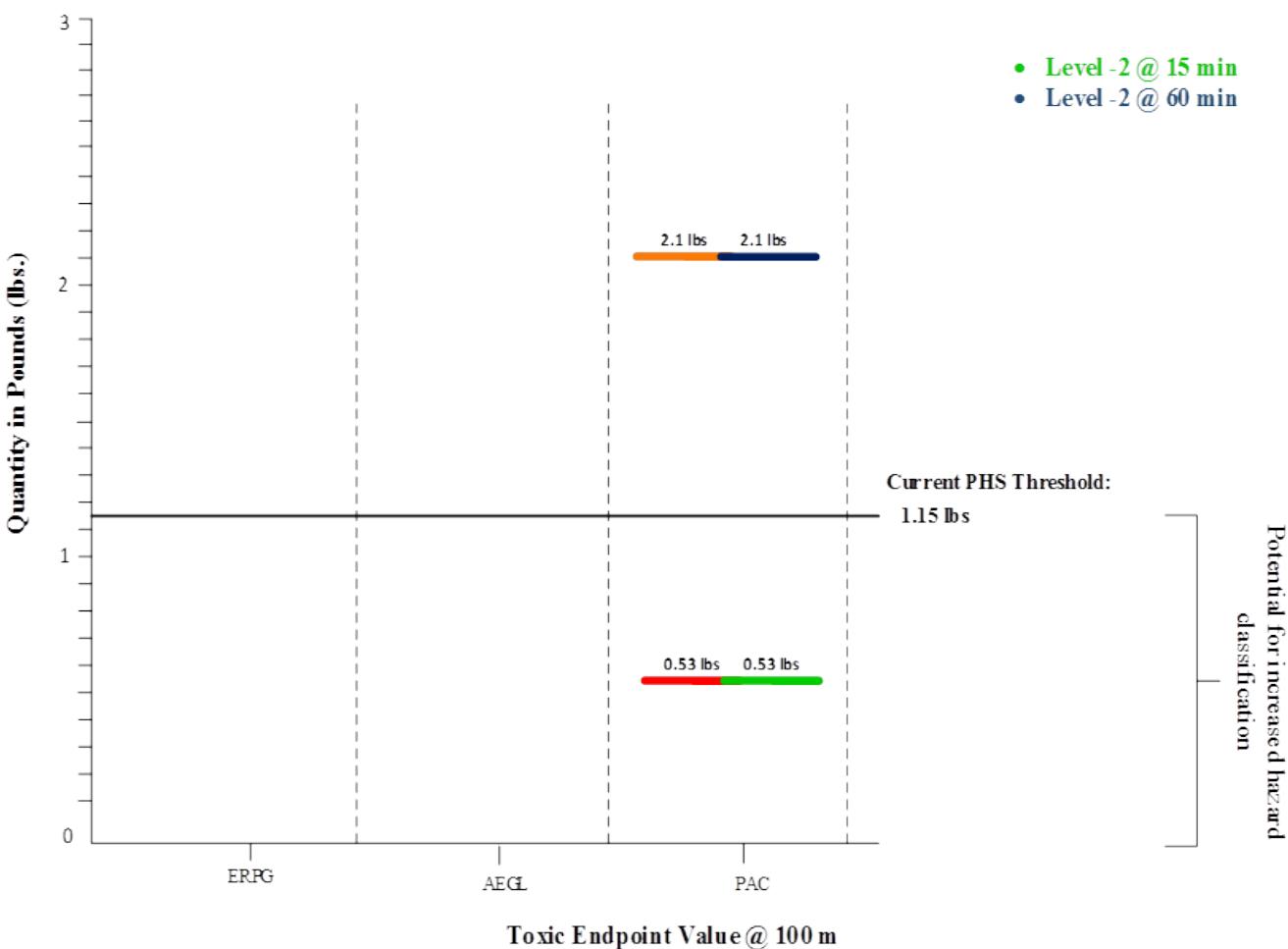


Figure 3. Boron Trichloride

Carbon Monoxide - CO

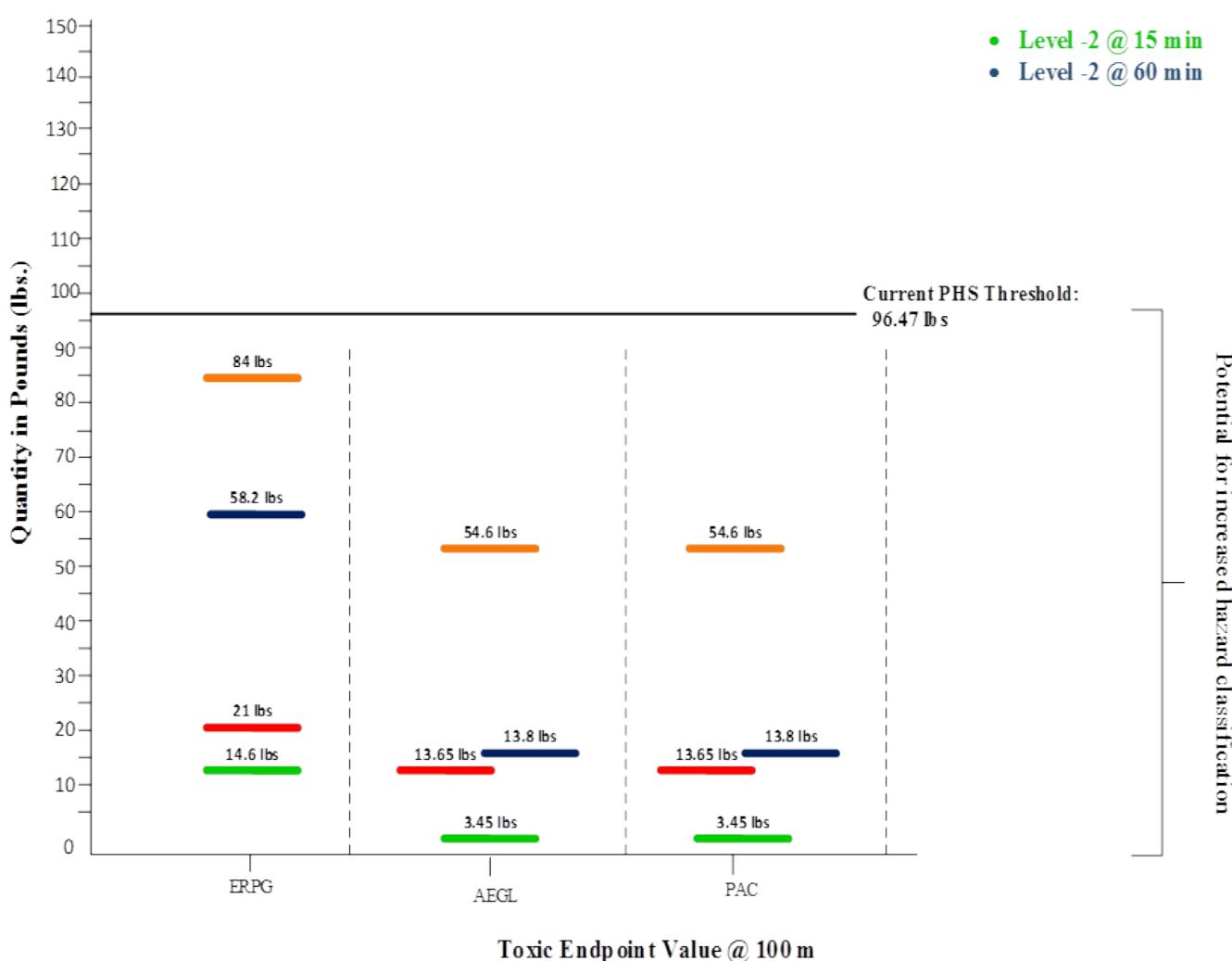


Figure 4. Carbon Monoxide

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

Distribution

[List external recipient names and addresses]

4 Lawrence Livermore National Laboratory
Attn: N. Dunipace (1)
P.O. Box 808, MS L-795
Livermore, CA 94551-0808

[List in order of lower to higher Mail Stop numbers.]

	MSXXXX	Name of Person	Org. Number
1	MSXXXX	Name of Person	Org. Number
1	MS0899	Technical Library	9536 (electronic copy)



Sandia National Laboratories