

TIC

INTERIM REPORT

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

Contract Program or Project Title: BWR Refill-Reflood Program  
Subject of this Document: Program Progress  
Type of Document: Monthly Letter  
Author(s): G. W. Burnette  
Date of Document: August 1979  
Responsible NRC Individual and NRC Office or Division: W. D. Beckner

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

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

INTERIM REPORT

999 160

7909240787

# GENERAL ELECTRIC

NUCLEAR ENERGY  
BUSINESS GROUP

GENERAL ELECTRIC COMPANY, 175 CURTNER AVE., SAN JOSE, CALIFORNIA 95125

September 11, 1979

Mr. Edward L. Halman, Director  
Division of Contracts  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dr. M. Merilo  
EPRI PMG Member, BWR-BD/ECC Program  
Safety & Analysis Department  
Electric Power Research Institute  
P.O. Box 14012  
Palo Alto, CA 94304

SUBJECT: BWR REFILL-REFLOOD PROGRAM  
CONTRACT NO. NRC-04-79-184  
INFORMAL MONTHLY PROGRESS REPORT FOR AUGUST 1979

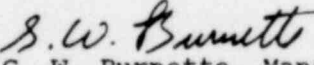
Gentlemen:

The following summarizes the subject matter covered in the attached report:

The first BWR Refill-Reflood Program PMG Meeting was held. Detailed design and fabrication of the hardware for the core spray distribution task is in progress. Single nozzle tests have been completed and simulator nozzle development has been started. Planning for the single heated bundle system performance tests is nearing completion and testing will be started late this year. The 30° Sector system effects tests planning has been started. Potential intermediate revisions to TRAC have been identified to improve interfacial shear and CCFL downflow modelling. Two alternatives are being considered for the fundamental single channel thermal-hydraulic model. Some improvements and means of modelling basic BWR components in TRAC have been evaluated.

Distribution of this report is being made in accordance with the "Monthly Distribution List" provided with W. D. Beckner's letter of April 20, 1979.

Very truly yours,

  
G. W. Burnette, Manager  
External Programs  
M/C 583, Telephone (408) 925-5375

999 161

cc: RG Bock

GWB/cat

NRC Research and Technical  
Assistance Report

B W R   R E F I L L - R E F L O O D   P R O G R A M

F I R S T   M O N T H L Y   R E P O R T

A U G U S T   1 9 7 9

Prepared for:

Division of Reactor Safety Research  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555  
NRC FIN No. B3014

and

Electric Power Research Institute  
3412 Hillview Avenue  
Palo Alto, CA 94304  
EPRI Project No. RP-495-1

and

General Electric Company  
175 Curtner Avenue  
San Jose, CA 95125

By

General Electric Company

Under

Contract No. NRC-04-79-184

999 162

REFILL - REFLOOD PROGRAM  
FIRST MONTHLY REPORT  
AUGUST, 1979

SUMMARY

The first BWR Refill-Reflood Program PMG Meeting was held. Detailed design and fabrication of the hardware for the core spray distribution task is in progress. Single nozzle tests have been completed and simulator nozzle development has been started. Planning for the single heated bundle system performance tests is nearing completion and testing will be started late this year. The 30° Sector system effects test planning has been started. Potential intermediate revisions to TRAC have been identified to improve interfacial shear and CCFL downflow modelling. Two alternatives are being considered for the fundamental single channel thermal-hydraulic model. Some improvements and means of modelling basic BWR components in TRAC have been evaluated.

ADMINISTRATIVE ITEMS

The Refill-Reflood contract was executed near the end of July. The contract has an effective start date of May 9, 1979. This monthly report covers activities pertinent to the program through August 1979.

The first BWR Refill-Reflood (R/R) PMG Meeting was held at Lynn, Mass., on August 21 and 22, 1979. Technical items discussed included the BWR/6 Core Spray Program (completed under G.E. funding), the general overview of the BWR R/R Program, status of the R/R Core Spray Distribution Task, planning the 30° Sector CCFL/Refill System Effects Tests, progress on the Single Heated Bundle Task, and model development activities. Various administrative items were also covered.

Core Spray Distribution (Task 4.2) - Design and fabrication of the BWR/4-5 lower header and double nozzle fixture are continuing. The task plan is approximately 50% complete. Horizontal Spray Facility testing for this task has been completed and the data are being analyzed. Test planning for the single (simulator) nozzle tests at the Vallecitos Spray Facility is approximately 50% complete and the hardware is being fabricated. Double nozzle testing in late 1979 and lower header testing in early 1980 are anticipated. These later tests will be conducted in the 30° Sector at Lynn, Mass.

Single Heated Bundle Task (Task 4.3) - Work is proceeding to prepare the Single Heated Bundle Test for operation using an existing bundle. This bundle was used for previous testing and has some heater rods which have deformed to a degree which makes them unsuitable for heat transfer testing. However, they are considered adequate for the system performance tests to be run late this year.

TLTA transient test data are being used to provide test boundary conditions for the Single Heated Bundle (SHB) tests. A scaling basis to translate the transient pressure data to atmospheric SHB conditions has been formulated.

This scaling basis is required in order to assure that the atmospheric pressure SHB tests will capture the relevant BWR refill phenomena.

The test plan and procedures for these tests have been issued so that system shakedown and preliminary testing can proceed. Work on the task plan document is proceeding.

CCFL/Refill System Effects Tests [30° Sector] (Task 4.4) - This task is in the early planning stage. The objectives for the SSTF have been formulated and prioritized. Work is in progress to define facility functional specifications in order to evaluate various design alternatives. In parallel with the evaluation of design alternatives, a measurement plan will be developed.

Basic Models (Task 4.7.1) - The models in the TRAC code for interfacial shear were reviewed. An intermediate revision of these models is being developed to predict the correct relative velocity between the phases over a range of conditions. A model for limiting the liquid downflow at a restriction for a given vapor upflow (CCFL) has also been suggested for incorporation into TRAC. Details will be reported in the next monthly report.

Single Channel Model (Task 4.7.2) - An evaluation is being made on the choice of a single (hot) channel model to use in conjunction with the TRAC system code. An existing drift flux model and the TRAC two-fluid 1D model are being considered. Recommendations will be made after some comparisons on features and running costs are made.

TRAC Support (Task 4.7.3) - A substantial effort has been expended to date in achieving familiarity with the TRAC computer program. The Tee component is being modified to correctly treat the momentum terms for the two streams. Separators are being modeled as part of the vessel component by preferentially adjusting the resistances to the phases in the two directions. A preliminary model of the BWR has been set up and run for 24 seconds into the blowdown following a LOCA. Further details will be provided in the next monthly report.

Model Qualification (Task 4.8) - A comprehensive list of all test facilities related to BWR LOCA Technology has been compiled. Each facility has been assessed for its potential applicability to relevant BWR phenomena.

The experimental data have been classified as Model Development Data, Preliminary Assessment Data, or Model Qualification Data. Model development data may be used in the development of empirically based models. Qualification data will not be used in the development of the models but will be utilized only for final code assessment. Preliminary assessment data will be used to assess the existing capability of the codes and models, and to provide guidance for further model development. These data will not generally be used to develop models. Classification of the data base is nearly complete and the Model Qualification Task Plan is scheduled to be documented in October 1979.

*S.W. Burnette*

G. W. Burnette, Manager  
External Programs

999 164