

February 14, 1991

Docket No. 50-219

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Mr. John J. Barton, Director  
Oyster Creek Nuclear Generating Station  
P. O. Box 388  
Forked River, New Jersey 08731

Dear Mr. Barton:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION ON OYSTER CREEK DRYWELL  
STRESS AND STABILITY ANALYSIS (TAC NO. 79166)

The staff has reviewed the GE reports Index No. 9-1 and 9-2, "An ASME Section VII Evaluation of the Oyster Creek Drywell Stress and Stability Analysis" and our comments and request for additional information are contained in the enclosure.

We request that the information be provided within 30 days of receipt of this letter. If you have any questions regarding this request, please contact me.

The requirements of this letter affect fewer than 10 respondents and therefore, are not subject to Office of Management and Budget review under P.L. 97-511.

Sincerely,

*151*

Alexander W. Dromerick, Senior Project Manager  
Project Directorate 1-4  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Enclosure:  
As stated

cc w/enclosure:  
See next page

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Mr. J. J. Barton  
Oyster Creek Nuclear Generating Station

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cc:

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**PART I - Stress Analysis**

1. Page 2-3, first paragraph

Reference is made to Table 2-1 which shows the 95 percent confidence thickness values in the locally corroded areas of the drywell. The basis and method of calculating these projected thicknesses should be explained. Furthermore, the anticipated date for reaching these projected thicknesses should be specified.

2. Page 2-5, first paragraph

The last sentence states that "given a design which satisfies the general code intent, as the Oyster Creek drywell does as originally constructed, it is not a violation of Subsection NE requirements for the membrane stress to be between  $1.0S_{mc}$  and  $1.1S_{mc}$  over significant distances." Further justification for the licensee's position should be provided. Under what conditions would this become a code violation? In other words, at what point does the "local" region become a "general membrane" region? Has the opinion of the Code Committee been solicited regarding this matter? If reference is to be made to Code Case N-480, the specific portions of the Code Case as it applies to the Oyster Creek drywell situation should be fully explained.

3. Page 5-2, Section 5.4

This section states that "the membrane stresses for the degraded thickness condition were obtained by scaling upwards the calculated stresses for the nominal thickness case (Table 5-2) by the thickness ratio." It should also be explained how the primary membrane plus bending stresses shown in Table 5-3 were obtained. It appears that the combined stress was scaled upwards linearly by the thickness ratio. However, the bending portion of the stress should be scaled by the square of the thickness ratio. Also, the effect of stress concentrations due to the change of thickness should be addressed.

4. Appendix A, page 21, second paragraph

The last sentence states that "impact testing would not be required by the present code rules unless the LST (lowest metal service temperature) were less than 30°F, and the Oyster

Creek drywell material would not require impact testing." Earlier in this section it is stated that an LST of 30°F was used for the Oyster Creek design basis. Is the LST for the drywell monitored by any plant operating procedures or the Technical Specifications? Have studies and plant operating history demonstrated that the drywell shell temperature is not expected to be lower than 30°F for all loading conditions?

5. Appendix F, page 1, first paragraph

What is the basis for performing the sand sensitivity study with a nominal sand stiffness of 366 psi/inch and a sand stiffness of 80 percent of the nominal value? Were studies and/or tests performed to support these assumptions? Otherwise, the sensitivity study should be conducted further with lower stiffness values. The licensee's letter of December 5, 1990 indicates that structural calculations assuming the sand removed would be completed by December 31, 1990. The results of these studies should be provided to demonstrate the sensitivity of the stresses to the assumed sand stiffness.

#### PART 2 - Stability Analysis

6. Page 2-3, Section 2.3

This section states that the method described in Reference 2-5 was used to quantify the effect that the orthogonal tensile stress has on reducing the effect of imperfections on the buckling strength. The sensitivity of the results should be studied by using other methods which also address this effect.

7. Page 2-4, Section 2.4

This section states that Reference 2-6 was used to calculate the plasticity reduction factor for the meridional direction elastic buckling stress. Since this approach apparently has not been incorporated into Code Case N-284, the sensitivity of the results should be studied by using other methods which address this effect.

8. Page 3-3, second paragraph

For the stability analysis the stiffness for the sandbed was assumed to be 366 psi/inch and no sensitivity studies are reported. As described in Question 5, the results of the stability analysis with the sand removed should be provided.

9. Page 3-6, Section 3.5.3

The first sentence states that "the 2 psi external pressure load for the refueling case is applied to the external faces of all of the drywell and vent shell elements." Unless it can be demonstrated that this pressure actually is present at all times during normal operation and refueling, the effect on the buckling analysis results of assuming no external pressure for these two load cases should be reported. Furthermore, is it possible to have an external pressure greater than 2 psi on the drywell shell? If so, an enveloping pressure case should be considered in the analysis.

PART 3 - General

10. Justification for the use of ASME Section III, Subsection NE has been provided to evaluate the Oyster Creek Steel drywell, taking into consideration DESIGN, material's, fabrication inspection and testing with exception of the comments indicated above, the justification appears to be reasonable. Since the present-day quality assurance and quality control requirements for the design and construction of nuclear power were in the formative stage at the time when the Oyster Creek Plant was designed and constructed, indicate what quality assurance and quality control programs were implemented for the Oyster Creek drywell. Indicate if documentation of the programs is available.
11. In GPU's presentation to the staff in September, 1990, it was indicated that GPU would have an on-line thickness measurement capability in the critical areas of thickness measurement. GPU has a current commitment to make UT measurements at outages of opportunity. State clearly what on-line thickness measurement program GPU will have during the fuel cycle starting in early 1991.