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NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

February 18, 1977

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50-296, 50-298, 50-321, 50-324, 50-325, 50-331, 50-333,  
50-341, 50-354, 50-355, and 50-366.

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2, Monticello, Peach Bottom Units Nos. 2 and 3, Browns Ferry  
Units Nos. 1, 2 and 3, Vermont Yankee, Hatch Units Nos. 1 and  
2, Brunswick Units Nos. 1 and 2, Duane Arnold Energy Center,  
Cooper, Fitzpatrick, Enrico Fermi Unit No. 2, and Hope  
Creek Units Nos. 1 and 2.

SUMMARY OF MEETINGS HELD ON FEBRUARY 2, 3, and 4, 1977 WITH REPRESENTATIVES  
OF THE MARK I OWNER'S GROUP

On February 2, 3, and 4, 1977, meetings were held in San Jose, California  
with representatives of the Mark I Owner's Group, General Electric Company  
(GE), and their technical consultants. The purposes of the meetings were  
to (1) discuss proposed revisions to the Mark I Containment Long Term  
Program (LTP) Action Plan, (2) review the status of ongoing LTP testing and  
analytical efforts, (3) establish procedures for Mark I Owner's Group - NRC  
staff interfacing during the conduct of the LTP, and (4) visit the GE 1/4  
scale two-dimensional pool swell testing facility and the EPRI 1/12 scale  
three-dimensional pool swell testing facility.

Enclosures 1 and 2 are lists of the meeting attendees.

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SummaryFebruary 2, 1977 Meeting

R. Buchholz provided an overview of the material which the Owners Group would present to the NRC staff during the course of the meetings, including a brief discussion of the revised integrated LTP schedule. Copies of the draft version of Revision 1 to the LTP Action Plan were distributed to NRC staff members present to serve as a reference during the presentations.

D. Galle, Commonwealth Edison Company, informed the NRC staff that he was stepping down from his position as Chairman of the Mark I Owner's Group due to a change in his responsibilities within Commonwealth Edison Company and that R. Logue, Philadelphia Electric Company, is the new Chairman.

W. Cooper, Teledyne, described the program and schedule for development of the LTP Structural Acceptance Criteria (Task 3.1). The intent of this effort is to establish criteria which comply with Section III of the ASME Code, including the Summer 1977 Addenda, to the maximum extent practical. A limited number of justifiable exceptions to the Code criteria may be identified (e.g., column buckling criteria). A test program (Task 3.2) related to column buckling is currently in progress. The initial plant unique analysis structural guide is targeted for March 1977. Cooper stated that this would be a "discussion" document and that it is anticipated that a series of working meetings would be held between the NRC staff and the representatives of the Mark I Owners Group leading to a final NRC-approved version by October 1978. The first such meeting is tentatively scheduled for April 1977.

Hal Townshend, GE, described the three dimensional multivalent Full Scale Testing Facility (FSTF) program (Task 5.11) for defining steam flow induced chugging loads on the torus shell and vent system downcomers. Enclosure 3 provides a detailed description of the FSTF. Construction of this facility is targeted for completion in November 1977 and commencement of the testing program is targeted for February 1978. A test report is scheduled for September 1978 with the submission of a final plant application report targeted for early 1979. The Mark I Owners stated that the objectives of this testing program are limited to the definition of steam chugging loads and testing of potential steam chugging load mitigating devices. There was some discussion regarding the capability for extracting the forcing function (in addition to measuring the structural response) from testing in

a facility with flexible walls. GE stated that the design was equivalent to the worst hydrodynamic conditions (Monticello) of all operating Mark I facilities.

W. Bilanin, GE, described the integrated LTP tasks (Tasks 5.11, 5.13, 5.15, 5.16) related to steam chugging loads. An interim predictive model, based on existing data and an analytical model, is scheduled to be available in mid-1977. This analytical model will be refined based on data from additional small scale test facilities and ultimately by the FSTF test results. It is anticipated that this model will be used to define plant-unique steam chugging loads.

Ed Kyss, GE, described the LTP task (5.15) related to determining hydraulic/structural interaction effects on the Mark I containment system. These efforts are aimed at the development of an analytical model which could be verified by the FSTF test results and which would then be used for plant-unique applications. At the present time this program is primarily designed to predict hydraulic/structural interaction associated with steam chugging; however, GE is hopeful that the model application could be expanded to other sources of hydraulic/structural interaction. The NRC staff inquired about this program's capability to decouple the steam chugging forcing function from the feedback effects of the hydraulic/structural interaction.

S. Lui, GE, described the LTP task (5.14) related to the definition of loads on submerged structures in the torus. (This is a program generic for all suppression pool containment systems, applying to Mark I, II and III designs).

H. Townsend, GE, reviewed the status and described the objectives of the 1/12 scale two-dimensional pool swell testing program (Task 5.8). Based on the testing to date, it is clear that the measured downward force is very sensitive to the structural stiffness of the test bed. A sub-task has been added to this testing program with an objective to study further the effects of test bed structural flexibility on the measured torus pressure forces.

S. Stark, GE, reviewed the status and described the objectives of the 1/4 scale two-dimensional testing program (Task 5.5). Based on the data obtained to date, the scaling laws have been confirmed for all parameters except the downward load for an initial condition of  $\emptyset$  psid drywell to wetwell differential pressure; the scaling laws have been confirmed for all parameters for an initial condition of maximum drywell to wetwell differential pressure.

Enclosure 4 contains the slides used in the presentations made during this meeting.

February 3, 1977

C. Sullivan, EPRI, discussed the 1/12 scale three-dimensional testing program (Task 5.6). He stated that the facility was in the final stages of construction and that shakedown testing was scheduled to commence this month. He indicated that the test scope had been expanded to include investigation of the effects of asymmetric mass distribution. R. Kiang, SRI, discussed the efforts which have been directed at minimizing the effects of instrument error on the results of the test program, in particular for the load measurements. The NRC staff expressed a concern that wave interference effects should be considered.

R. Chan, JAYCOR, discussed the progress of the pool swell analytical model development program (Task 5.9). The model will be 2 1/2 dimensional and is designed to simulate the non-uniform hydrodynamic response in the torus beginning with initial drywell pressurization and ending just prior to bubble breakthrough. The model will be validated using the 1/12 scale three-dimensional test data. The Mark I Owners do not intend to use the Lawrence Livermore Laboratory (LLL) test data to validate the model. Progress to date indicates that the model requires additional refinement to better predict peak downward loads.

G. Sliter and J. Carey, EPRI, discussed the programs (Task 5.3), both analytical and testing, which are designed to investigate fluid-structure effects associated with vent header impact loads. Comparison of the results of the analytical and testing programs is scheduled for August 1977. GE will conduct additional 1/4 scale tests using both rigid and flexible vent sections.

S. Arain, GE, discussed the program (Task 5.4), for developing plant-unique seismic slosh loads.

J. Humphrey, GE, discussed the program (Task 6.3) for investigation and testing of potential pool swell load mitigating devices. The objective of the program is to identify a single device with attractive pool swell and steam chugging mitigation performance. Preliminary screening tests have identified several designs which offer attractive mitigation potential; additional testing is scheduled through September 1977.

H. Townsend, GE, discussed the program (Task 6.1) for identifying a potential steam chugging load mitigation device. Preliminary screening tests are currently in progress. Additional testing is scheduled through August 1977.

M. Tanner, GE, discussed the program (Task 6.2) for identifying a potential safety-relief valve load mitigating device. Initial screening of potential devices is in progress, based upon a review of existing test data. A large scale testing program of potential devices will be included in the LTP.

S. Stark and L. Stark (GE) discussed the preliminary results of the Monticello in-plant safety-relief valve testing program (Task 5.1). Further data reduction is necessary to correct strain gage measurement errors. The identification of asymmetric loading conditions in the torus shell was of particular interest. A final report is scheduled to be issued in July 1977.

Enclosure 5 contains the slides used in the presentations made during this meeting.

#### February 4, 1977 Meeting

P. Ianni, GE, provided a general overview of the LTP content and schedule. He stated that the Mark I Owners and GE believe that the revised LTP is responsive to all NRC requirements. He requested acknowledgement of this from the NRC staff. The NRC staff stated that, based on the information presented at the meetings of the two previous days, we are in general agreement with that belief, but that we would like to review the submitted version of Revision 1 of the LTP Action Plan before making a firm statement. B. Sobon, GE, stated that the final version of Revision 1 would be submitted to NRC on February 11, 1977. The NRC staff stated that further discussion regarding the use of test data from the LLL 1/5 scale facility would be necessary. The NRC staff further stated that we were confident that the Short Term Program Safety Evaluation Report would be issued in the very near future.

A general discussion took place regarding the philosophy for future interfacing between the Mark I Owners Group and the NRC staff during the conduct of the LTP. The following general guidelines were agreed to:

- a. Major meetings should take place at 3 to 4 month intervals, primarily at major decision points in the LTP. The next major meeting would most likely be scheduled for July 1977.
- b. Single purpose meetings should be called as appropriate, but that these would be "working" meetings limited to smaller groups.
- c. A periodic (monthly) information report on the program status would be submitted to the NRC. Enclosure 6 is a sample of such a report.

- d. Preliminary information reports on testing and analytical program results would be submitted to the NRC when available (see Enclosure 7).

At the request of the NRC staff, the Mark I Owners and GE described the Quality Assurance procedures which are being utilized during the conduct of the testing and analytical programs.

NRC personnel were taken on a tour of the GE 1/4 scale two-dimensional testing facility and the EPRI 1/12 scale three-dimensional testing facility.



John C. Guibert  
Operating Reactors Branch #3  
Division of Operating Reactors

Enclosures:

1. Attendance List - February 2, 1977 meeting
2. Attendance List - February 3, 1977 meeting
3. Full Scale Test Facility Program Description
4. Slides used in presentation of February 2, 1977 meeting
5. Slides used in presentation of February 3, 1977 meeting
6. Mark I Containment Program Activity Review Report - November 1976
7. Proposed Mark I Long Term Program Documentation



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\*NRC PDR

\*Local PDR

\*Docket Files 50.237

NRR Rdg

ORB#3 Rdg

\*B. C. Rusche

\*E. G. Case

\*V. Stello

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\*K. R. Goller

T. J. Carter

\*D. Eisenhut

\*A. Schwencer

\*D. Ziemann

\*G. Lear

\*R. Reid

W. Butler

\*L. C. Shao

\*J. Guibert

\*OELD

\*with enclosure

\*OI&E (3)

C. Parrish

NRC Participants

\*ACRS (16)

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J. Shea

P. O'Connor

R. Silver

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