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October 5, 1982

LETTER REPORT

Accession No. _____
Contractors Report No. _____

Contract Program or Project Title: Investigation of Accident-Induced Flow and
Material Transport in Nuclear Facilities

Subject of this Document: Progress reported for AUGUST 82

Type of Document: Informal monthly progress report

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Responsible NRC Individual and NRC Office or Division

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Prepared for
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

NRC FIN NO. A7029

LETTER REPORT

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September 28, 1982
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Safety Assessment

Mr. S. Bernstein
Office of Nuclear Regulatory Research
US Nuclear Regulatory Commission
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Dear Steve:

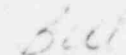
SUBJECT: R673 MONTHLY STATUS REPORT FOR AUGUST 1982--INVESTIGATION OF
ACCIDENT-INDUCED FLOW AND MATERIAL TRANSPORT IN NUCLEAR
FACILITIES

The monthly status report for August 1982 is enclosed. Please
call if you have questions or need clarification.

Sincerely,



R. A. Martin



W. S. Gregory

RAM/WSG:cd

Enc: As cited above

Cys w/enc: P. C. Owczarski/J. Mishima, PNL
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PROGRAM STATUS REPORT

TITLE: Investigation of Accident-Induced Flow and Material Transport
in Nuclear Facilities

PROJECT NO: R673

FIN NO: A7029

CONTRACTOR: Los Alamos National Laboratory

MONTH COVERED: August 1982

BUDGET STATUS: Annual Budget \$580 k (includes FY 1981 carryover of \$64 k)

Monthly spending : \$ 27.7
Cumulative Spending: \$517.8
Funds Remaining : \$ 62.2

I. PROGRAM DESCRIPTION

The objective of this research is to develop the capability to predict accident-induced flow and material transport within a fuel-cycle facility. We will develop techniques and conduct experiments to provide supportive data for transport of internal accident releases throughout a facility. The program will be limited to providing source-term characterization at a plant's atmospheric boundary. The primary pathway to the atmosphere is a facility's ventilation system, and techniques developed in this investigation will be designed for, but not limited to, ventilation system pathways. Level One accident analysis computer codes for fire, explosion, and tornado will be developed this fiscal year. We will perform tasks in the analytical and experimental areas to support these program deliverables. As required, we will provide the necessary support to design and provide data for an accident analysis user's handbook.

II. HIGHLIGHTS/SIGNIFICANT MONTHLY ACTIVITIES

The Los Alamos Fire Model was updated by replacing empirical inputs on hot-layer chemistry with bounding factors that are derived from basic thermodynamic principles. The bounding factors were verified as far as

possible with the 1981 series of Lawrence Livermore National Laboratory (LLNL) fire tests as well as available Factory Mutual tests. The updated model then was used to provide pretest predictions of the 1982 LLNL fire test series. One unresolved scientific question is what happens to the liquid and solid portions of the unburned fuel. The pretest predictions assumed an extreme case where all liquid fuel is vaporized. The other extreme case which is more in line with empirical pool fire test results, would be to assume that none of the unburned liquid fuel is vaporized. A second set of predictions was prepared and submitted, which reflects this second case.

The physics of the updated model also was used to initiate a simple two-step approximation of FIRAC source terms. The first step denotes the initial fire, which is characterized by minimum wall heat loss. The second step describes the effects of the burn room on the final fire. A draft report on this "quick look" capability for fire source analysis was initiated. Use of this fire source analysis should protect the analyst against physically unrealistic heat and mass deposition as discussed during the Boston Research Review Group meeting.

III. PROGRAM DEVELOPMENT VARIANCE

Intermediate milestones in the areas of B.1.c, B.1.d, B.3.a, B.3.b, and B.3.c will not be fulfilled in FY 1982 (Fig. 1). These tasks will be considered in the program direction meeting planned for next month in Washington.

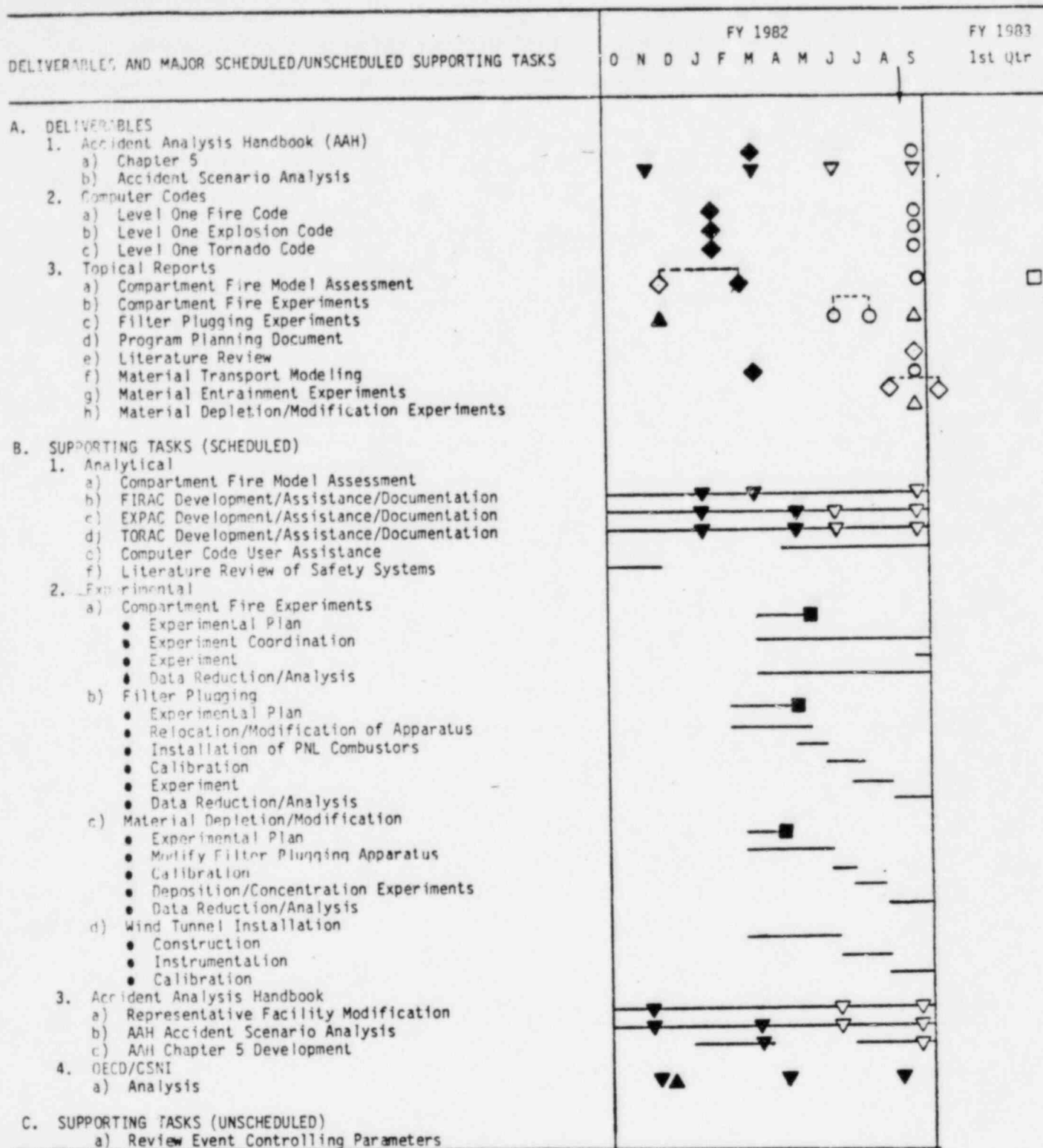
We have added another intermediate milestone in B.4.a to reflect fire compartment analyses performed as per your approval after the OECD/CSNI meeting in Denver, Colorado.

The topical report on material transport experiments will not be delivered this month. We are rescheduling delivery of this rough-draft report to November 1982.

IV. BUDGET VARIANCE

We have brought our spending level down and are now below our budget forecast for FY 1982 (Fig. 2). We expect to carry over some funds into FY 1983 to pay for work subcontracted to New Mexico State University and LLNL.

FIG. 1
FY 1982 PROGRAM DEVELOPMENT SCHEDULE



LEGEND

- | | |
|--------------------------|-----------------------------------|
| □ Informal Letter Report | ■ Informal Letter Report Complete |
| ◇ Draft Topical Report | ◆ Draft Topical Report Complete |
| ○ Final Topical Report | ● Final Topical Report Completed |
| △ Draft Interim Report | ▲ Draft Interim Report Complete |
| ▽ Intermediate Milestone | ▼ Intermediate Milestone Complete |

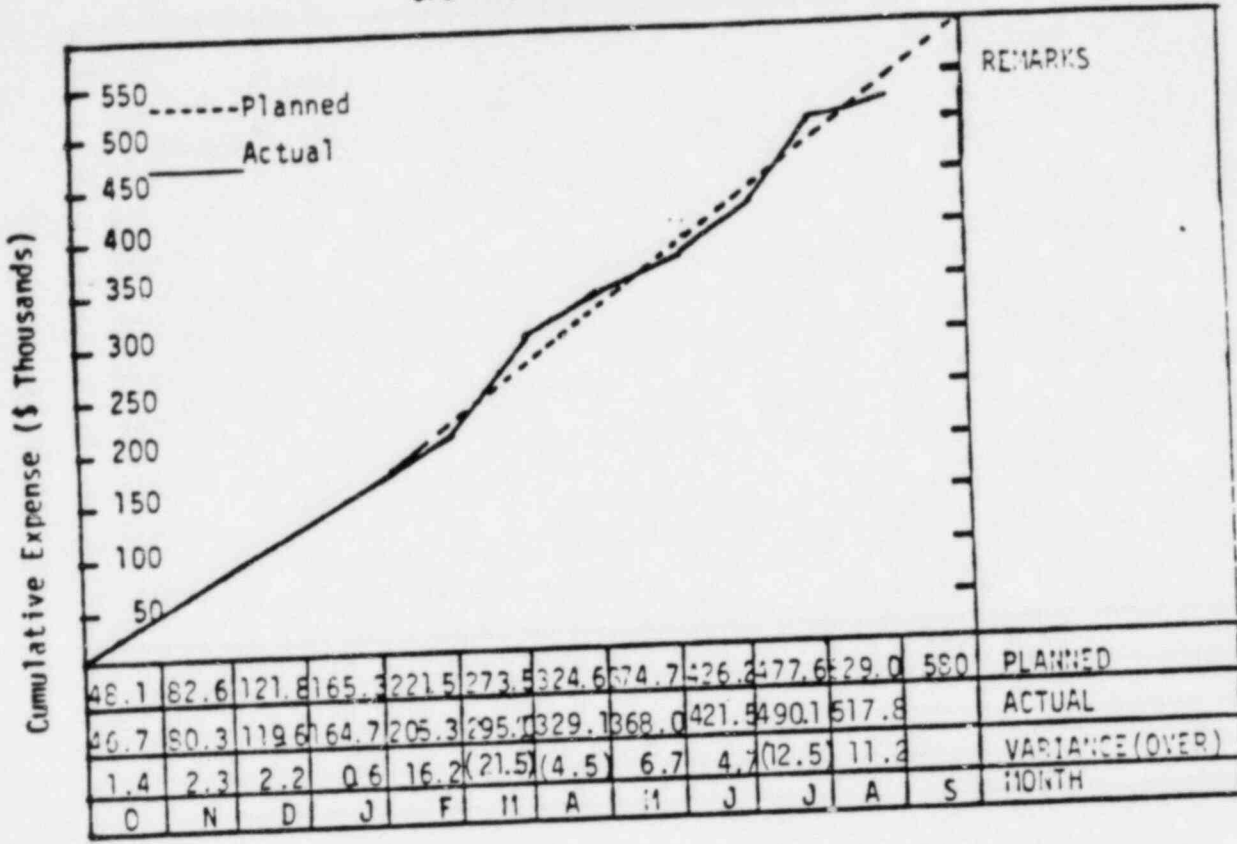
----Scheduled Variation

— Activity Line

* Identification of Cause in Variation

↓ Time Now

Fig. 2.
OPERATING COSTS IN THOUSANDS



REMARKS