July 27, 1982 PDR

LETTER REPORT

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Contractors Report No. _____

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Subject of this Document: Progress reported for MAY 82

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Author(s): P. C. Owczarski

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Washington, D.C. 20555

NRC FIN NO. B2287 & B2407

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LETTER REPORT

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July 16, 1982

Steven Bernstein
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Office of Nuclear Regulatory Research
Transportation & Materials Risk Branch
Standards Section
Mail Stop NL 5650
Washington, DC 20555

Dear Steve:

ACCIDENT AEROSOL CHARACTERIZATION - JUNE MONTHLY REPORT

This monthly report and each succeeding one will cover progress under both FIN-B2287 and FUN-B2407 entitled AEROSOL RELEASE OF RADIOACTIVE MATERIALS FROM FUEL CYCLE FACILITY ACCIDENTS and AEROSOL RELEASES OF RADIOACTIVE MATERIALS FROM ACCIDENTS, respectively.

Through May 30, 1982, 57.2% or $307.2K of the available operating funds for FY-82 have been spent.

PROJECT MANAGEMENT

FY-82 operating expenditures through May 30, 1982 were $307.2, which is 57.2% of the available $537K. The corresponding working period (October 1-May 30) was 66.1% of the available time in FY-82. The expenditures from April 26 to May 30 were $39.2K. We are still anticipating an accelerating spending rate in the last 4 months of FY-82 due to the arrival of Factory Mutual subcontract charges.

A PNL Schedule/Progress of Deliverables - FY-82 is attached. It represents progress up to May 30, 1982. Please refer to it along with the narrative task progress discussed below.

Considerable team effort was spent the first half of May producing our written plan entitled "Level One Source Term Models for Fires in NUREG/CR-2508 Fuel Cycle Facility Accident Analysis Handbook." This plan, mailed to you in May, outlined our concept of FIRIN1, a source term computer code for fires. Also included was our Review of Fire Controlling Parameters.

I met with Bill Gregory and Dick Martin May 24-25 in Los Alamos to work on the Project Plan Document. Some useful catagorizing of PNL tasks, deliverables and milestones was accomplished and I am enclosing these in

the form of two lists: PNL Deliverables and the PNL Task Management Schedule. Please review these.

TASK A - A.A.H. DELIVERABLES

Marcel Ballinger has begun writing the descriptions for the A.A.H. of FIRIN1 models for radioactive releases in fires. These models will be reviewed in July in Boston.

Sue Sutter will be assuming Marcel's role as task leader on the A.A.H. in August. Sue's skills for report organization will be put to good use in reorganizing the ORNL material. Marcel and Sue will be working together in July to insure a smooth and efficient transition.

TASK B - AEROSOL GENERATION EXPERIMENTS

Chemical analysis of all the samples from the UNH pressurized release experiments was completed. The maximum mass airborne was 0.15 g at 500 psig release from a 350 cm^3 source. This is in the range of the uranine mass releases which ranged from 0.13 g to 0.2 g. The source volume did not appear to be significant in determining the magnitude of the release. Releases from 350 cm^3 and 100 cm^3 sources were comparable.

The video tape program "Accident Generated Aerosols, An Experimental Program" was shown at 2 sessions of the ANS Topical Meeting on Radioactive Waste Management, Richland, WA, April 19-22.

The planning document "Experimental Plan: Experiments to be Performed in the RART" was revised and resubmitted for peer review.

TASK C1 - FIRE EXPERIMENTS DELIVERABLES

Factory Mutual Research did not send us any results in May. They continue to promise significant data by the time of the Boston meeting.

The remaining tasks (C2, D and E) have no significant progress to report in May.

Sincerely,

Pete Owczarski

P. C. Owczarski
Applied Meteorology & Emissions Assessment
Geosciences & Engineering Department

PCO:dh

cc: W.S. Gregory/R.A. Martin - LANL

PNL DELIVERABLES

Literature Reviews

ACCIDENT GENERATED AEROSOLS (FORMAL REPORT)	PLR 1
COMBUSTION PRODUCTS (FORMAL REPORT)	PLR 2
MODELS FOR AEROSOL BEHAVIOR IN ENCLOSURES (FORMAL REPORT)	PLR 3
EXPLOSIONS AS SOURCE TERMS (FORMAL REPORT)	PLR 4
HISTORY OF GLOVEBOX ACCIDENTS (INFORMAL REPORT)	PLR 5
GLOVEBOX VENTILATION SYSTEMS (INFORMAL REPORT)	PLR 6
CRITICALITY MODELS (LETTER REPORT)	PLR 7

Experimental Deliverables

		Predecessor Deliverables
FREE FALL SPILLS OF POWDERS AND LIQUIDS (FORMAL REPORT)	PED 1	PLR 1
PRESSURIZED RELEASES OF POWDERS AND LIQUIDS (FORMAL REPORT)	PED 2	PLR 1
PRESSURIZED RELEASES OF HEATED LIQUIDS AND FLASHING SPRAYS (FORMAL REPORT)	PED 3	PLR 1
ENERGY OF DEFLAGRATIONS (FORMAL REPORT)	PED 4	PLR 4
COMBUSTION PRODUCTS FROM FUEL CYCLE FACILITY FIRES (INFORMAL REPORT)	PED 5	PLR 2
AIRBORNE RELEASES FROM GLOVEBOX SYSTEM FIRES (FORMAL REPORT)	PED 6	PLR 2, PLR 5, PLR 6
AIRBORNE RELEASES FROM GLOVEBOX SYSTEM EXPLOSIONS (FORMAL REPORT)	PED 7	PLR 4, PLR 5, PLR 6
DESIGN/BUILD COMBUSTORS FOR LOS ALAMOS FILTER LOADING EXPERIMENTS	PED 8	PLR 3

Modeling Reports

		Predecessor Deliverables		
SOURCE TERM MODELS FOR FREE FALL SPILLS (FORMAL REPORT	PMR 1	PLR 1	PED 1	
SOURCE TERM MODELS FOR PRESSURIZED RELEASES (FORMAL REPORT) (POWDERS, LIQUIDS, HEATED LIQUIDS, FLASHING SPRAYS)	PMR 2	PLR 1	PED 2	PED 3
SOURCE TERM MODELS FOR EXPLOSIVE RELEASES-LEVEL ONE (FORMAL REPORT)	PMR 3	PLR 1	PLR 4	
SOURCE TERM MODELS FOR RELEASES FROM GLOVEBOX FIRES AND EXPLOSIONS (FORMAL REPORT)	PMR 4	PLR 3 PLR 5 PMR 5	PLR 4 PLR 6	PMR 1,2 PED 1-7
SOURCE TERM MODEL FOR FIRES-LEVEL ONE (USERS MANUAL)	PMR 5	PLR 1 PLR 1	PED 1,2 PED 5	PMR 1
SOURCE TERM MODEL FOR FIRES-LEVEL TWO	PMR 6	PMR 5	OTHERS TO BE DEFINED	
SOURCE TERM MODEL FOR EXPLOSIONS-LEVEL TWO	PMR 7	PMR 6	PMR 1-3	

Accident Analysis Handbook

Chapter 2 Facility Descriptions

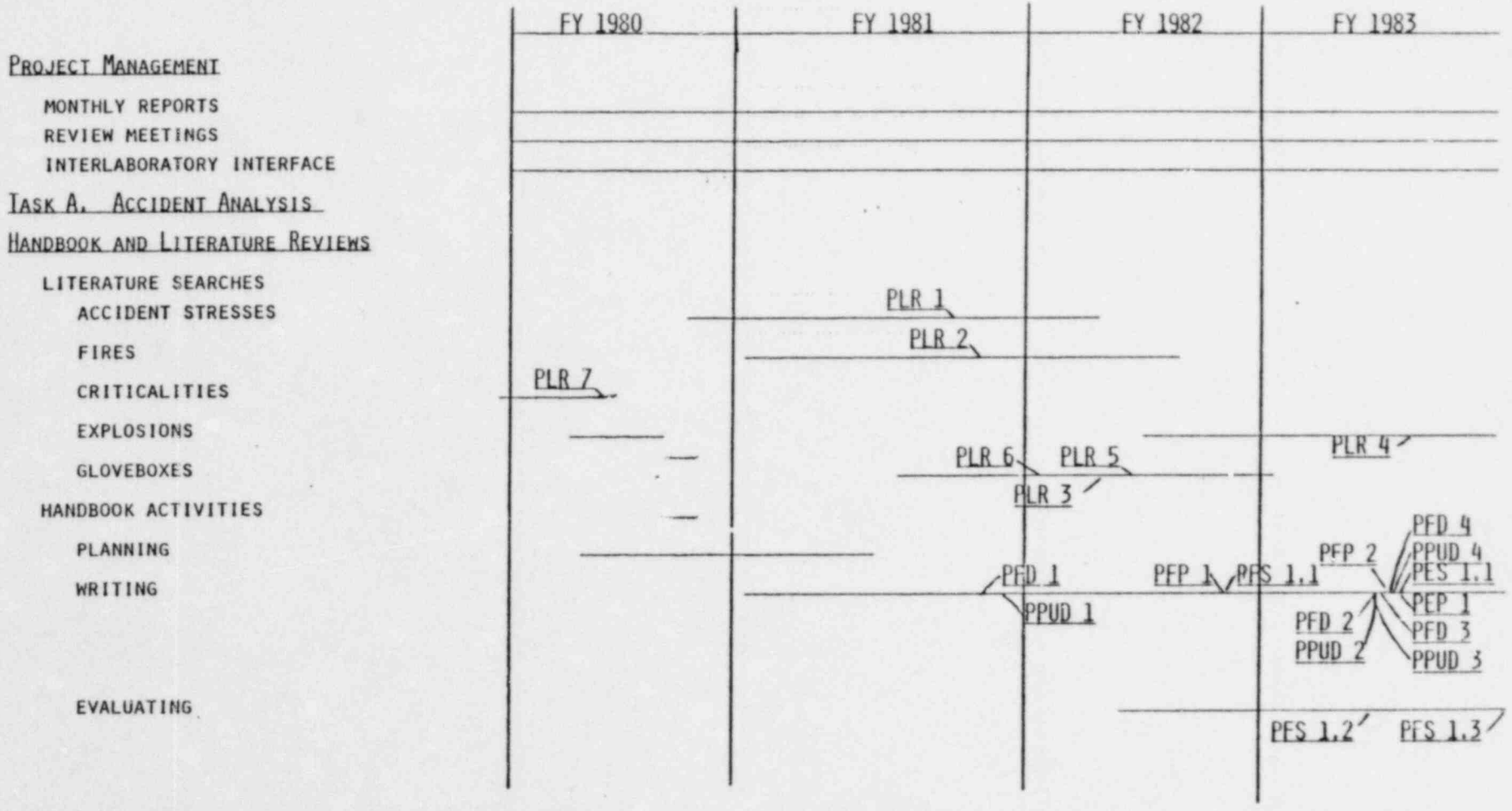
FUEL MANUFACTURING	PFD 1
FUEL REPROCESSING	PFD 2
SPENT FUEL STORAGE	PFD 3
WASTE STORAGE AND SOLIDIFICATION	PFD 4

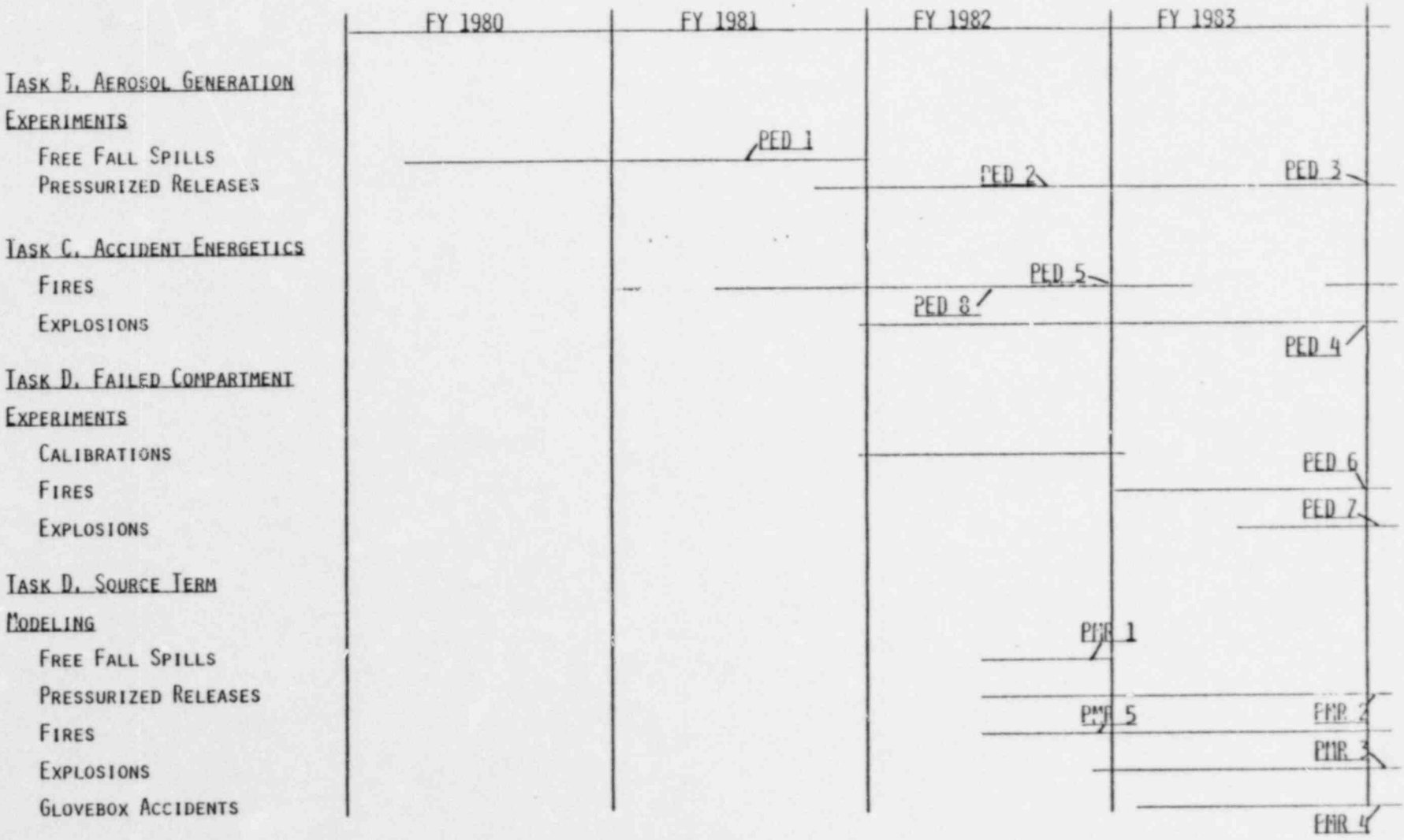
Chapter 3 Processes and Unit Operations

FUEL MANUFACTURING	PPUO 1
FUEL REPROCESSING	PPUO 2
SPENT FUEL STORAGE	PPUO 3
WASTE STORAGE AND SOLIDIFICATION	PPUO 4

CHAPTER 4 SCENARIO AND SOURCE TERM DEFINITION	PREDECESSOR DELIVERABLES
FIRES: LEVEL ONE PFS 1.1, PARAMETER SENSITIVITY PFS 1.2, VERIFICATION PFS 1.3	PMR 5
LEVEL TWO PFS 2.2, PARAMETER SENSITIVITY PFS 2.2, VERIFICATION PFS 2.3	PMR 6 + LANL EX.
GLOVEBOX FIRES PFS 3.1, PARAMETER SENSITIVITY PFS 3.2, VERIFICATION PFS 3.3	PMR 4
SAMPLE PROBLEMS - SIMPLE PFP 1, COMPLEX PFP 2	PFS 1.1 PFS 2.1
EXPLOSIONS: LEVEL ONE PES 1.1, PARAMETER SENSITIVITY PES 1.2, VERIFICATION PES 1.3	PMR 3 + LANL EX.
LEVEL TWO PES 2.1, PARAMETER SENSITIVITY PES 2.2, VERIFICATION PES 2.3	PMR 7 + LANL EX.
GLOVEBOX EXPLOSIONS PES 3.1, PARAMETER SENSITIVTY 3.2, VERIFICATION PES 3.3	PMR 5
SAMPLE PROBLEMS - SIMPLE PEP 1, COMPLEX PEP 2	PES 1.1 PES 2.1
TORNADOS: LEVEL ONE PTS 1, SAMPLE PROBLEM PTP 2	PLR 1 + LANL GUIDELINES
CRITICALITIES: LEVEL ONE PCS 1, SAMPLE PROBLEM PCP 1	PLR 7 PMR 2 PMR 3 PMR 7
SPILLS: LEVEL ONE PSS 1, SAMPLE PROBLEM PSP 1	PMR 1
EQUIPMENT FAILURE: LEVEL ONE PEFS 1, SAMPLE PROBLEM PEFP 1	PMR 1 PMR 2 PMR 3

PNL TASK MANAGEMENT SCHEDULE




FY 1980
FY 1981
FY 1982
FY 1983
Task B. Aerosol Generation Experiments
Free Fall Spills
Pressurized Releases
PED 1
PED 2
PED 3
Task C. Accident Energetics
Fires
Explosions
PED 5
PED 8
PED 4
Task D. Failed Compartment Experiments
Calibrations
Fires
Explosions
PED 6
PED 7
Task D. Source Term Modeling
Free Fall Spills
Pressurized Releases
Fires
Explosions
Glovebox Accidents
PMR 1
PMR 5
PMR 2
PMR 3
PMR 4

PNL SCHEDULE/PROGRESS OF DELIVERABLES - FY-82

TASK A. A.A.H. Deliverables

1. Revise Chapters 2 and 3 to Accomodate FIRIN1 (Sept 82)

   Percent Complete 50

2. Revise Chapter 4 to Accomodate FIRIN1 (Sept 82)

   Percent Complete 20

3. Write FIRIN1 User's Manual (Sept 82)

   Percent Complete 10

4. ORNL Material into New Format (Dec 82)

   Percent Complete 5

5. Identify Further Needs in ORNL Material (Dec 82)

   Percent Complete 0

6. First Explosion Problem (See Task C2.)

   Percent Complete --

7. Complete Planning Document with LANL (June 82)

   Percent Complete 70

TASK B. Aerosol Generation Experiment Deliverables

1. Revised Free Fall Spills Document (Nov 81)

   Percent Complete 100

2. Extended Spills (Dec 81)

   Percent Complete 100

3. Pressurized Powders and Liquids Document (1st Draft Aug 82)

   Percent Complete 25

4. FY-82 RART Plan (July 82)

   Percent Complete 80

5. Revised Source Term Literature Review (Early 82)

   Percent Complete 100

TASK C1. Fire Experiments Deliverables

(Factory Mutual Experiments Begin Jan. 82)

Factory Mutual Final Report (Sept 82)

Percent Experiments Complete 0

Percent Monthly Documentation Complete 0

Percent Final Documentation Complete 0

TASK C2. Fire and Explosion Studies

1. Combustion Products Literature Review (Jan 82)

   Percent Complete 100

2. LANL Smoke Generator (Feb/March 82)

   Percent Complete 100

3. Initiate Explosion Parameters Literature Review (Oct 81)

4. Draft Explosion Parameters Literature Review (3rd Qtr '83)

   Percent Complete 20 (first outline complete)

5. Develop Preliminary Level One Source Term Models for Explosions

   Percent Complete 50

6. Develop Radioactive Release Scenario for Each Model in 5. (Letter Report Sept 82)

   Percent Complete 0

7. For A.A.H., Provide Step-by-Step Procedures for Models in 5. (1st Qtr '83)

   Percent Complete 0

8. For A.A.H., Provide Sample Explosion Problem (2nd Qtr, FY-83)

   Percent Complete 0

TASK D. Failed Compartment Tests Deliverables

SUBTASK 1. Experiment Planning

1. Aerosol Behavior Code Literature Search (Jan. 82)
   Percent Complete 100
2. Summarize Historical Data on Glovebox Fires (Informal Report - April 82)
   Percent Complete 75
3. Experimental Plan to Characterize Glovebox (April 82)
   Percent Complete 25
4. Preliminary Plan for First Fire Release (Aug. 82)
   Percent Complete 0

SUBTASK 2. Experimentation

1. Complete Glovebox Characterization (June 82)
   Percent Complete 0
2. Analyze Data (July 82)
   Percent Complete 0
3. Prepare Equipment for Fire Experiments (Late 82)
   Percent Complete 0

TASK E. Models Deliverables

1. Free Fall Spills (Draft Aug 82)

   Percent Complete 30

2. Combustion Products Computer Code (Aug 82)

   Percent Complete 30

3. Pressurized Releases (Late 82)

   Percent Complete 0

4. Task D Support - Well Mixed Compartment (Late 82)

   Percent Complete 0