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

MAY 26 1977

MEMORANDUM FOR: W. Pike, Project Manager, Light Water Reactors
Branch No. 3, DPM

FROM: G. Lainas, Chief, Containment Systems Branch, DSS

THRU: R. Tedesco, Assistant Director for Plant Systems, DSS

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR GE TOPICAL REPORT NEDE-21078-P (TAC-3619)

Report Number:	NEDE-21078-P
Report Title:	Test Results Employed by GE for BWR Containment and Vertical Vent Loads
Responsible Branch:	LWR-3
Project Manager:	W. Pike
Requested Completion Date:	N/S
Review Status:	Incomplete

By letter dated December 20, 1974, (I.F. Stuart to E. G. Case), GE proposed a technical specification limit for the suppression pool temperature. Specifically, the proposed technical specification requires operator actions to limit the bulk pool temperature below 160°F to avoid steam quenching vibration during safety/relief valve operation. This limit was established on the basis of experiments performed in a foreign country. GE also submitted a summary of the test results to support this limit.

GE submitted topical report (NEDE-21078-P) to justify this limit. As a result of our evaluation, however, we find that the information provided in the topical report does not totally justify this limit. Data indicate that excessive steam quenching vibration can occur at a bulk pool temperature significantly below the GE proposed temperature limit. We, therefore, cannot conclude on the adequacy of this pool temperature limit for containment designs using a ramshead device (this includes Mark I and Mark II types). We have prepared the enclosed request for additonal information, and have discussed this request

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T. Su
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with GE during several telecons. They are aware of the kind of information we need to complete our review. Note that the enclosure contains proprietary information, therefore, it should be handled accordingly.

Gus C. Lainas, Chief
for Containment Systems Branch
Division of Systems Safety

Enclosure:
As stated

cc: S. Hanauer
F. Schroeder
R. Tedesco
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PROPRIETARY

Request for Additional Information
Topical Report Evaluation

Report Number: NEDE 21078-P
Report Title: Test Results Employed by GE for BWR Containment and Vertical Vent Loads
Originating Organization: Containment Systems Branch
Reviewed By: T. M. Su

The following request for additional information is related to the content in Chapter 4 of NEDE 21078 regarding temperature threshold for high temperature condensation oscillation during safety relief valve (SRV) discharge.

1. Figure 4.3-1 (Straight Pipe Condensation Map) shows that the transition pool temperature from smooth steam condensation (Zone 3) to pulsating condensation (Zone 4) is 158°F. Figures 4.3-2 and 4.3-3, however, show that pulsating condensation occurs when water temperature is above 120°F. To clarify this discrepancy, provide the following additional information:

   (a) Provide the data base used to define each condensation zone of Figure 4.3-1. Information should include the pressure measurement at the pipe discharge, tank walls and tank bottom for various pool temperature and mass flux thru the pipe discharge.

   (b) Provide detailed description of the test facility for the test data requested in item (a, above and the data provided in Figures 4.3-2 and 4.3-3. Information should include: pipe diameter, distance from pipe discharge to tank bottom, distance from pipe center line to the wall, location of temperature and pressure sensors.

(c) Provide the bases upon which the test results show in figures 4.3-2 and 4.3-3 have been considered in the development of the condensation zones.

2. As indicated by the straight pipe test data, severe vibration of the test stand was observed when water temperature was elevated to 120°F. Considering this data, justify your proposed pool temperature limit for Mark I and Mark II containments. In addition, provide the following information:

(a) Ramshead test data performed in the Moss Landing and San Jose facilities.

(b) Detailed description of these facilities including instrumentation set-up, physical dimensions of the facilities, and the relative dimensions of ramshead discharge to the surrounding structures and pressure sensors.

(c) Discuss and justify the applicability of these test data for the Mark I and II containments.

3. For typical Mark I and II containments, provide figures showing reactor pressure, ramshead mass flux and suppression pool temperature versus time for the following events:

(a) Stuck-open SRV during power operation assuming reactor scram at 10 minutes after pool temperature reaches 110°F and all RHR system operable.

(b) Same as event (a) above except that only one RHR train available.

(c) Stuck-open SRV during hot standby condition assuming 120°F pool temperature initially and only one RHR train available.

(d) Automatic Depressurization System (ADS) activated following a small line break assuming an initial pool temperature of 120°F and only one RHR train available.

(e) Primary system is isolated and depressurized at a rate of 100°F per hour with an initial pool temperature of 120°F and only one RHR train available.

4. With regard to pool temperature limit, two specific terms, i.e., "local" and "bulk" pool temperature, have been quoted in various sections of Chapter 4 of NEDE-21078. For clarification, provide the following additional information:

(a) Provide definition of these two terms and their application to the scaled test facilities data and full scale containment.

(b) Section 4.3.2.3 indicates that the local temperature is 10°F above bulk temperature. Provide the data base used to support this value.

(c) Based on the definition given by (a) above, define the temperature scale of figures 4.3-1 thru 4.3-3 in terms of the suppression pool temperature for an actual containment.

5. Sections 4.1.1.3 and 4.3.2.3 describes some operational experience of SRV events at elevated pool temperature in domestic plants. Provide the following additional information:

   (a) Describe in greater detail the scenario of events including: name of the plant, time history of reactor pressure and pool temperature, and operator actions following the incident.

   (b) Describe the suppression pool temperature monitoring system and the relative location of temperature sensors to the SRV discharge.

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