

INTERIM REPORT

# NRC Research and Technical Assistance Report

Accession No. \_\_\_\_\_

TK

**Contract Program or Project Title:**

Analysis of Hypothetical Accidents Resulting in Core Meltdown

**Subject of this Document:**

Analysis of Hypothetical Accidents Resulting in Core Meltdown

**Type of Document:**

Monthly Progress Report for February, 1979

**Author(s):**

R. S. Denning, P. Cybulskis and P. Baybutt

**Date of Document:**

June 13, 1979

**Responsible NRC Individual and NRC Office or Division:**

M. A. Cunningham  
Office of Nuclear Regulatory Research

This document was prepared primarily for preliminary or internal use. It has not received full review and approval. Since there may be substantive changes, this document should not be considered final.

# NRC Research and Technical Assistance Report

BATTELLE  
Columbus Laboratories  
505 West King Avenue  
Columbus, Ohio 43201

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

INTERIM REPORT

589 02079 08020557



Columbus Laboratories  
505 King Avenue  
Columbus, Ohio 43201  
Telephone (614) 424-6424  
Telex 24-5454

June 19, 1979

Mr. Mark A. Cunningham  
Office of Nuclear Regulatory Research  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Cunningham:

Due to a delay in FY79 funding, our program "Analysis of Hypothetical Accidents Resulting in Core Meltdown" has been held to a low level since the beginning of the calendar year. Some effort has been expended on Task I, Reactor Safety Study Follow-On Program, in order to minimize the impact on the progress of parallel efforts at Sandia Laboratories. In April the authorization for FY79 was received by Battelle. With this letter we are providing reports for our efforts in January, February, March, April, and May.

In April and May, \$58,100 in costs were incurred in responding to the Three-Mile Island accident. These costs have not been assigned to any of the three current tasks. Because of the delay in FY79 funding authorization, these additional costs should not lead to a cost overrun. However, if the initial objectives of these tasks are to be met, it will be necessary to supplement FY80 funds by this amount. The current project balance including Three Mile Island costs is \$276.3K.

Within the next month we will meet with Sandia Laboratories and Probabilistic Analysis Staff members to reschedule milestones for our three FY79 tasks.

Sincerely,

Richard S. Denning  
Research Leader  
Nuclear and Flow Systems Section

RSD/sm

Enc.

cc: G. Edison/NRC  
J.A. Murphy/NRC  
R. DiSalvo/NRC  
M.A. Taylor/NRC  
R. Matson/NRC  
R. DeYoung/NRC  
R. Boyd/NRC  
T. Novak/NRC  
Div. of Tech. Info and  
Document Control (2)

589 021

PROGRAM: Analysis of Thermal-Hydraulic Behavior

FIN#: A4067

CONTRACTOR: Battelle-Columbus Laboratories

BUDGET PERIOD: (mm/yy-mm/yy) 10/78-9/79

PAS PROGRAM MANAGER: M. A. Cunningham

BUDGET AMOUNT: (Thousands) \$90

CONTRACTOR PROGRAM MANAGER: R. S. Denning

PHONE: FTS 976-7510

PRINCIPAL INVESTIGATOR(S): P. Cybulskis

PHONE: FTS 976-7509

PROGRAM OBJECTIVES:

1. Test each of the modules in the MARCH code
2. Standardize programming and units
3. Document the MARCH code
4. Verify against available data and compare with similar codes

ACTIVITIES DURING FEBRUARY, 1979

None

MAJOR MILESTONES:

MILESTONE DESCRIPTION	SCHEDULED/ACTUAL START	SCHEDULED COMPLETION	ACTUAL/PROJECTED COMPLETION
1. MARCH Testing/ Documentation	4/79-	12/79	
2. MARCH Verification	10/79	9/80	
3.			

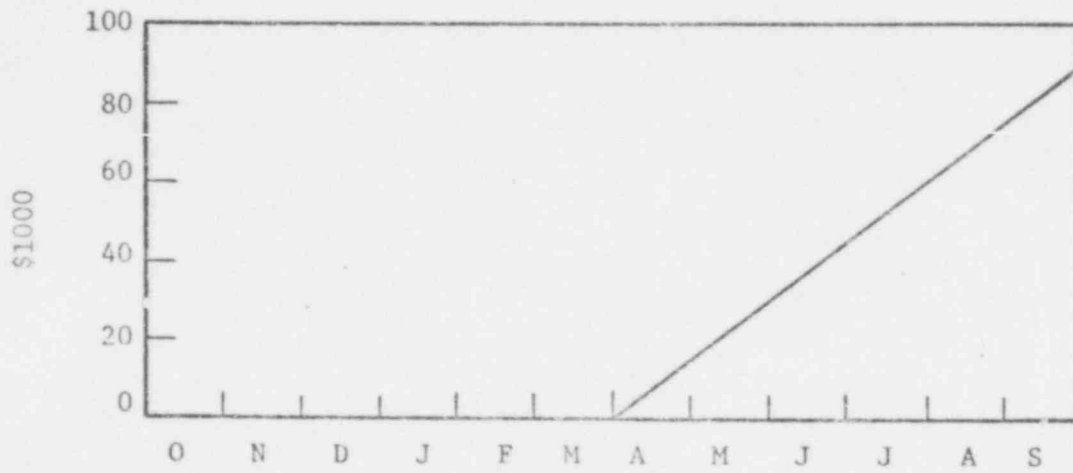
MANAGEMENT AND TECHNICAL ISSUES/POTENTIAL SCHEDULE OR FUNDING PROBLEMS:

None

589 022

EXPENDITURES

PROGRAM: ANALYSIS OF THERMAL-HYDRAULIC BEHAVIOR



RESOURCES EXPENDED:

	February, 1979	CUMULATIVE
DOLLARS	0	0
MAN-MONTHS	0	0

589 023

PROGRAM: REACTOR SAFETY STUDY FOLLOW-ON PROGRAM SUBTASK FIS : A4067

CONTRACTOR: Battelle Columbus Laboratories

BUDGET PERIOD: (mm/yy-mm/yy) 10/78-9/79

PAS PROGRAM MANAGER: M. A. Cunningham

BUDGET AMOUNT: (Thousands) 180.2\*

CONTRACTOR PROGRAM MANAGER: R. S. Denning

PHONE: FTS 976-7510

PRINCIPAL INVESTIGATOR(S): P. Cybulskis

PHONE: FTS 976-7509

#### PROGRAM OBJECTIVES:

Investigate the effects of LWR plant design variations on the risks associated with reactor meltdown accidents. Specifically, determine the effects of plant design variations on the probability and nature of the radionuclide source term released during key meltdown accident sequences.

#### ACTIVITIES DURING FEBRUARY, 1979

MARCH calculations were initiated for a number of accident sequences for the Combustion Engineering plant design. The sequences were identified by Sandia Laboratory.

#### MAJOR MILESTONES:

MILESTONE DESCRIPTION	SCHEDULED/ACTUAL START	SCHEDULED COMPLETION	ACTUAL/PROJECTED COMPLETION
1. RSS PWR BASELINE ANALYSES	4/78-4/78	7/78	6/78
2. B&W PWR ANALYSES	4/78-4/78	6/78	11/78
3. CE PWR ANALYSES	7/78-8/78	9/78	**
4. RSS BWR BASELINE ANALYSES	6/78-6/78	9/78	11/78
5. GE MARY III BWR ANALYSES	9/78-9/78	12/78	**

#### MANAGEMENT AND TECHNICAL ISSUES/POTENTIAL SCHEDULE OR FUNDING PROBLEMS:

Pending receipt of FY 79 authorization, program effort has been reduced to minimum level. Schedules will be reevaluated upon receipt of above authorization.

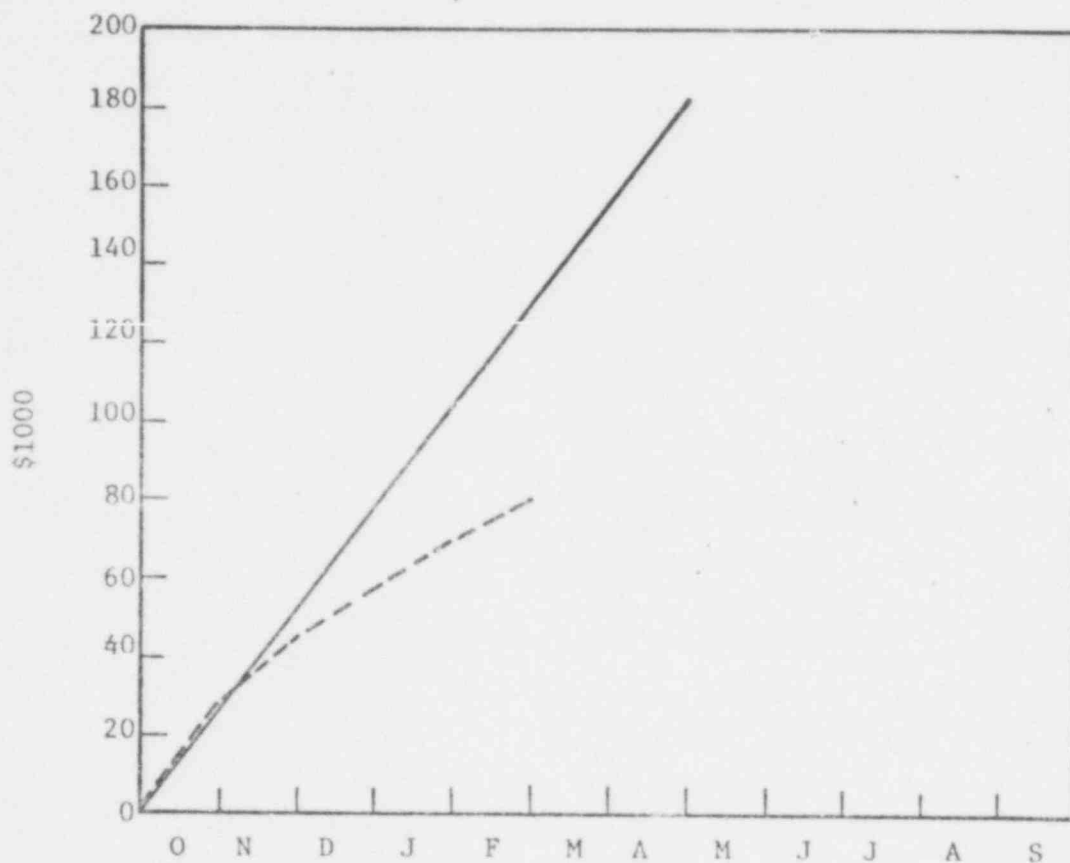
\* Includes \$30,250 carryover from FY78.

\*\* Milestones are under review as a result of the delay in FY79 authorization.

589 024

EXPENDITURES

PROGRAM: REACTOR SAFETY STUDY FOLLOW-ON PROGRAM



RESOURCES EXPENDED:

	February, 1979	CUMULATIVE
DOLLARS	9.9K	79.8K (44%)
MAN-MONTHS	1.2	10.0

589 025

PROGRAM: PROBABILISTIC UNCERTAINTY ANALYSIS SUBTASK

FIN#: A4067

CONTRACTOR: Battelle Columbus Laboratories

BUDGET PERIOD: (mm/yy-mm/yy) 10/70-9/79

PAS PROGRAM MANAGER: M. A. Cunningham

BUDGET AMOUNT: (Thousands) 228.1K\*

CONTRACTOR PROGRAM MANAGER: R. S. Denning

PHONE: FTS 976-7510

PRINCIPAL INVESTIGATOR(S): P. Baybutt

PHONE: FTS 976-7499

PROGRAM OBJECTIVES:

- o Perform probabilistic uncertainty analyses for PWR and BWR accident sequences
- o Evaluate the uncertainty analysis methodology and develop decision criteria
- o Assess the feasibility of developing response surfaces for the MARCH and CORRAL codes.

ACTIVITIES DURING February, 1979

The project was inactive during this month awaiting funding authorization.

MAJOR MILESTONES:

MILESTONE DESCRIPTION	SCHEDULED/ACTUAL START	SCHEDULED COMPLETION	ACTUAL/PROJECTED COMPLETION
1.	FY79 milestones are under review due to the delay in funding authorization.		
2.			
3.			

MANAGEMENT AND TECHNICAL ISSUES/POTENTIAL SCHEDULE OR FUNDING PROBLEMS:

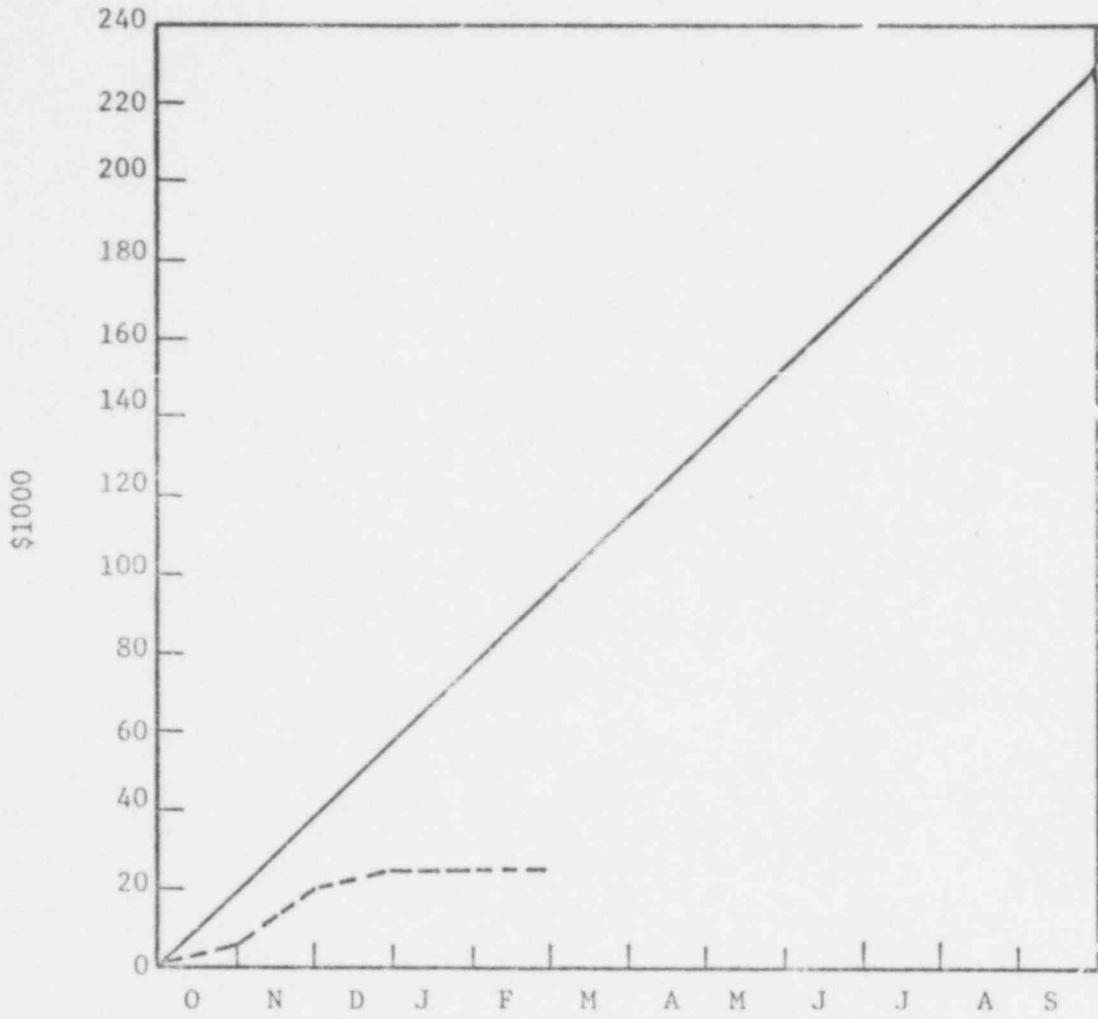
The delay in funding authorization will require rescheduling of the FY79 effort.

\* Includes \$18.1K carryover from FY78.

589 026

EXPENDITURES

PROGRAM: PROBABILISTIC UNCERTAINTY ANALYSIS



RESOURCES EXPENDED:

	February, 1979	CUMULATIVE
DOLLARS	0.2K	25.2 (11%)
MAN-MONTHS	0	3.1

589 027