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

DEC 2 0 1978

Docket Nos.: 50-358, 50-352/353, 50-367, 50-373/374, 50-387/388, 50-410, 50-322, 50-397

APPLICANT: Members of Mark II Owners Group

SUBJECT: MEETING WITH MARK II OWNERS GROUP TO DISCUSS THE STAFF'S MARK II CONTAINMENT ACCEPTANCE CRITERIA - DECEMBER 13, 1978

Background

This meeting between the staff and the owners of the lead Mark II plants (Zimmer, LaSalle, and Shoreham) was one in a series of meetings to discuss the owner's exceptions to our criteria of September 14, 1978. The major items discussed in this meeting included bubble phasing and frequency associated with the Safety Relief Valve (SRV) loads, LOCA/SRV submerged structure drag loads, Load Case 10 and the proposed LaSalle in-plant SRV tests.

An attendance list and a copy of the meeting handouts are enclosed.

Summary

Five SRV discharge cases are considered for design assessment by the owners of the lead plants, ranging from single valve actuation to simultaneous actuation of all valves. For the all-valve case, five cases are considered to determine the bounding load case. The all-valve cases included one case with simultaneous bubble discharge where all bubbles are assumed to simultaneously enter the pool. The bubbles from each valve are then assumed to oscillate in phase. The loads from individual SRV's were combined by the SRSS method. The remaining four cases were evaluated by linear combination of the SRV loads. The limiting all-valve case assumed simultaneous SRV actuation with a linear combination of the SRV loads and with bubble phasing that accounts for line length variations. The staff stated that the cases considered by the owners of the lead plants appear to meet the intent of our acceptance criteria. However, some questions exist regarding the

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relative importance of bubble phasing versus the method of combining the SRV loads on the response of the containment, piping and equipment. We stated that an additional meeting would be required to clear up our questions in this matter.

Relating to SRV bubble frequencies considered in the containment evaluation, a single frequency was considered for the all-valve in-phase evaluation ($\sim$10 Hz) for LaSalle. To account for uncertainties in the frequency, a 30 percent broadening of the response spectrum was considered rather than sweeping the SRV load over a prescribed frequency range. However, for the all-valve case, where line variations were taken into account, a range of frequencies of about 10 $\pm$ 1.5 Hz exists. The staff reiterated its concern that a significant uncertainty exists in the frequency associated with the SRV load. It is not apparent to the staff that a 30 percent broadening of the response spectrum meets the intent of our criteria relating to the uncertainty in the SRV frequency. Additional meetings will be required to resolve this issue.

A presentation was made of the methods used by the lead plant owners to evaluate LOCA/SRV submerged structure loads and the additional analyses which they intend to perform in response to our related acceptance criteria. A summary of the discussion is provided below.

The lead plant owners have had difficulty in utilizing our criteria related to the LOCA water jet loads as a result of singularities in the load equation under certain conditions. As a result they propose use of the generic ring vortex model. We stated that the ring vortex model appears to be a more realistic model than that provided in our criteria. However, we have not received documentation describing the model. We still believe that our criteria should be utilized for the lead plant LOCA water jet loads. Problems arising from the presence of a singularity in the load equation resulting from the use of our criteria appear to be minor.

For the SRV "T" quencher jet load, a cylindrical zone of influence ten feet in diameter was proposed. Jet loads outside of this zone will be considered to be negligible. It is our judgement that this is a conservative approach. However, we will require experimental confirmation of this approach in the "T" quencher test program.

Related to LOCA acceleration drag coefficients, a proposal was made to use values specified in designated references rather than the conservative specification noted in the staff's criteria. The staff stated that for the non-oscillating flow field encountered in LOCA related pool swell loads, a significant reduction appeared justifiable. However, we stated

that the unpublished data of Sarpkaya previously discussed at the November 15, 1978 Mark II owners meeting must be provided for our review. These data indicate a potential increase of the acceleration drag coefficients by about 40 percent above the values specified for the lead plants. Near the point of maximum pool swell, a proposal was made to use the Kuelegan-Carpenter approach at the appropriate Kuelegan-Carpenter Number. We stated that this was consistent with our criteria and therefore acceptable.

The staff's criteria for submerged structure drag loads specify that the maximum value of flow field "seen" by the structure should be used rather than the value at the center of the target. The lead plant owners proposed a method whereby each target is discretized. The flow field at the center of each target node is then utilized. Sensitivity studies were performed to determine the necessary degree of nodalization. We stated that we find this approach acceptable.

It was proposed that interference effects for LOCA/SRV air bubble drag loads be determined utilizing methods described in specific references. We stated that this was acceptable provided generic guidelines be developed to provide guidance for those cases where extrapolation must be made for conditions outside the cases covered by the specified literature.

Relating to quencher air bubble drag loads the lead plant owners proposed use of the ramshead methodology with the bubble pressure for a "T" quencher to be determined by the DFFR methodology for a cross quencher. We stated that we lacked evidence to conclude that this was a conservative specification for a "T" quencher.

The staff provided information to clarify its position for Load Case 10 relating to the combination of SRV loads with DBA pool swell loads. We stated, that we would require that the lead plants evaluate their containment, critical piping and equipment based on Load Case 10 considering the "spurious" actuation of one SRV. This evaluation should be completed prior to operation of the plant. We stated that it was our judgement that the reactor pressure transient associated with a DBA would not result in actuation of multiple SRVs. However, we will require that confirmatory analyses be provided to confirm this to be the case.

A presentation was made by representatives for the LaSalle Plant of their preliminary plans for in-plant SRV tests. The scope of these tests depends to some extent on the availability of data resulting from the in-plant tests

at the Zimmer facility. The information provided includes the test schedule, test matrix and instrumentation. A copy of the preliminary test plans is enclosed.

Sincerely,

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Enclosures:
As Stated

cc: See attached pages

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