Class-C Cargo Compartment ULD Suppression Agent Penetration

Federal Aviation Administration

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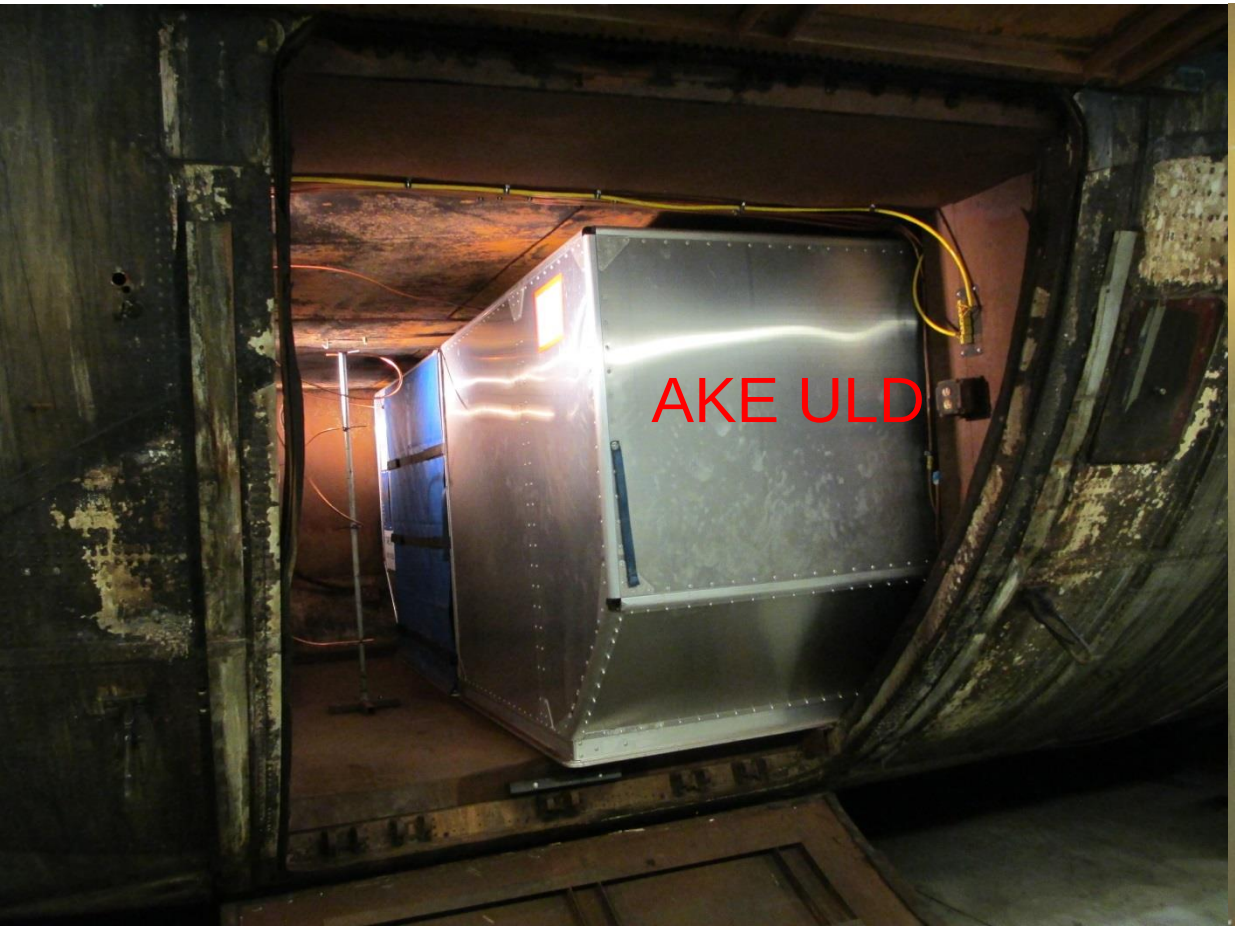
Background

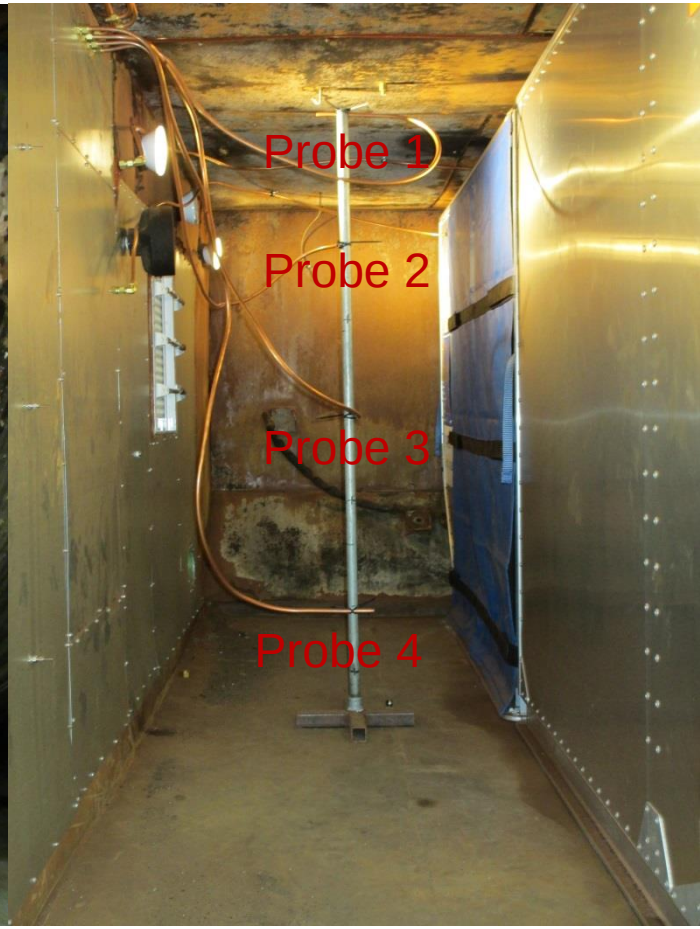
- Tests have shown that flammable vapors from batteries in thermal runaway could accumulate in cargo containers.
- Pressure pulse from igniting flammable vapors could dislodge the liners or open the decompression panels in a class-C compartment.
- Halon fire suppression system would be rendered ineffective.

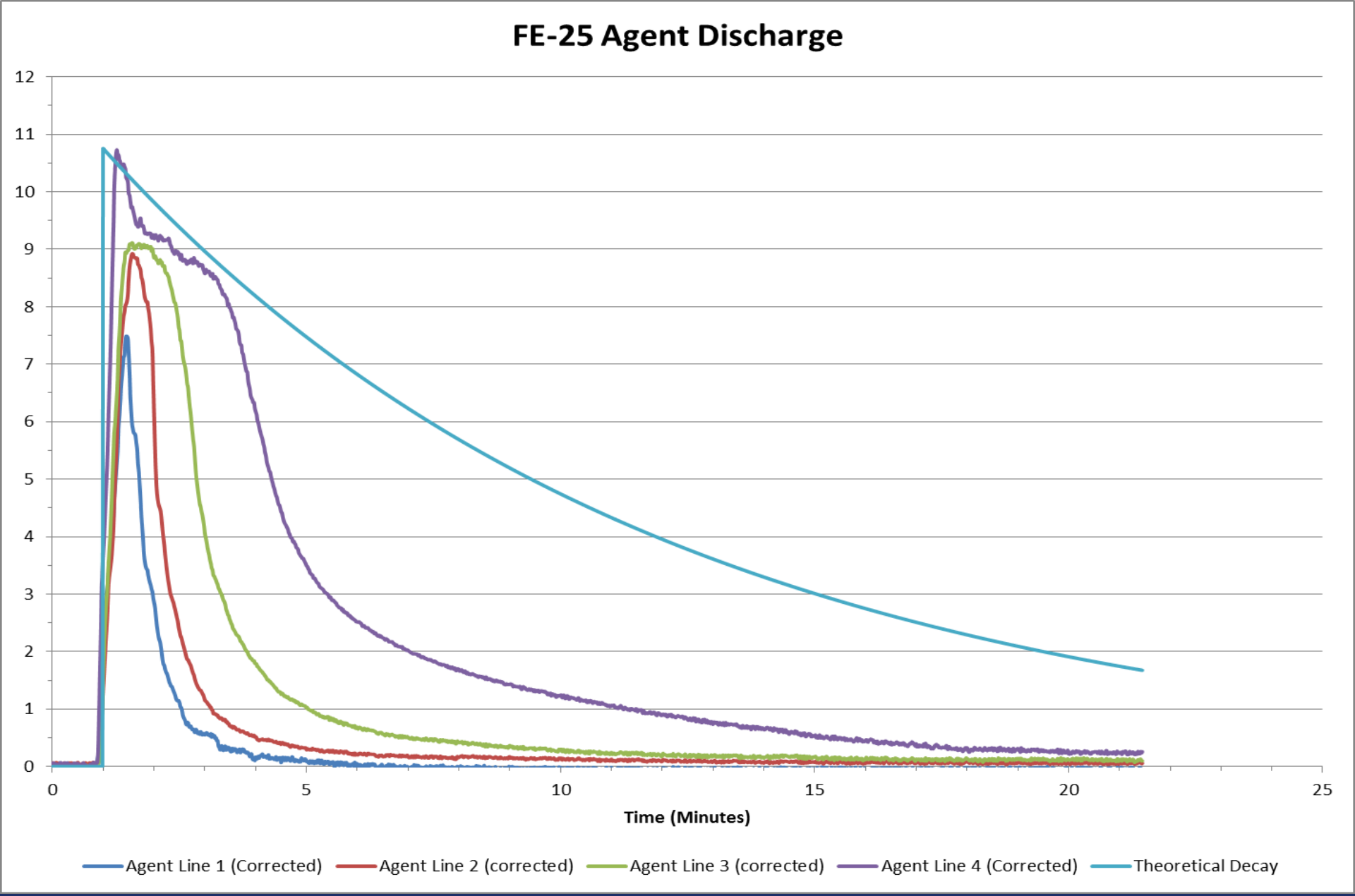
Class-C Compartment Test Setup

- Testing was conducted to measure concentrations of FE-25 within a fully loaded class-C compartment.
- Gas probes placed in the empty space within compartment.
  - Compartment volume: 1303 ft^3.
- Compartment filled with 6 AKE ULDs.
  - ULDs filled with cardboard boxes. ~15% free volume.
- Tests conducted to measure concentrations of FE-25 at various heights to observe stratification.

Class-C Compartment Test Setup






FE-25 Agent Discharge
12
11
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
Time (Minutes)
Agent Line 1 (Corrected)
Agent Line 2 (corrected)
Agent Line 3 (corrected)
Agent Line 4 (Corrected)
Theoretical Decay

Results

- Agent in the compartment dissipates much quicker than theoretical calculations.
- Determine theoretical values by including
  - Effects of ventilation.
  - Leakage compensation
- Correction factors could help determine agent dissipation rates in the compartment.
  - Help determine agent concentration levels to inert compartment as well as containers.
- Input and test data from others is welcome.

Questions?

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