

INTERIM REPORT

Accession No. _____

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 November, 1978

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Responsible NRC Individual and NRC Office or Division:

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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.

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Washington, D. C. 20555

INTERIM REPORT

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HYPOTHETICAL ACCIDENTS RESULTING IN CORE MELTDOWN

PROGRAM: Reactor Safety Study Follow-On Program Subtask FIN#: A4067

CONTRACTOR: Battelle's Columbus Laboratories BUDGET PERIOD: (mm/yy-mm/yy)10/77-9/7

PAS PROGRAM MANAGER: M. A. Cunningham BUDGET AMOUNT: (Thousands) 300*

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 NOVEMBER, 1978

Detailed analyses of the potentially dominant accident sequences for the B&W PWR design were completed.

The MARCH/CORRAL rebaseline analyses for the RSS BWR were completed.

A paper on "Methods of Analysis for Core Meltdown Accidents in Light Water Reactor" was presented at Karlsruhe on November 28-29, 1978.

MAJOR MILESTONES:

| MILESTONE DESCRIPTION | SCHEDULE/ACTUAL START | SCHEDULED COMPLETION | ACTUAL/PROJECTED COMPLETION |
|---------------------------------|--------------------------|-------------------------|--------------------------------|
| 1. RSS PWR BASELINE ANALYSES | 4/78/4/78 | 6/78 | 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 | 12/78 |
| 4. RSS BWR BASELINE ANALYSES | 6/78/6/78 | 9/78 | 11/78 |
| 5. GE MARK III BWR ANALYSES | 9/78/9/78 | 12/78 | |

MANAGEMENT AND TECHNICAL ISSUES/POTENTIAL SCHEDULE OR FUNDING PROBLEMS:

Start of the detailed analyses for the CE PWR design is contingent on the identification of key accident sequences.

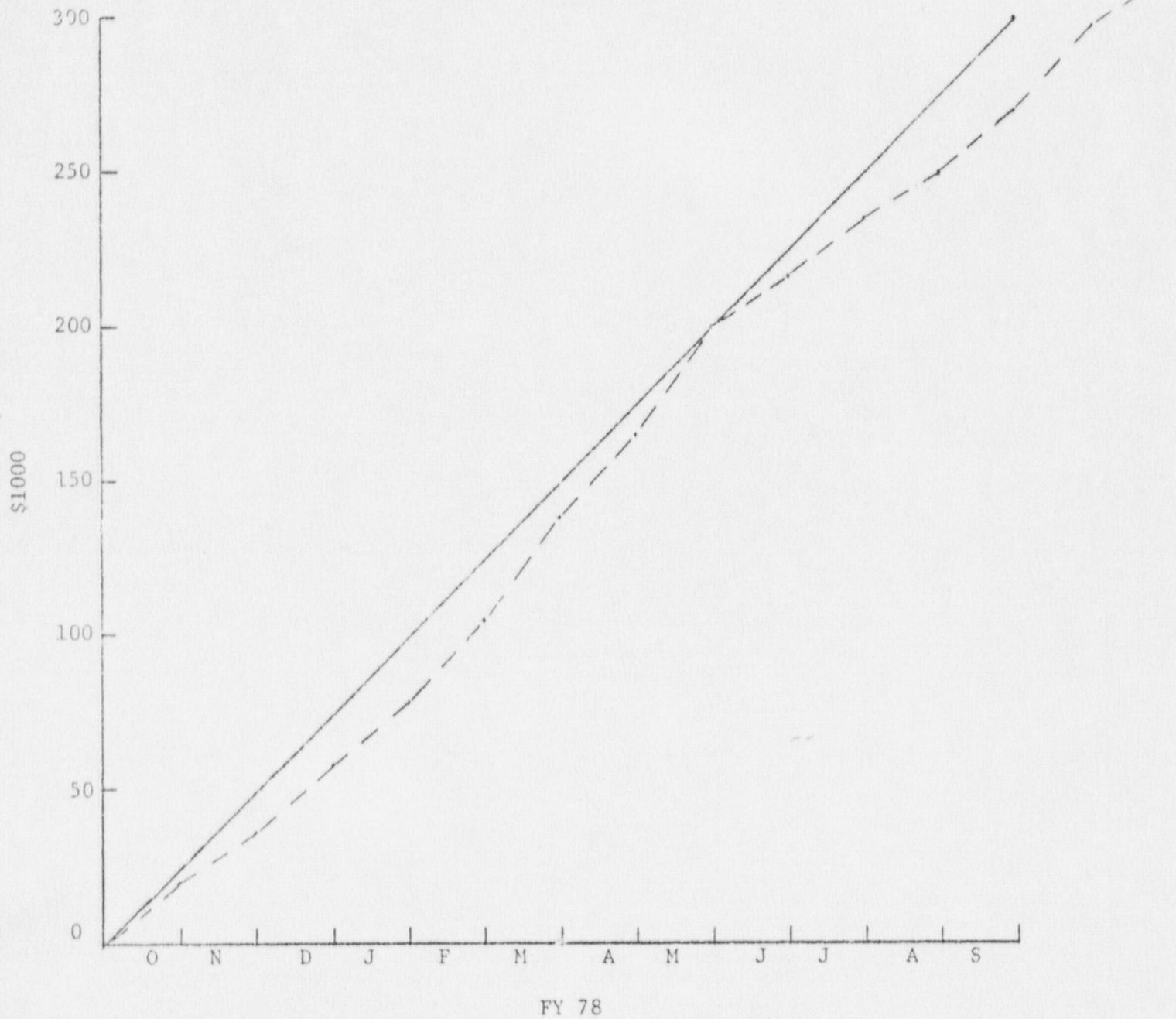
The program is currently operating on a no-fund extension. The previous authorization has been expended, thus future progress is contingent on the receipt of the FY 79 authorization.

* Includes 50 K for special studies.

NRC Research and Technical
Assistance Report

EXPENDITURES

PROGRAM: REACTOR SAFETY STUDY FOLLOW-ON PROGRAM



RESOURCES EXPENDED:

| | NOVEMBER 1978 | CUMULATIVE |
|------------|---------------|--------------|
| DOLLARS | 16.4 K | 313 K (104%) |
| MAN-MONTHS | 2.2 | 42 |

HYPOTHETICAL ACCIDENTS RESULTING IN CORE MELTDOWN

PROGRAM: Probabilistic Uncertainty Analysis Subtask FIN#: A4067
 CONTRACTOR: Battelle Columbus Laboratories BUDGET PERIOD: (mm/yy-mm/yy) 10/77-9
 PAS PROGRAM MANAGER: M. A. Cunningham BUDGET AMOUNT: (Thousands) 171.4*
 CONTRACTOR PROGRAM MANAGER: R. S. Denning PHONE: FTS 976-7510
 PRINCIPAL INVESTIGATOR(S): Paul Baybutt PHONE: FTS 976-7499

PROGRAM OBJECTIVES:

1. Determine the areas of greatest uncertainty in the calculation of accident consequences
2. Identify priority areas for reactor meltdown accident research which would reduce these uncertainties in accident consequences
3. Evaluate the effect of methodology assumptions on the importance ranking of variables.

ACTIVITIES DURING NOVEMBER, 1978

All MARCH runs were completed for the 28⁻⁴ design on the BWR accident sequence TC. CORRAL runs for one half of the full design matrix have been completed and these were used in an EFFECTS analysis of a 27⁻⁴ foldover design. The remaining CORRAL runs are in progress.

The effect of bias on the variance estimates of the code output was investigated. Some insight into the reduction of bias errors in the variance was gained.

MAJOR MILESTONES:

| MILESTONE DESCRIPTION | SCHEDULED/ACTUAL START | SCHEDULED COMPLETION | ACTUAL/PROJECTED COMPLETION |
|--------------------------------------|------------------------|----------------------|-----------------------------|
| 1. Uncertainty analysis PWR Sequence | | | 5/78 |
| 2. Uncertainty analysis BWR Sequence | 4/78 5/78 | 9/78 | 11/78 |
| 3. | | | |

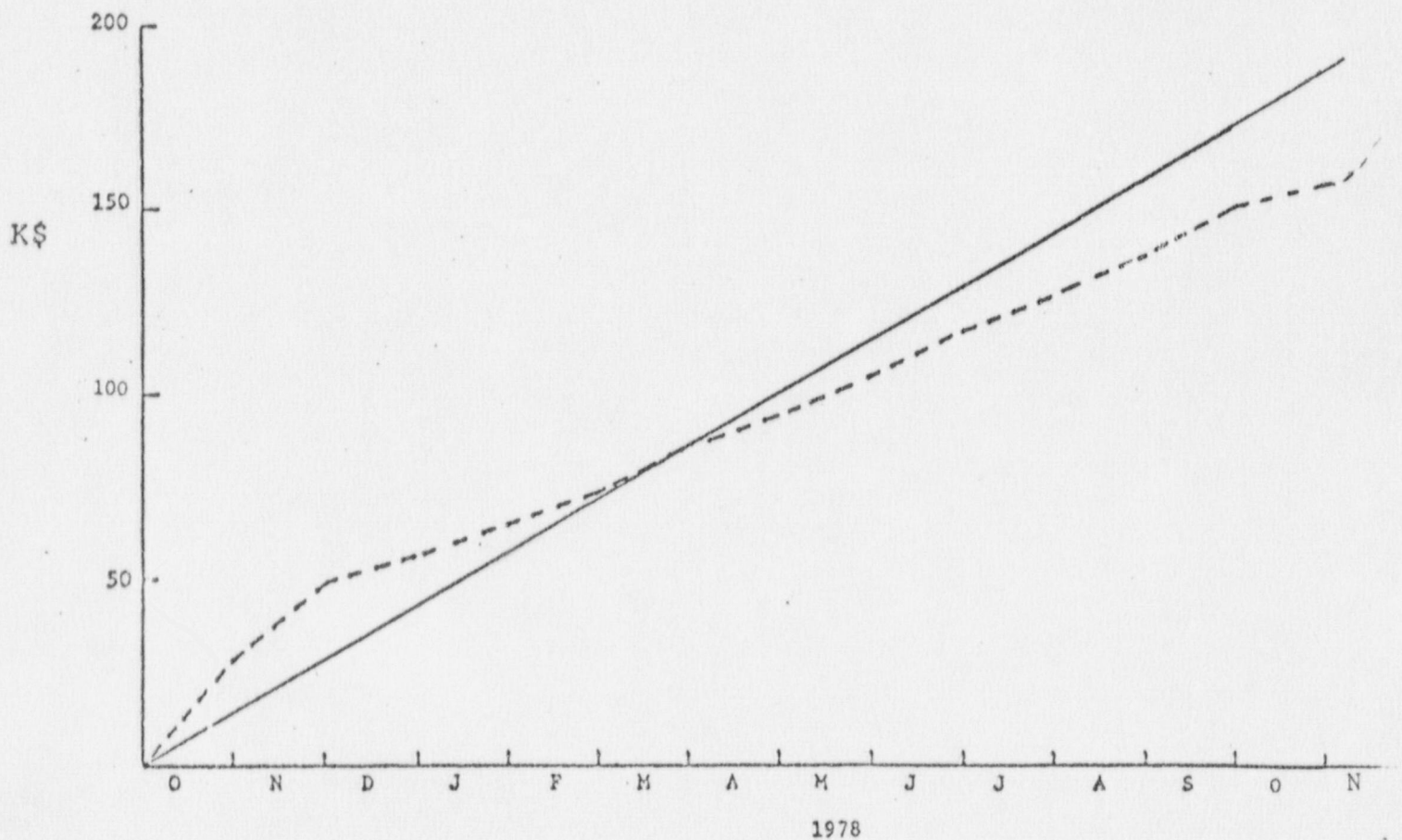
MANAGEMENT AND TECHNICAL ISSUES/POTENTIAL SCHEDULE OR FUNDING PROBLEMS:

FY 78 funding is essentially spent.

* Includes approx. \$29,500 unexpended FY 77 authorization.

EXPENDITURES

PROGRAM: PROBABILISTIC UNCERTAINTY ANALYSIS



RESOURCES EXPENDED:

| | NOVEMBER 1978 | CUMULATIVE * |
|------------|---------------|--------------|
| DOLLARS | 12.7 K | 168.8 (98%) |
| MAN-MONTHS | 1.9 | 21 |

*The cumulative costs have been adjusted to reflect the actual versus estimated expenditures during the previous month.