

Contract Program or Project Title:

Creare Downcomer Effects Program

Subject of this Document:

Progress Report for June 1979; Creare Project 345-10; NRC CONTRACT NO. NRC-04-75-162

Type of Document:

Monthly Progress Report

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Contract No: NRC-04-75-162

Date of Document: July 6, 1979

Date Transmitted to NRC: July 6, 1979

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RSR

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NRC Research and Technical
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July 6, 1979

Mr. A. W. Serkiz
Acting Branch Chief
Separate Effects Branch
Div. of Reactor Safety Research
U.S. Nuclear Regulatory Commission
Willste Building
7915 Eastern Avenue
Silver Spring, Maryland 20910

Dear Mr. Serkiz:

Subject: PROGRESS REPORT FOR JUNE 1979; CREARE PROJECT
345-10; NRC CONTRACT NO. NRC-04-75-162

Principal activities during May included flashing transient experiments and analysis, RIL support efforts, flow topography, and technical assistance.

Under the Bypass task of the Creare program, work continued on a semi-empirical flashing transient analysis. At this stage, the basic model consists of interactive lower plenum and break pressure drop models solved by a coupled numerical scheme. During June, several break models were compared against RELAP calculations with the lower plenum model fixed (constant bubble rise). Excellent agreement was obtained at high bubble rise velocities, while some differences were calculated at low velocities (i.e., approaching homogeneous). The differences are due to the downcomer slip model in RELAP. We are proceeding with the planned addition of downcomer models during July and will readdress these comparisons with RELAP after the downcomer model is added. A model for the effects of wall heat transfer was also added in June, and comparisons scoping the effects of wall heat transfer were performed. (The effect is detectable, but not dominant.) During July we will begin to address lower plenum models, in combination with alternate break models, as well as incorporate downcomer models into the analysis. When these efforts are completed, we will have a preliminary semi-empirical capability to predict tests with ECC injection and will begin scoping data comparisons.

NRC Research and Technical
Assistance Report

510 328

Mr. A. W. Serkiz

- 2 -

July 6, 1979

Arrangements were made during June to utilize RELAP4/MOD7 on an informal exploratory basis. We will cooperate closely with INEL as we did previously with MOD5.

On the testing phase of this task, flashing transient tests exploring the effect of separator pressure (or vessel-to-separator Δp) were run in the 1/15-scale vessel. Flow visualization tests were also run at 1/30-scale in the transparent vessel.

On the RIL support task, we reviewed the final DRAFT document of the RIL and Attachment 1. Verbal comments were transmitted to Bill Beckner on June 25 with follow-up written comments during June.

Under the Flow Topography task, the software for obtaining power spectral density distributions by means of the Fast Fourier Transform was enhanced; it is now being applied to the motion of the steam/water interface as well as to the analog pressure recordings. Data from a representative sample of our countercurrent flow tests are being analyzed to locate trends related to test parameters. The technique used to locate the steam/water interface was also upgraded to produce more consistent interfaces and to allow new methods of editing the raw data. Some minor improvements were made to the data acquisition programs in preparation for running a few flashing transient tests with saturated water. During July analysis of data will continue and limited testing is planned.

The hiatus on Lower Plenum Voiding work continued in June.

Technical Assistance activities during June included:

- 1) Hot Wall....a few special calculations were carried out on request and informal documentation of the results submitted.
- 2) Flow Topography....A tape containing software and sample FLOTO data was transmitted to M. Hintze at INEL in response to a request from G. Rhee.
- 3) Upper Plenum....tracking Dartmouth studies; report preparation continues with publication planned for July after internal reviews.

Mr. A. W. Serkiz

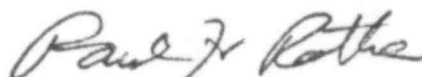
- 3 -

July 6, 1979

Overall project costs and schedule are in line with plans.

Sincerely yours,

CREARE INCORPORATED



Paul H. Rothe
Project Director



Christopher J. Crowley
Project Engineer

PHR/CJC/sr

Attachment

cc: Dr. L. S. Tong
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510 330