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SUBJECT: FORWARDS FEB 1979 PROGRAM ACTIVITY REVIEW RE MARK I CONTAINMENT PROGRAM.

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GENERAL ELECTRIC

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PROJECTS DIVISION

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MFN-098-79

April 6, 1979

U. S. Nuclear Regulatory Commission
Division of Operating Reactors
Office of Nuclear Reactor Regulation
Washington, D. C. 20555

Attention: Mr. C. I. Grimes, Task Manager
Mark I Containment Long-Term Program

Gentlemen:

SUBJECT: MARK I CONTAINMENT ACTIVITY REVIEW, FEBRUARY 1979

The purpose of this letter is to forward ten (10) copies of a February 1979 Program Activity Review for your information. This review lists the meetings held and provides a brief task-by-task activity summary for the month. It is provided to you on behalf of the Mark I Owners Group. The document is comprised of information extracted from selected sections of a monthly report prepared by General Electric for the Mark I Owners Group. Sections on contract and billing status have been removed.

Sincerely,

L. J. Sobon, Manager
BWR Containment Licensing
Containment Improvement Programs

LJS/d

Enclosures (10)

cc: L. S. Gifford (GE Bethesda)

MARK I CONTAINMENT PROGRAM

PROGRAM ACTIVITY REVIEW

FEBRUARY 1979

GENERAL ELECTRIC COMPANY

San Jose, California

I. MEETING SUMMARY

Date	Attendees	Place	Meeting Content
2/1/79	GE/NUTECH/Atwood-Morrill	San Jose	Vacuum Breaker Performance
2/2/79	GE/NUTECH	San Jose	FSTF Report
2/6/79	TRAC/GE/NUTECH	San Jose	1/4 Scale Test Review
2/7/79	TRAC/GE/NUTECH	San Jose	LDR (Part B) Utility Review and EPRI Analytical Pool Swell Model Review
2/12/79	GE/NUTECH	San Jose	FSTF Report - Final Review
2/13/79	NRC Staff/GE/NUTECH	Bethesda	S/RV Roadmap Review
2/14/79	NRC/PIC/GE	Bethesda	Program Review
2/15/79	NRC Staff/GE/NUTECH	Bethesda	Pool Swell Load Working Meeting
2/20/79	GE/NUTECH/GPE	San Jose	Vacuum Breaker Performance
2/22/79	GE/Wyle	Norco	Contact Extension
2/27 & 28/79	AE Seminar	San Francisco	S/RV and Submerged Structures Computer Codes
2/27/79	GE/NUTECH	San Francisco	Review of Incorporation of Utility LDR Part B Comments

III. ACTIVITY SUMMARY

Task 3.0 - Structural Acceptance Criteria

The publication of the Plant Modification Criteria (Task 3.1.4) has been delayed due to late receipt of comments. Transmittal of this report to the Utilities and the NRC will be targeted for early April 1979 following their satisfactory resolution.

The NRC has indicated that they would like to meet with the Mark I Program Structural Acceptance Criteria Working Group Representatives on the Plant Unique Analysis Application Guide (PUAAG) and related topics in late March 1979. The detailed discussion topics will be: 1) NRC reaction to PUAAG - Task 3.1.3, 2) Basic Torus Shell Analysis - Task 3.1.5.3, and 3) Plant Modification Criteria - Task 3.1.4.

Task 5.5 - 1/4 Scale 2D Pool Swell Tests

The Task 5.5.3 plant unique pool swell test report was reviewed at a Utility/AE meeting in early February. All comments have been incorporated and the final report is targeted for issue in late March 1979.

Additional supplementary pool swell tests were requested by several Mark I Owners. These tests are being billed on a plant unique basis in Task 10.1 of the Supplementary Support Effort (SSE). Testing has been completed for Monticello, Duane Arnold, Pilgrim, Oyster Creek and Nine Mile Point; Millstone testing is in progress and Cooper (the last in the SSE series) will be completed by late March.

The final report encompassing all the SSE 1/4 scale tests will be issued by June, 1979.

Task 5.6 - 1/12 Scale 3D Pool Swell Tests

EPRI has completed the additional 1/12 scale 3D pool swell tests using a "split orifice" configuration. Test data will be transmitted to GE in mid-March as verification of the split orifice effects assumed in the LDR.

EPRI is continuing development of an analytical model to investigate vent system flow distribution. EPRI tentatively plans to present their development to TRAC in early April.

Task 5.11 - Full Scale Test Facility

TRAC comments on the final test report have been resolved, and the document is currently being prepared for final typing. Transmittal to the Mark I Owners is scheduled for the week of March 26, 1979.

Task 5.14 - Submerged Structures

NRC has indicated that they consider that the LDR water jet model for LOCA (and Ramshead) submerged structures loads is not necessarily conservative.

III. ACTIVITY SUMMARY

Task 5.14 - Submerged Structures - Continued

GE has initiated a study to assess the area of influence for the water jet (accounting for ring vortex dissipation effects); preliminary observations indicate that if structures are more than two vent diameters away from the exit plane, the water jet load will have dissipated such that the air clearing loads will clearly be limiting. Upon completion of this study, the necessity of additional water jet model development will be reviewed with TRAC.

The model/data evaluation report, showing comparison of experimental submerged structures loads with analytical model results, is in final preparation. Comments have been incorporated and final issue is scheduled for early April.

The final report describing the analytical model for T-Quencher water jet loads on submerged structures was issued for TRAC review in mid-February. The final report, with all comments incorporated, is scheduled for mid-April release.

The final report on the T-Quencher air bubble submerged structure loads has been reviewed and is scheduled for publication in early April.

Task 5.17 - Condensation Oscillation

The Condensation Oscillation Investigative Team (COIT) integration of FSTF test phenomena with structural dynamic modeling technology has been completed. A draft report of the task will be reviewed by a Utility/AE report review team in early March, 1979. It is anticipated that this general approach will be reviewed with the NRC at a working group meeting in Bethesda in mid-March.

Task 6.2.1 - T-Quencher Development

The final report on the T-Quencher 1/4 Scale Test was issued to the Mark I Owners and NRC on February 16, 1979. Issue of this report completed all activities authorized by the Mark I Owners on this task.

Task 7.1.7.2 - S/RV Load Models

A two day AE Seminar on the use of the S/RV and Submerged Structure Computer Programs was held in San Francisco on February 27 and 28, 1979. The next AE Seminar to review the status and provide assistance on the use of the computer programs has been tentatively scheduled for early April 1979 in Atlanta.

The Task 7.1.1.2 - T-Quencher S/RV Loads Model report was transmitted to the Utilities and the NRC on February 26, 1979 (see MI-G-41). This report provides the model/data comparisons and methodology for calculating torus shell loads due to S/RV T-Quencher bubbles. The Task 7.1.2.2 - T-Quencher S/RV Pipe Loads and Task 7.1.1.1 - Ramshead S/RV Shell Loads reports are scheduled for transmittal in mid and late March 1979, respectively. The publication of these two reports will complete the documentation of the S/RV reports supporting the LDR.

III. ACTIVITY SUMMARY

Task 7.3.3 Vent Deflector Load Definition

An analytical/empirical effort has been undertaken to provide methodology for plant unique vent deflector load definitions. Comparison of analytical model to test results has been made for Monticello, Pilgrim and Oyster Creek to assure the general validity of the method for a spectrum of plant unique applications. These comparisons have led to minimization of some of the conservative factors in the model. The revised final report is due to be issued in late March as a technical methodology report; plant unique vent deflector loads will be issued separately in the PULD reports to each utility.

Task 7.5.2 - T-Quencher Thermal Mixing.

The draft report on the T-Quencher Thermal Mixing Test conducted at Monticello in November 1978 was forwarded for TRAC review on February 26, 1979. Pending receipt of TRAC comments by March 9, 1979, the final document will be issued to the Mark I Owners and NRC in April 1979.

A report documenting the basis of the T-Quencher thermal mixing model has been drafted and is currently undergoing GE internal review. The report includes test predictions for the November 1978 Monticello tests of extended S/RV blowdown and presents calculations on pool thermal mixing for an S/RV event at the Monticello plant. The report is scheduled for transmittal to TRAC for review during the first week of April 1979.

Task 7.7 - Load Definition Report (LDR) Part B Preparation

GE/NUTECH met on February 28, 1979 and resolved/reviewed the incorporation of Utility comments into Part B of the LDR. These comments had resulted from the February 7, 1979 TRAC/GE review meeting. Part B of the LDR is scheduled for transmittal to the Utilities and the NRC on March 16, 1979.

GE/NUTECH met with the NRC for a S/RV T-Quencher "roadmap" discussion on February 13, 1979. The purpose of this meeting was to instruct the NRC and their consultants on how the LDR S/RV sections and the various supportive reports tie together to provide the basis for the S/RV load definition methodology. The discussion emphasized that the individual Utility/AEs would be calculating plant unique S/RV loads utilizing the LDR methodology due to the plant/line unique features. This meeting identified the need for a more detailed technical discussion regarding the T-Quencher scaling for the 1/4 Scale NUS Tests. This meeting is being targeted for early March 1979.

Task 9.2.3 - 1/4 Scale Off-Centerline T-Quencher Test

All Tests for the 1/4 scale off-centerline test program have been completed. Preliminary results indicate that near torus wall loads are approximately 50% higher than for discharge on the centerline under otherwise similar conditions. The draft test report will be forwarded for TRAC reciew in early March 1979.

MARK I CONTAINMENT PROGRAM
STATUS OF TEST PROGRAMS

Task No.	Description	Performing Agency/Facility	Scale	Phenomena Being Tested	Testing Fluid	Date for Completion of Testing	Comments
3.2.1	Column Buckling Test	TES/TES	N/A	Dynamic Load Capacity	N/A	February 1977 (Complete)	---
3.2.2	Ring Header/Vent Pipe Intersection Test	Bechtel/ Anamet	N/A	Load Capacity	N/A	Indefinite	Task put on hold on April 25, 1978. Reactivation of task will depend upon identification of need.
5.1.1	Monticello S/RV Ramshead Test	GE/NSP	Full	S/RV Discharge Loads	Air/ Steam	July 1976 (Complete)	---
5.1.2	Monticello S/RV Quencher Test	GE/NSP	Full	S/RV Discharge Loads	Air/ Steam	December 1977 (Complete)	---
5.2	4T High Temperature Tests	GE/GE	Full	Chugging Wall & Vent Loads	Steam	July 1976 (Complete)	Mark II configuration.
5.3.2	Flexible Cylinder Tests	EPRI/DSI	1/6 & 1/3	Fluid/Structure Interaction-Vent Header	Water	July 1977 (Complete)	---
5.3.3	Flexible Cylinder Tests	GE/NSC	1/4	Fluid/Structure Interaction-Vent Header	Air/Water	November 1977 (Complete)	---
5.4	Seismic Slosh	GE/SWRI	1/30	Seismic Slosh Loads/Vent Uncovering	Water	July 1977 (Complete)	---
5.5.1	1/4-Scale 2D Test	GE/NSC	1/4	Pool Swell Scaling Laws	Air	November 1976 (Complete)	---
5.5.2	1/4-Scale 2D Test	GE/NSC	1/4	Download Oscillations	Air	October 1977 (Complete)	---
5.5.3	1/4-Scale 2D Test	GE/NSC	1/4	LDR Loads	Air	October 1978 (Complete)	Additional plant unique test series in progress; to be completed by March 1979.

MARK I CONTAINMENT PROGRAM
STATUS OF TEST PROGRAMS

Task No.	Description	Performing Agency/Facility	Scale	Phenomena Being Tested	Testing Fluid	Date for Completion of Testing	Comments
5.6.1	1/12-Scale 3D Test	EPRI/SRI	1/12	Pool Swell Loads	Air	July 1978 (Complete)	Split orifice tests in progress; to be completed by March 1979
5.6.2	1/30-Scale 3D Test	GE/SWRI	1/30	Torus/Cylinder Geometry	Air	September 1977 (Complete)	Qualitative supplement to 5.6.1.
5/8	1/12-Scale 2D Test	GE/GE	1/12	Pool Swell Scaling Laws	Air	October 1976 (Complete)	---
5.11	Full Scale 3D Test	GE/Braun	Full	Chugging	Steam	August 1978 (Complete)	---
5.13	1/12-Scale 3D Test	GE/NUTECH	1/12	Chugging	Steam	September 1977 (Complete)	Qualitative multivent effects.
5.14	Submerged Structures	GE/Wyle	1/3	Steady State & Transient Drag Loads	Air/ Steam	June 1977 (Complete)	---
		GE/NSC	1/4	Submerged Loads	Air	January 1978 (Complete)	---
		GE/SWRI	N/A	Components of Drag	Water	February 1978 (Complete)	---
5.15.2	Structural/Hydro-dynamic Interactions	GE/Aerotherm	1/12	Fluid/Structure	Steam	April 1978 (Complete)	Flat plate only. Design level QC implemented.
5.16.1	Reduced Submergence	GE/GE Licensee	Full	Chugging	Steam	April 1977 (Complete)	Testing at Mark I submergence levels.
5.16.2	Chugging Mitigation	GE/GE Licensee	Full	Chugging	Steam	May 1977 (Complete)	Testing mitigator at Mark I submergence.
5.17	Condensation Oscillation	GE/ARAP	1/12	Condensation Oscillation	Steam	August 1978 (Complete)	Parametric testing.

MARK I CONTAINMENT PROGRAM
STATUS OF TEST PROGRAMS

Task No.	Description	Performing Agency/Facility	Scale	Phenomena Being Tested	Testing Fluid	Date for Completion of Testing	Comments
6.1.1	Chugging Parametrics	GE/NUTECH	1/12	Chugging	Steam	March 1977 (Complete)	Scoping parametrics.
		GE/Creare	1/12, 1/6, 1/4	Chugging	Steam	July 1977 (Complete)	Scaling parametrics.
6.1.2	Chugging Mitigation	GE/NUTECH	1/12	Chugging	Steam	March 1977 (Complete)	Scoping mitigation.
		GE/Creare	1/6	Chugging	Steam	September 1977 (Complete)	Mitigation screening.
6.2.1	S/RV	GE/NUTECH	1/12	S/RV Discharge Loads	Steam	June 1977 (Complete)	Mitigation confirmation.
		GE/NUS	1/4	S/RV Discharge Loads - Phase I	Steam	July 1978 (Complete)	Quencher parametrics.
				Phase II		October 1978 (Complete)	Quencher parametrics.
6.3.1	Pool Swell Screening	GE/NUTECH	1/12	Pool Swell Downloads	Air	September 1976 (Complete)	Screening tests.
6.3.2	Pool Swell Mitigation	GE/NSC	1/4	Pool Swell	Air	November 1977 (Complete)	Qualification tests.
6.3.3	Vent Header Device	GE/NSC	1/4	Pool Swell	Air	November 1977 (Complete)	Vent impact mitigation.
7.5.2	T-Quencher Thermal Mixing	GE/NSP	Full	Pool Thermal Mixing-Phases I & II	Steam	November 1978 (Complete)	---
9.2.2	T-Quencher End Cap Clearing	GE/NUTECH	1/12	Air Clearing	Steam	March 1979	---
9.2.3	T-Quencher Off-Centerline Test	GE/NUS	1/4	S/RV Discharge Loads	Steam	February 1979 (Complete)	---