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SUBJECT: SUMMARY OF MEETING HELD ON MARCH 4, 1981 WITH THE MARK I OWNER'S GROUP

On March 4, 1981 the staff met with representatives of General Electric and the Mark I Owner's Group in Bethesda, Maryland. The purpose of this meeting was to discuss the results of supplementary tests conducted in the Full-Scale Test Facility and resolution of the outstanding Mark I issues identified in NUREG-0661. The meeting attendees are identified in Enclosure 1 and copies of the non-proprietary slides presented during the meeting are contained in Enclosure 2.

A. Bilanin of CDI described the results of Tests M11B and M12 in FSTF as they compare to Test M8 from the original test series. (Note: Test M11A was aborted due to a facility malfunction and no data were taken.) Test M8 forms the principal basis for "condensation oscillation" (CO) loads in the Mark I Containment Long Term Program. Based on comparisons

of local and spatially-averaged torus shell pressures, power spectral densities, and structural response characteristics, the Mark I Owner's Group has concluded that the basic CO phenomena are consistent and reasonably repeatable. The results of Test M12 are slightly higher in amplitude and varies in frequency because the test was initiated with a maximum pool temperature allowed in plant Technical Specifications (95°F) while the other tests used a nominal initial pool temperature of 70°F. Nevertheless, based on comparisons of all three tests, the Mark I Owner's Group concludes that the uncertainty in the magnitude of the CO torus shell loads is well within the margins of conservatism provided by the structural assessment techniques.

G. Wade of GE described the various vent systems used in Mark I plants and the CO load information derived from Tests M8, M11B, and M12. Prior to the last two tests, "snap" tests were conducted on the downcomers to establish damping and natural frequency for the FSTF vent system. Based on the results of these tests, the Mark I Owner's Group is proposing to use Regulatory Guide 1.61 damping values (2%) and analytically derived vent system natural frequencies for the plant-unique analyses.

R. Palaniswamy of Bechtel described analytical modeling of the FSTF vent system and data analysis. The analytical modeling was verified by comparison to the "snap" test results to the extent that the analysis overpredicts the response by appropriately 20% in the range of the CO stress intensities (i.e., the model is slightly more flexible than the FSTF vent system). Because the inner and outer downcomer pressures in FSTF were observed to be in-phase for the CO period while the inner and outer strains were nearly 180° out-of-phase, the Mark I Owner's Group has concluded that the primary response of the vent system is a "swing" mode with various pairs of downcomers swinging out-of-phase. This conclusion was verified by analysis with a postulated loading condition.

Based on these analyses, the Mark I Owner's Group has proposed internal pressure and dynamic loading conditions for the vent system. The internal pressure loads would be those stipulated in Section 4.4.4.2 of NEDO-21888. Although slightly higher pressures were occasionally observed in the additional data, the Mark I Owner's Group concluded that a change in the load specification to bound all observed pressures is not worthwhile because the load specification is already being used in plant-unique assessments and there is sufficient conservatism in the assessment to offset the uncertainty in the pressure amplitude. The dynamic load is described as a sinusoidal pressure in one downcomer which will result in the characteristic swinging response. The pressure amplitudes and

frequency ranges (±2.85 psi at 4-8 Hz, ±2.6 psi at 8-16 Hz, and ±1.2 psi at 12-16 Hz) were derived from data analysis from all tests. In addition, four load cases have been defined to ensure maximum response in the vent system for downcomer pairs loaded out-of-phase.

At the conclusion of the meeting, the staff indicated that the basic approach outlined by the Mark I Owner's Group was reasonable. Further, the staff requested that the Mark I Owner's Group submit a letter report describing the material presented in the meeting and expanding on the following issues:

(1) Justification is needed to support the symmetry of the CO global torus loads at the fundamental frequency and considering the limited FSTF segment as extrapolated to an entire torus. This justification should address both phasing and pressure amplitude.

(2) Because the vent system dynamic load is artificial (sinusoidal pressure oscillation in one downcomer) it will not realistically simulate the vertical loading components. Therefore, the load specification should be justified by confirming that, for the range of Mark I vent systems, a specific plant would not be significantly more sensitive to the vertical loading components than FSTF. The justification should be discussed in terms of structural response and structural significance.

(3) Because the staff's review of the torus CO loads has been predicated on comparisons to the absolute sum of structural responses from the pressure-frequency histogram, the report should confirm that absolute sum will be used for the plant-unqiue analyses. The Mark I Owner's Group indicated that some utilities feel it will be necessary to use the SRSS summation technique described to the staff in a meeting on April 23, 1980. The staff responded that the SRSS technique discussed at that time had never been formally submitted nor reviewed in depth and, therefore, its application will be considered an exception to the Acceptance Criteria.

(4) The report should contain a commitment to the effect that an organization within the Mark I Owner's Group will be responsible for assuring a sufficient level of detail in the finite-element modeling of the vent systems for the plant-unique analyses.

During the course of discussing the potential for exceptions to the Acceptance Criteria, the staff indicated that whenever a licensee determines that an exception must be taken, the licensee should immediately notify the staff in writing of the nature of the exception. The staff will

determine at that time whether the exception will be reviewed before implementation or during the post-implementation audit of the plant-unique analyses. The exception and justification for the alternative approach used shall be described in detail in the plant-unique analysis report.

The staff requested that the letter report described above be submitted as soon as possible in order for the staff to issue a supplement to NUREG-0661 to conclude the generic program. GE indicated that they will try to submit the report in April 1981. In addition, GE intends to submit an FSTF final report, a revised NEDO-21888 Load Definition Report (to incorporate the Acceptance Criteria), and a T-Quencher Water Jet report by about June 1981. The staff indicated that a separate load definition report for the vent system loads would not be necessary, provided sufficient detail of the methods is incorporated in the revision to NEDO-21888.

C. I. Grimes
A-7 Task Manager

Enclosures:
As Stated

Enclosure 1

ATTENDEES

MARK I OWNER'S GROUP MEETING

MARCH 4, 1981

Name	Organization
C. I. Grimes	NRC/DL
K. Wichman	NRC/DL
J. R. Fair	NRC/IE
B. Siegel	NRC/DL
C. P. Tan	NRC/DE
P. Boehnert	NRC/ACRS
G. Maise	BNL
J. D. Ranlet	BNL
G. Bienkowski	Princeton (BNL)
C. Brennen	Cal Tech (BNL)
A. Sonin	MIT (BNL)
L. D. Steinert	GE
R. M. Hunt	GE
G. E. Wade	GE
U. C. Saxena	GE
A. J. Bilanin	CDI
P. D. Hedgecock	NUTECH
R. A. Malte	NUTECH
V. Kumar	NUTECH
R. Palaniswamy	Bechtel
J. J. Bhatt	Bechtel
N. Celia	Teledyne
S. A. White	SCS
D. F. Lehnert	Detroit Edison
K. B. Ramsden	CECo
R. N. Smart	NUSCo
J. C. Carter, III	TVA