



# Leak Path Factors

## And Structural Impacts on Hazardous Material Releases

May 3 - 6, 2010 Renaissance Las Vegas Hotel • Las Vegas, Nevada



# Project History

- Background: Chuck is “too dumb to duck”
- EMI SIG 2009 - Source Term Working Group was attempting to identify a project for the group
- Idea was to simply compile a table of leak path factors from a bunch of other documents
- Group members looked for several “stock” or “Generic” LPFs . . . And looked . . . And looked



EPA 550-B-99-009

# ***Risk Management Program Guidance for Offsite Consequence Analysis***

- A mitigation factor of 55 percent may be used in the event of a gaseous release which does not destroy the building into which it is released. This factor may overstate the mitigation provided by a building with a higher ventilation rate.

**D.1.2 Gaseous Release Inside Building**



# Panel Participants

*"Let's form a panel!"*

*We can share our respective site experiences with LPFs*

- Phillip Pfeiffer – INL
- Charles Rives – Pantex Plant
- Susan Vosburg – SNL (NM)
- Michele Wolfgram – ORNL

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# Leak Path Factor Overview

- One of the five factors in the source term formula

$$ST = (MAR)(DR)(RF)(ARF)(LPF)$$

“The fraction of confinement of airborne materials transported from containment of deposition or mechanism (e.g., fraction of airborne material leaving the glovebox under static conditions, fraction of material passing through HEPA filters.” (DOE-HDBK-3010-94)



# LPF Synonyms

- Filtration Rate
- Confinement
- Filter Mitigation

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# Structural Source Term Effects that are not LPF

- Limits Evaporation Rates from Pools
- Air exchange rate
- Holdup time

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# Considerations for Inclusion

- Data source & defensibility
- Indicators of operation
- Robustness and reliability
- Active versus passive operation
- Configuration Management



# Pantex

- EM-PLN-0031 allows use of LPF under two conditions:
  - Any citable source for the LPF – AND –
    - Currently – only from DSA documents
    - PLN-0031 authorizes use of others (e.g., EPA)
  - EITHER
    - Extremely robust – OR -
    - Provides some indicator whether it is still present and working

# Pantex Examples

- Gravel Gertie Cell Facilities
- Bay Facilities



## Structural Effect on Evaporation

- EPA 550-B-99-009 Appendix D. wind speed (for evaporation purposes)
  - 0.1 (m/s) in the building ( $U^{0.78}=0.16$ )
  - 1.5 m/s outdoors worst-case ( $U^{0.78}=1.37$ )
  - 3 m/s outdoors alternative ( $U^{0.78}=2.36$ )

$$QR = \left( U^{0.78} \right) (LFA, LFB) (A)$$

“The rate will only be  $(0.1/1.5)^{0.78}$ , about 12 percent of the rate for a worst case, and  $(0.1/3)^{0.78}$ , about seven percent of the rate for an alternative case.”



# Site/Organizational Experiences with LPF

Generally, ways that you, your site or organization has used or developed LPF

- Criteria for use of LPF
- Examples of leak path factor used or considered
- Examples of Structural Source Term Effects
- *(Including those considered and rejected)*



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