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INTERIM REPORT

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NRC Research and Technical  
Assistance Report

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MONTHLY HIGHLIGHTS

for

September 1979\*

PROGRAM: Advanced Reactor Safety Analysis  
Technical Assistance, Reactor Projects  
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NRC Research and Technical  
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## MONTHLY HIGHLIGHTS

### TASK I. SPECIAL SERVICES (R. A. Bari)

A brief review of the DOE NASAP report "Nuclear Proliferation Civilian Nuclear Power" (Volume VI - Safety, Environmental and Licensing Considerations) was performed. Comments on the HWR and LMFBR were transmitted to J. F. Meyer.

### TASK II. POST-ACCIDENT CONTAINMENT ANALYSIS (W. T. Pratt)

#### Floating Nuclear Plant Sacrificial Bed Analysis (R. D. Gasser and W. T. Pratt)

A meeting between OPS and BNL relating to FNP sacrificial bed design parameters was held at Brookhaven on September 14. At the meeting, the BNL MELSAC code was provided to OPS. The most recent sacrificial bed and cavity configuration for the FNP was described by OPS. Physical properties for the molten pool together with scoping studies necessary to address ACRS concerns were discussed.

A model which describes the heat-up and melting of the reactor vessel has been successfully incorporated into the MELSAC code. The scoping studies which were agreed upon at the September 14 meeting have been completed and a report is being prepared.

#### Hydrogen Flammability Studies (S. S. Tsai)

The KESS\* and MARCH codes for analysis of hypothetical meltdown accidents in LWRs are being reviewed. In particular, attention is directed to the modeling of hydrogen production from zirconium-water reaction. It appears that these two codes have similar hydrogen production models with considerable uncertainty in the quantification of the effect of steam blockage, as a result

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\*W. Gulden and K. Hassman, "KESS - A Computer System to Analyze Hypothetical Meltdown Accidents," European Nuclear Conference, May 6-11, 1979, Hamburg, FRG.

of channel blockage, on hydrogen production. The amount of hydrogen produced is calculated until the complete melting of cladding. Both codes do not consider zirconium-water reaction after the cladding melts.

TASK III. PLANT DYNAMICS AND RELIABILITY ANALYSIS (R. A. Bari)

FFTF Natural Circulation Test Program (K. R. Perkins)

Calculations of the secondary loss-of-power test were made in an attempt to understand the phenomenology contained in the data. The results of these calculations are being incorporated into a forthcoming report. In summary, the results using the worst-case IANUS model with minor (phenomenological) changes show good agreement with the data but indicate a need for a more detailed (i.e., more than seven nodes) and more accurate (representing a four-pass rather than a seven-pass heat exchanger) representation of the DHX.

LWR System Code Application (Y. H. Sun)

The IRT code has been studied in connection with small LOCA evaluations. A copy of the code has been obtained.

Reliability Analysis (A. J. Buslik and Y. H. Sun)

Discussions of systems interactions were held with SANDIA and NRC personnel in connection with SANDIA's work in this area. An ACRS subcommittee meeting on risk analysis was attended.

TASK IV. REACTOR PHYSICS (H. Ludewig)

HWR NASAP Studies (A. Mallen)

HWR calculations were extended by carrying out explicit 37-pin CANDU-type cell calculations. These were carried out to check the homogenization approximation currently being used for the CE-HWR analysis.

Suggested changes are being incorporated in the two reports which were prepared last month.

Distribution

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