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BECo. Ltr. #79-103

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

License No. DPR-35
Docket No. 50-293

Supplementary Information Regarding
Response to I&E Bulletin 79-07 and Snubber Design

Dear Sir:

This letter is in response to your request for information in telephone conversations between Boston Edison and the Nuclear Regulatory Commission on May 24, 1979. BECo feels the attachments provide the information sought. If there are any further questions please advise us at your convenience.

Very truly yours,

G. Carl Andognini

Add:
TA/EDO
AD Sys/Proj
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EEB

B001
SE 1/1

7906080 258

Q1 For postulated pipe breaks inside containment, does the change in highest stress locations in the reanalysis (if any) effect any FSAR analysis?

A. A review of the FSAR indicates that pipe breaks inside containment were not postulated on the basis of stress.

Q2 For the reanalysis of the recirculation and main steam lines how were the horizontal and vertical components of the earthquake combined?

A. For the reanalysis of the main steam lines and the recirculation system the representative maximum values of the codirectional moments from the largest of the two horizontal components of earthquake were added absolutely to the representative maximum value of the codirectional moment for the vertical component of earthquake.

Q3 Were the spring hangers considered in the models that were used in the reanalysis of the recirculation and main steam systems?

A. Spring hangers are not modeled in the seismic analysis since they have negligible effect on the piping system response. In the weight analysis, hangers are modeled as forces equal to the setting of the spring hanger.

Q4 Have nozzle loads, snubber support loads and snubber support structural steel loads for the reanalyzed lines been checked and found to be acceptable?

A. The recirculation inlet and outlet nozzle stresses were evaluated and found to be less than code allowable. The calculated stresses for the steam line nozzles have also been evaluated and found to be less than code allowable. For this latter case the final verification is in process and will be completed prior to startup.

For the main steam lines and the recirculation system all associated support steel, including building structural steel where appropriate, were checked using loads generated from the reanalysis for those cases in which this load was greater than the original design load. Either the existing support steel, and associated structural steel, were found acceptable or modifications were made to make them acceptable. All modifications will be completed prior to startup.

Q5 How many additional snubber supports were checked and found to be acceptable?

A. All the remaining safety related snubbers and associated structural steel were checked using the SSE load and found to be acceptable or modifications are being made to make them acceptable. There are seventy-six safety related snubbers. Included in the seventy-six snubbers are twenty-four snubbers in the recirculation system and twelve in the main steam system.

Q6(a) Has a representative sample of concrete expansion anchor bolts in areas inaccessible during normal operation been inspected in accordance with the requirements of IE Bulletin 79-02?

A. Yes - All concrete expansion anchor bolts in areas inaccessible during normal operation have been inspected in accordance with the requirements of IE 79-02.

Q6(b) For those supports for which the reanalysis conducted under IE Bulletin 79-07 indicated a higher load than the original design load, were the flexibility concerns specified in IE Bulletin 79-02 considered in the reanalysis of the support?

A. Yes.

Q7 For the recirculation system piping stress ratios given in the BECo/NRC meeting of May 18, 1979 for the pump outlet Loop A node, why is the "PISYS" SSE stress ratio higher than the corresponding "DAPS" ratio when this relationship is reversed for the OBE conditions.

A. This difference is attributed to a clerical error. The ratios for that table should have read:

Upset Stress Ratio		Emergency Stress Ratios	
DAPS	PISYS	DAPS	PISYS
.624	.653	.45	.464

As we attempted to communicate in the May 18, 1979 meeting, the stress ratios given at that time were based upon checked but not verified calculations. The verification processes have since identified some errors in the previous analyses. All errors have since been corrected and all lines reanalyzed. This will result in stress ratios somewhat different than those presented on 5/18. All stresses from the latest analyses are also within code allowable. Final verification is in process and startup will be predicated on satisfactory completion of this process. In addition, the emergency (SSE) stress ratios and loads given in the May 18, 1979 meeting were based upon conservatively ratioing the OBE seismic loads by 1.875 (0.15g/0.08g) to obtain SSE seismic loads. The final calculations will be based upon response spectrum with a damping factor of 1% for the SSE and 0.5% for the OBE as allowed by Section 12.2.3.6 of the PNPS FSAR. The conservative ratioing technique was used in the May 18, 1979 meeting to provide a more appropriate comparison between the original "DAPS" results and the results of the reanalysis.

Q8 Based upon information presented in the May 18, 1979 meeting, the stress ratios for the PISYS calculations are generally lower than the DAPS calculation whereas the snubber loads for the PISYS calculations are generally higher than for the DAPS calculation. Please explain this.

A. The original DAPS model used about seventy lumped masses whereas the PISYS model used over two hundred masses to model the system. If the piping system could be compared to a simple supported beam modeled with one lumped mass at the center, the single lumped mass model would predict higher stresses than the same beam with a more uniformly distributed mass. Both beams would have similar support loads. This could explain some of the reduction in stresses relative to support loads.

Furthermore, the PISYS model included snubbers with stiffnesses based on vendor snubber tests. These stiffnesses were higher than those used in the original model. The revised stiffnesses could have resulted in mode shape changes that account for a redistribution of stresses and support loads.

Q9 Please provide BECo's plan that provides assurance that, for the reanalyzed lines, the model used in the computer codes represents the way the plant exists today, i.e. the "as built" configuration.

A. BECo's plan to assure itself that the model used in the computer codes represents the as built plant was based on making certain representative field verifications and gaining confidence as to the congruence of the as built and computer model based on the results of these tests. One of those tests consisted of visual inspection of the general location and orientation of snubbers and hangers in the reanalyzed portion of the main steam system and recirculation system. The visual inspection of the orientation included (a) determining the existence of the snubber or hanger (b) determining the general orientation of the snubber or hanger (i.e. vertical or horizontal, a 90° or 45° angle from the pipe axis, etc.) and (c) a general orientation of snubber location (i.e. near pump suction elbow, near ring header, etc.) This visual inspection was conducted for all recirculation and main steam system snubbers and hangers.

Another test included taking dimensional measurements of key dimensions in the recirculation systems. Measurements of typical riser length, recirc pump discharge line length and certerline location of the recirculation pump were made. A third test was made by cross checking valve weights used in the model versus the manufacturer's drawings. (Note: No Velan swing check valves are located in any of the reanalyzed systems.)

Based on the results of these tests Boston Edison has gained enough assurance that it believes that the remaining documents (drawings, specs., etc) used to generate the model used in the computer codes represents the as built configuration of the plant.