

TASK 25 FINAL REPORT

June 2, 2000

The purpose of this task was to support ESH-3 in providing Airborne Release Fraction and Respirable Fraction training to safety analysts at LANL who perform accident analysis, hazard analysis, safety analysis, and/or risk assessments at nuclear facilities. The task included preparation of materials for and the conduct of two 3-day training courses covering the following topics:

- Safety Analysis Process
- Calculation Model
- Aerosol Physic Concepts for Safety Analysis
- Overview of Empirically Derived Airborne Release Fractions and Respirable Fractions

The first course was presented November 4 – November 6, 1998. The requirement for a second course was cancelled due to a lack of potential students.

The course outline is attached. The complete volume of course materials and handouts is available from ESH-3.

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AGENDA

8:00 a INTRODUCTION/OPENING REMARKS (Dave Seidel/DOE Office Mgr.?)
General information - Segura (15-30 min)

8:30 a INTRO TO COURSE MATERIAL (Mishima) - Outline (15 min)

8:45 a 1st Day - Overview

- Safety Analysis Process - Steele (60 min)

9:45 a *Break* (15 min)

10:00 a

- Assessment of Downwind Radiological Consequences (Source Term Calculations, 5-factor formula) - Mishima (30 min)

10:30 a

- Aerosol Physics Considerations in Consequence Assessment 60 min)

11:30 a

- Stresses/Phenomenon that generate airborne materials: intro material
 - A. Explosions (pressure impulse and shock waves) (30 min)

12:00 *Lunch* (60 min)

1:00 p

- B. Fires (thermal stress) (45 min)

1:45 p

- C. Crush-Impact ... Free-Fall Spills (30 min)

2:15 p

- D. Mechanical transfer of energy (15 min)

2:30 p *Break* (15 min)

2:45 p

- E. Aerodynamic entrainment (60 min)

3:45 p

- Summary of ARFs and RFs (60 min)

4:45 p

- Questions and discussion (any remaining time)

5:00 p *Close*

8:00 a 2nd Day - Overview (15 min)

- Explosive Dispersal of Materials

8:15 a 1. Plume consideration (Steele, 30 min)

8:45 a 2. Explosive dispersion ARFs & RFs: by experiments (90 min)

- a. Gases
- b. Vapors
- c. Liquids: aqueous solutions and slurries; combustible, organic

9:15 a 3. Solids: Metals (elastic-plastic response); brittle; powder (60 min)

10:15 a ***Break*** (15 min)

10:30 a 4. Dispersion by Fires (thermal stresses)

- A. Gases
- B. Vapors

10:45 a 5. Fire data - Tewarson (wood and plastic), drum fire experiments

12:00 ***lunch*** (60 min)

1:00 p 6. Combustible, organic solutions and slurries

6. Liquids, aqueous (solutions, slurries, viscous)

3:00 p ***break*** (15 min)

7. Addition discussion Dispersion by Fire (thermal stress)

8. Questions and discussion (time remaining)

5:00 p ***close***

3rd Day - Derivation of ARF/RF Values (cont)

8:00 a

1. Dispersion by fires (thermal stress)(cont.)
2. Solids, Reactive Metals (plutonium, uranium)

9:30 a *break* (15 min)

9:45 a

3. Solids, Brittle
4. Solids, Powders
5. Surface Contamination
 - Combustible solids
 - Non-combustible solids
 - HEPA filter

12:00 *lunch*(60 min)

1:00 p

6. Mechanical Initiators
7. Aerodynamic Entrainment/Resuspension

3:00 p *break* (15 min)

3:15 p

8. Questions, discussion

4:30 p

9. Closing Remarks