Docket Files
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NOV 10 1977

Docket No. 50-320

MEMORANDUM FOR: D. B. Vassallo, Assistant Director for LWRs, DPM

FROM: D. F. Ross, Jr., Assistant Director for Reactor Safety, DSS

SUBJECT: DRAFT SAFETY EVALUATION FOR THREE MILE ISLAND, UNIT 2

Plant Name: Three Mile Island, Unit 2
Docket No.: 50-320
Licensing Stage: OL
Responsible Branch and Project Manager: LWR-4; H. Silver
DSS Branch Involved: Analysis Branch
Description of Review: Safety Evaluation
Review Status: Incomplete

As requested by the Containment Systems Branch, the Analysis Branch has reviewed the applicant's methods for determining mass and energy release to the containment following a main steam line break. We have requested additional documentation from the applicant concerning the EWHAM code which is used in these analyses. Although the applicant stated in answer to question 222.9 that this information would be provided, it has not yet been received. We will require this information in order to complete our review. With this exception, we have concluded that the analytical methods used by the applicant for calculation of mass and energy release to the containment following a main steam line break are conservative.

Original signed by
D. F. Ross

D. F. Ross, Jr., Assistant Director
for Reactor Safety
Division of Systems Safety

Enclosure:
Request for Additional
Information

cc: S. Hanauer
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72-326

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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D F Ross Jr

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72-327

MAIN STEAM LINE BREAK WITHIN CONTAINMENT - BREAK FLOW

The mass and energy release to the containment following the postulated double-ended rupture of a main steam line was calculated using the CRAFT-1 computer code with modifications to maximize heat flow from the primary into the secondary system and into the containment. The heat transfer from the primary system is sufficient to heat the secondary system break flow to superheated steam. The steam flow is released to the containment at sonic velocity using the Moody critical flow correlation. The main steam isolation valves are assumed to fail so that both steam generators discharge completely into the containment.

Feedwater flow into the steam generator from the main feedwater lines is calculated using the RELAP-4 code for the portion of the system between the feedwater pump suction and the steam generators. Between the feedwater pump suction and the main condenser, the systems are modeled using the EWHAM code. The RELAP-4 code is a two-phase blowdown code and is used for the portion of the system where two-phase flashing occurs. The EWHAM code is a single phase transient code and is used for the portion of systems where the flow remains subcooled. Using these methods, the feedwater flow was calculated to increase to approximately two times the normal value before closure of the isolation valves.

Following isolation valve closure, the unisolated mass in the feedwater system was added to the steam generator using the RELAP-4 code. Sufficient energy was transferred from the primary system to transform the feedwater flow into steam before release into the containment.

We have reviewed the applicant's methods and assumptions for the portions of the analysis using the CRAFT-1 and RELAP-4 codes and have concluded that the release rates to the containment are calculated so as to maximize the containment pressure and temperature.

We have requested additional documentation concerning the EWHAM code. The applicant has indicated that this information will be provided in the near future. Contingent on our review of the additional documentation of the EWHAM code, we have concluded that the analytical methods used by the applicant to calculate mass and energy release to the containment following a postulated main steam line break are conservative.