

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:  
E. Roy Hawkens, Chair  
Dr. Paul B. Abramson  
Dr. Anthony J. Baratta**

In the Matter of:	)	
	)	September 14, 2007
AmerGen Energy Company, LLC	)	
(License Renewal for Oyster Creek Nuclear	)	Docket No. 50-219
Generating Station)	)	
	)	
	)	

**AMERGEN'S PRE-FILED SURREBUTTAL TESTIMONY  
PART 2  
ACCEPTANCE CRITERIA**

**I. WITNESS BACKGROUND**

Q. 1: Please state your names and current titles. The Board knows that a description of your current responsibilities, background and professional experience was provided in Parts 1 and 2 of AmerGen's Pre-Filed Direct Testimony on July 20, 2007, and in Part 2 of AmerGen's Pre-Filed Rebuttal Testimony on August 17, 2007, so there is no need for you to repeat that information here.

A. 1: (MPG) My name is Michael P. Gallagher, and I am Vice President of License Renewal for Exelon.

(PT) My name is Peter Tamburro, and I am a Senior Mechanical Engineer in the Engineering Department at the Oyster Creek Nuclear Generating Station (“OCNGS”).

(AO) My name is Ahmed Ouaou, and I am a registered Professional Engineer specializing in civil structural design. I am an independent contractor.

Q. 2: Would you please summarize the purpose of your testimony?

A. 2: (All) The purpose of our testimony is to address the Atomic Safety and Licensing Board’s (“Board”) questions asked during the September 5, 2007 pre-hearing conference call regarding the established drywell shell thickness acceptance criteria for the sand bed region.

## **II. RESPONSE TO BOARD QUESTIONS**

Q. 3: Where can the Board find documentation that the three acceptance criteria—general and local buckling criteria, and the pressure criteria—are part of the CLB?

A. 3: (All). In general, the CLB as defined in 10 C.F.R. § 54.3 includes NRC approvals as well as design basis information contained in a plant’s Updated Final Safety Analysis Report (“UFSAR”). The general buckling criterion (uniform thickness of 0.736”) is part of the CLB as documented in the NRC’s approval of this criterion in the April 1992 NRC Safety Evaluation attached as Applicant’s Exhibit 37.

The local buckling criterion (0.536” in the tray configuration described in Part 2 of AmerGen’s Direct Testimony and as shown in Applicant’s Exhibit 11) and the pressure criterion (0.490” over circular areas of diameters up to 2.5”) are part of the CLB as documented in the design basis information contained in the

OCNGS UFSAR. Relevant pages of the UFSAR are attached as Applicant's Exhibit 38. The Table of Contents to the UFSAR shows that Section 3.8 addresses the "DESIGN OF CATEGORY I STRUCTURES." Section 3.8.2.1 discusses the drywell shell as part of the containment, which is a Category I structure. Section 3.8.2.4.1, discusses the "Drywell." Section 3.8.2.5, entitled "Structural Acceptance Criteria" states, with italics added for emphasis:

The Structural Acceptance Criteria relating the design and analysis results for the loads and load combinations given in Subsection 3.8.2.3 to the allowables, is presented in Subsection 3.8.2.4 and other referenced documents. The Basic Design phase of the Containment System is given in Subsection 3.8.2.4 *and the references listed in Subsection 3.8.6. These reference documents must be addressed to obtain complete information.*

It is clear, therefore, that the references in Section 3.8.6 provide the detailed information about the CLB acceptance criteria. Section 3.8.2.8, entitled "Drywell Corrosion" states:

During 14R, UT measurements were taken from the outside of the drywell vessel in the sand bed region. Measurements were taken in each of the ten sand bed bays. The results of the inspection and the structural evaluation of the "as found" condition of the vessel is contained in Reference 44 [TDR-1108]. As documented in the TDR, the vessel was evaluated to conform to ASME code requirements given the deteriorated thickness condition."

Reference 44 is listed in Section 3.8.6 as the "GPUN Technical Data Report TDR-1108, 'Summary Report of Corrective Action Taken from Operating Cycle 12 through 14R', April 28, 1993", which is Applicant's Exhibit 27 ("TDR-1108"). Page 17 of TDR-1108 states:

Acceptance Criteria – Local Wall:

If the thickness for the evaluation is less than 0.736 inches, then the use of specific GE studies is employed (Ref. 2.21). These studies contain analyses of the drywell using the pie slice finite element model, reducing the thickness by 0.200 inches in an area 12 x 12 inches in the sand bed region, tapering to original thickness over an additional 12 inches, located to result in the largest reduction possible. This location is selected at the point of maximum deflection of the eigen-vector shape associated with the lowest buckling load. The theoretical buckling load was reduced by 9.5 % from 6.41 to 5.56. Also, the surrounding areas of thickness greater than 0.736 inches is [*sic*] used to adjust the actual buckling values appropriately. Details are provided in the body of the calculation.

Note that the TDR's discussion of the local "wall" criterion includes only GE's modeling of 0.536" in the tray configuration as shown in Applicant's Exhibit 11. It does not include any other thickness or configuration.

As the quote above shows, the TDR identifies "(Ref. 2.21)" as the basis of its local buckling criterion. Reference 2.21, listed on page 5 of the TDR, is the "GE Letter Report, "Sandbed Local Thinning and Raising the Fixity Height Analyses (line Items 1 and 2 in Contract # PC-0391407)", dated December 11, 1992." This Letter Report contains GE's analysis of 0.536" in the tray configuration. It is attached as Applicant's Exhibit 39.

Page 18 of TDR-1108 discusses the pressure criterion, establishing the "required minimum thickness" for "Very Local Wall (2½ Inch Diameter)" to be 0.490".

In A.16 of AmerGen's Direct Testimony, we provided references for the Board to find how the CLB is carried through for License Renewal.

Q. 4: Is there another document that explains the technical basis for the established acceptance criteria and describes the modeling of the drywell used in the GE analyses upon which the acceptance criteria were established in the 1990s?

A. 4: (All) Yes. The presentations AmerGen provided to the Advisory Committee on Reactor Safeguards (“ACRS”) License Renewal Subcommittee on January 18, 2007, and the full ACRS on February 1, 2007 are attached as Applicant’s Exhibits 40 and 41. Slides 15 through 35 from the January 18 meeting describe the modeling of the drywell and buckling analysis in GE’s December 11, 1992 Letter Report (Applicant’s Exhibit 39). Slides 36 through 45 of Applicant’s Exhibit 40 summarize General Electric’s ASME Section VIII Stress Analysis. Similar information is also summarized in Applicant’s Exhibit 3, beginning on page 6-7.

Applicant’s Exhibits 40 and 41 [ACRS Presentations] also contain information regarding the drywell physical structure, the causes of historical corrosion in the sand bed region, the actions taken to arrest corrosion, and the actions taken to verify that corrosion has been arrested.

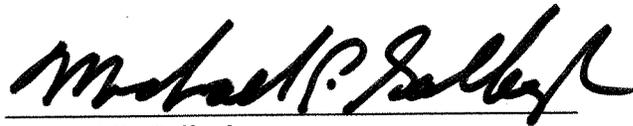
Q. 5: Do you have anything else to add?

A. 5: (MPG, PT) Yes. In our Direct Testimony, A.8, we stated that, with respect to the design and function of the drywell, “AmerGen complies with the [General Design Criteria] by meeting the applicable ASME Boiler and Pressure Vessel Code, standards, and specifications.” The relevant portion of ASME Code Section III is attached as Applicant’s Exhibit 42.

Q. 6: Does this conclude your testimony?

A. 6: (All) Yes.

In accordance with 28 U.S.C. § 1746, I state under penalty of perjury that the foregoing is true and correct:



Michael P. Gallagher

9-12-07

Date

\_\_\_\_\_  
Peter Tamburro

\_\_\_\_\_  
Date



Ahmed Ouaou

9/12/07

Date

In accordance with 28 U.S.C. § 1746, I state under penalty of perjury that the foregoing is true and correct:

\_\_\_\_\_  
Michael P. Gallagher

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Date

  
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Peter Tamburro

  
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Date

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Ahmed Ouaou

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